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OIL DEPENDENCE OF POST-SOVIET COUNTRIES IN THE CASPIAN SEA REGION: THE CASE OF AZERBAIJAN AND KAZAKHSTAN

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ABSTRACT

The aim of the research is to present oil dependence of Azerbaijan and Kazakhstan from 2000 till 2017. The analysed countries represent two former Soviet Union countries in the Caspian Sea region and are among the world's top 15 oil dependent economies. It is shown that both countries generate high oil rents to GDP ratios. Moreover, the paper reveals that their fuels export constitutes a huge portion of total merchandise export. It implies that majority of Azerbaijani and Kazakhstani export revenues come from resources extraction. The empirical analysis of co-movements between the crude oil prices and chosen macroeconomic indicators shows that correlation between oil prices and Kazakhstani and Azerbaijani public debt to GDP ratios is negative, strong and significant. In addition, there is significant relationship between oil prices and Kazakhstani exchange rate and GDP growth rate.

Key words: crude oil, natural resource dependence, natural resource curse, real effective exchange rate, economic growth, Caspian Sea region

INTRODUCTION

Oil is a natural and non-renewable resource with crucial and significant implications for the real economy and financial markets. Oil reserves are not evenly distributed around the world. Some countries are rich with oil production while some produce none. More than 90% of known oil reserves are located in 15 countries [Dülger et al. 2013]. Oil abundance may generate many positive opportunities for economic development. However, many researchers point out that oil-rich economies tend to develop slower than resource-poor ones. The phenomenon is called in literature as natural resource curse. Vast majority of studies show that more specific resource curse is attributed to heavily natural resource dependent economies [Badeeb et al. 2017]. Therefore, the measurement of country's natural resource dependence constitutes an important part in an analysis of the phenomenon. The paper is focused on country's oil dependence's measures and country's sensitivity to oil price changes.

The aim of the paper is to demonstrate oil dependence of Azerbaijan and Kazakhstan, two post-Soviet countries from the Caspian Sea region. It should be stressed that the region is one of the oldest oil-producing areas in the world. The coastlines of the Caspian Sea is shared by Kazakhstan, Russia, Azerbaijan, Iran and Turkmenistan. The paper concentrates on Azerbaijan and Kazakhstan. It results from the fact that they represent those post-Soviet countries in the Caspian Sea region that are among the world's top 15 oil dependent countries (taking into account the 2016 oil rents as a share of gross domestic product ratio).

The paper is organised as follows. Section 2 contains literature review concerning natural resource dependence issue. Section 3 is focused on methods and

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data applied in the study. Section 4 presents oil dependence of Kazakhstani and Azerbaijani economies. The chosen measures of the countries' oil dependence are calculated and presented. Moreover, the relation between oil prices and Kazakhstani and Azerbaijani nominal and real exchange rates, economic growth and public debt is analysed and discussed. Section 5 summarizes and concludes.

LITERATURE REVIEW

Natural resource dependence may be defined as a degree to which a country economic performance is determined by resource revenues. The literature provides several different ways to measure country's natural resource dependence. The natural resources export as a share of gross domestic product (GDP) and the ratio of natural resources export relative to total export are among the most popular ones [Badeeb et al. 2017]. The International Monetary Fund (IMF) measures a natural resource dependence as an average resource revenues related to total revenues generated over multiple years. This fund claims that country is resource dependent when this measure is greater than 25% [Barma et al. 2012]. Stevens and Dietsche [2008] suggest that natural resource dependent are the countries, whose merchandise export of fuels and minerals exceeds 30% of total export. They study data covering the period from 1965 till 1995 and identify 54 countries that could be classified as natural resource dependent.

The issue of natural resource dependence is related to the resource curse phenomenon. The resource curse paradox pictures the situation when natural resource-rich countries experience slower growth rate than countries with fewer natural resources [Gelb 1988, Auty 1993, Gylfason et al. 1999, Sachs and Warner 1999]. It is believed that a more specific natural resource curse phenomenon is attributed to countries whose economies are significantly reliant on the natural resources' production. Sachs and Warner [1995], Leite and Weidmann [1999], Auty [2001], Manzano and Rigobon [2001], among other, demonstrate that the share of resource rents in GDP is negatively correlated with the GDP per capita growth rate and confirm that resource dependence may lead to negative development of resource-rich country. Mehrara [2008] also studies oil dependence based on data of oil revenues. He shows that positive oil revenues shocks have a short-term positive and significant impact on economic growth. In addition, Mehrara [2008] reveals that negative oil revenues shocks have negative, significant and, in comparison to positive shocks, over twice larger impact on GDP growth rate. Thus, the overall influence of oil revenues shocks on country's economic growth is very often negative and is associated with natural resource curse. Mehrara [2009] studies a non-linear link between change in oil dependence measured by oil revenues and growth rate of GDP. He shows that there are some adverse effects on output that come out when growth in oil revenues exceeds the threshold level of 18–19%.

Natural resource dependence is very often defined based on the values of country's natural resources export. Daniele [2011] estimates country resource dependence as a share of ores and fuels in total merchandise export. Blanco and Grier [2012] applies a ratio of total export of primary commodities to GDP. Arezki and Van der Ploeg [2011] measure natural resource dependence based on natural resource export and GDP. They show that there is a direct negative effect of natural resource dependence on country's income per capita. It is worth emphasizing that the ratio of resource export to GDP is applied interchangeably in literature as a proxy for both natural resource dependence and natural resource abundance, while it is an appropriate measure only for natural resource dependence [Brunnschweiler and Bulte 2008].

MATERIAL AND METHODS

The paper applies rents from oil over GDP ratio and share of fuels export in total merchandise export for measuring country's oil dependence. Oil rents are evaluated as the difference between the value of crude oil production and total cost of production. An oil rents annual data come from the World Bank database and cover the period from 2000 till 2016. Annual data on merchandise export come from the World Trade Organisation and the World Bank, and cover the period from 2000 till 2017. Merchandise export reflects the country's value of goods provided to the rest of the world. In the paper merchandise export is divided into

five categories according to the Standard International Trade Classification (SITC):

I. Fuels correspond to the commodities in SITC section 3 (mineral fuels),
II. Ores and metals embrace SITC section 2 division 27 (crude fertilizers and minerals excluding coal, petroleum and precious stones, division 28 (metalliferous ores and scrap) and section 6 division 68 (nonferrous metals),
III. Manufactures comprise commodities in SITC section 5 (chemicals), section 6 (basic manufactures), section 7 (machinery and transport equipment), section 8 (miscellaneous manufactured goods),
IV. Food and agricultural raw materials correspond to commodities in SITC section 0 (food and live animals), section 1 (beverages and tobacco), section 2 (crude materials except fuels) excluding divisions 27 and 28, section 4 (animal and vegetable oils and fats),
V. Others include all commodities that were not included in above categories.

Additionally, the study employs Pearsons's and Spearman's rank correlation coefficients and corresponding significance tests in order to measure the relationship between crude oil price changes and country's exchange rates, GDP and public debt. Spot exchange rates of Kazakhstan Tenge to US dollar (USD/KZT) and Azerbaijani manat to US dollar (USD/AZM) are applied as country's official, nominal exchange rates. Annual data of nominal exchange rates come from Reuters Datastream. Moreover, the study is carried out based on real effective exchange rates (REER) for Azerbaijan and Kazakhstan. Annual REER indicators are calculated according to the methodology described by Darvas [2012]. Data are obtained from Bruegel. Annual real values of GDP and public debt come from World Bank database and Reuters Datastream. All macroeconomic data, apart from public debt in Kazakhstan, cover the period from 2000 till 2017 and come from World Bank database. Due to data limitations, Kazakhstani public debt data span from 2002 to 2017.

The study uses crude oil prices' daily and annual data from January 2000 to December 2017. Crude oil prices data are obtained from Reuters Datastream.

OIL DEPENDENCE OF AZERBAIJAN AND KAZAKHSTAN

Oil is one of the most important energy sources in the world. Figure 1 presents the volatility of daily crude oil prices in the period from January 2000 to December 2017. Oil prices have recorded large increases between January 2007 and July 2008, and between January 2009 and May 2011. In the period 2011–2014, oil prices maintained at a high level. The situation changed rapidly in 2014. Between August 2014 and

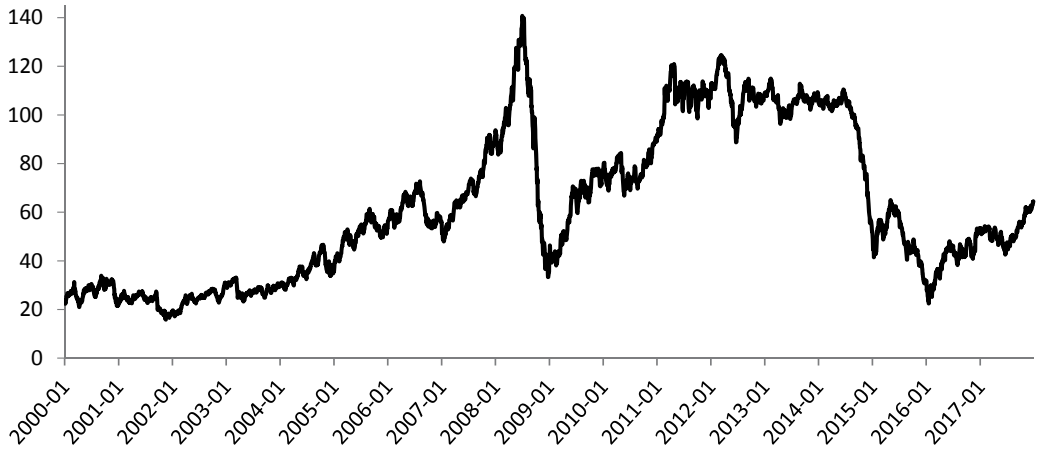

Fig. 1. Daily crude oil prices from January 2000 till December 2017 (USD/bbl)

Source: Own elaboration based on data from Reuters Datastream.

January 2016 oil prices plunged more than 75%. Oil exporters encountered many challenges after the 2014 oil price collapse. It led to broad-based and negative effects on their economies. Most of them experienced a sharp fall in private consumption and investment. Nearly 70% of oil-exporting emerging markets and developing countries registered significant decline in GDP growth rate [World Bank Report 2018].

The collapse in oil prices that started in 2014 put the issue of country income sources' diversification at the forefront of the policy debate. Many oil exporters decided to reduce their oil dependency by diversification of their economies. It is worth emphasizing that most of the negative effects of oil price decline concern primary countries that highly depend on oil income. The paper is focused on Azerbaijan and Kazakhstan, the economies that represent the former Soviet Union states of Caspian Sea region and are among the world's top 15 oil dependent countries.

Among the most frequently proposed indicators of country's natural resource dependence are rents from natural resources over GDP and share of natural resources export in total export ratios. Figure 2 depicts total natural resources rents as a share of GDP ratios in Azerbaijan and Kazakhstan, in the period from 2000 till 2016. The measure is based on resource revenues. It should be stressed that resource revenues are highly volatile. The variability that results from opening new deposits or closing a depleted ones is easier to predict. However, immense part of resource revenues' variability is hardly predictable and generated mainly by the volatility of commodity prices [Venables 2016]. The World Bank measure of resource rents to GDP illustrates high volatility of natural resources revenues (Fig. 2). The natural resource rents to GDP ratio has fluctuated between 30.84 and 38.28% in 2008 to 13.35 and 10.30% in 2015, in Azerbaijan and Kazakhstan respectively. Oil rents to GDP ratio has also highly fluctuated between 2000 and 2016. It concerns both Azerbaijan and Kazakhstan.

Figure 2 shows that Azerbaijani and Kazakhstani oil rents constitute a large portion of natural resources rents. Moreover, Figure 2 depicts a few spikes that have been observed in oil rents to GDP ratios. The Azerbaijani ratio reached a record high level of 41.81% in 2006. The highest level of oil rents to Kazakhstani GDP was observed in 2005, when the ratio hit the maximum level of almost 26%. It is worth emphasizing that taking into account the 2016 oil rents as a share of GDP ratio Azerbaijan and Kazakhstan are among top 15 world's oil dependent economies.

Resource dependence should express the degree to which country has access to alternative sources of income other than resource extraction. Figures 3 and 4

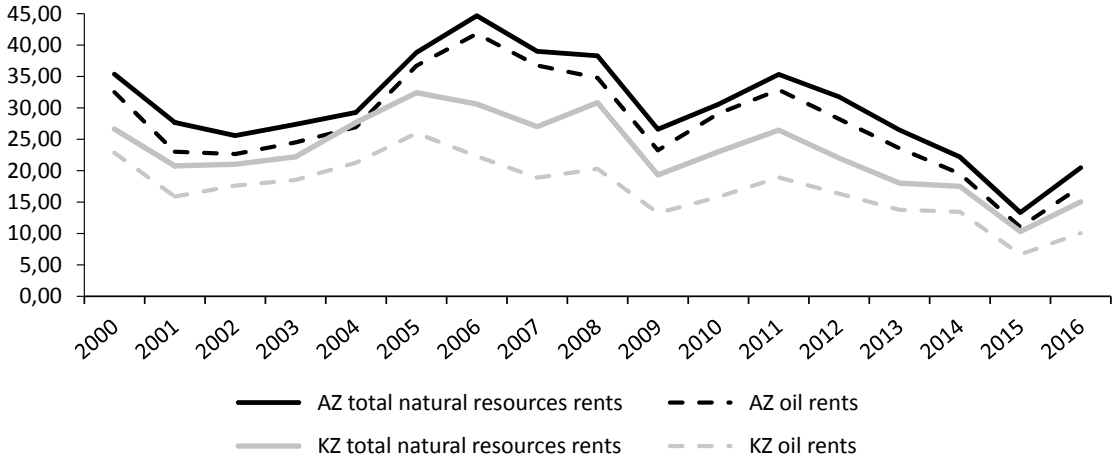

Fig. 2. Total natural resources rents (% of GDP) and oil rents (% of GDP) in Azerbaijan (AZ) and Kazakhstan (KZ) from 2000 till 2016

Source: Own elaboration based on data from World Bank.

present structure of merchandise export in Azerbaijan and Kazakhstan respectively.

Fuels export constitutes a large portion of the whole merchandise export in Azerbaijan and Kazakhstan. The average 2000–2017 fuels export as a share to merchandise export ratio equals 88.85 and 66.82% in Azerbaijan and Kazakhstan respectively. In Kazakhstan ores and metals, and manufactures exports accounts for, in average, around 30% of total merchandise export, while in Azerbaijan it is only 6%. Both in Azerbaijan and Kazakhstan export of food and agricultural raw materials accounts for around 5% of total merchandise export. Taking into account fuels to merchandise export ratio, Azerbaijan seems to be more oil-dependent economies than Kazakhstan.

The results presented in Figures 2–4 show that both Kazakhstan and Azerbaijan should be considered as highly oil dependent countries. The table presents empirical analysis of co-movements between the crude oil prices and chosen macroeconomic indicators for Azerbaijan and Kazakhstan. It should be stressed that measuring correlation

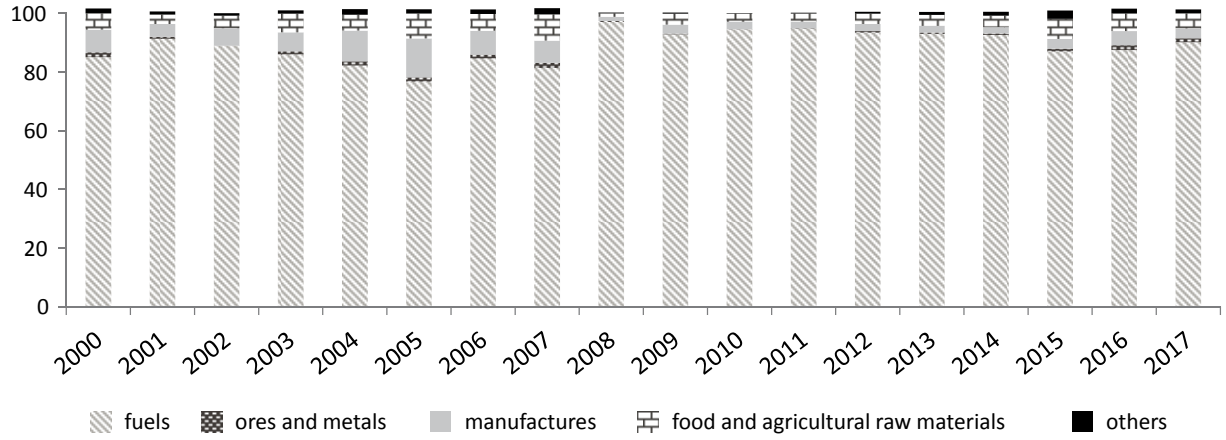

Fig. 3. Structure of merchandise export in Azerbaijan

Source: Own elaboration based on data from World Trade Organisation and World Bank.

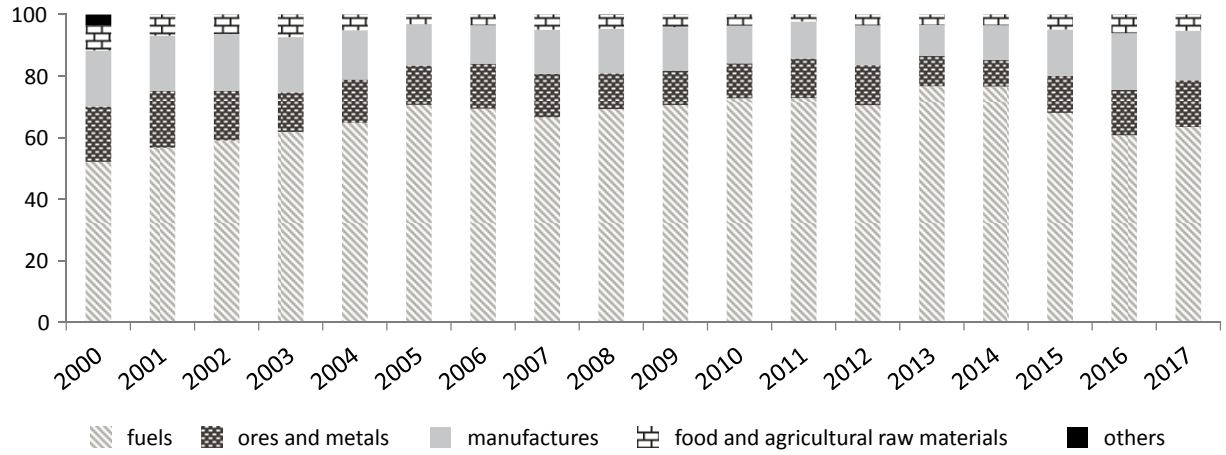

Fig. 4. Structure of merchandise export in Kazakhstan

Source: Own elaboration based on data from World Trade Organisation and World Bank.

between two or more variables requires knowledge of their joint distribution. When the joint distribution is normal the Pearson correlation coefficient is applied. However, when the joint distribution is not normal, the relationship between chosen variables is calculated based on Spearman's rank correlation coefficient. Estimation of correlation coefficients requires variables to be stationary. The augmented Dickey–Fuller (ADF) test points that the first difference of all applied data does not have the unit root. Thus, all data are expressed as a first difference of their logarithm value. The table summarizes correlation estimates between oil prices and spot nominal exchange rates (Azerbaijani manat to US dollar USD/AZM, Kazahstani tenge to US dollar USD/KZT), real effective exchange rates of Azerbaijan (AZ_REER) and Kazakhstan (KZ_REER), growth rates of GDP in Azerbaijan (AZ_GDP) and Kazakhstan (KZ_GDP), ratio of public debt to GDP in Azerbaijan (AZ_Debt to GDP) and Kazakhstan (KZ_Debt to GDP).

The normality of joint distribution of analysed variables is tested based on Shapiro–Wilk test. The table presents Shapiro–Wilk test statistics and corresponding *p*-values. The null hypothesis of normality is rejected for all variables apart from joint distribution of oil and AZ_GDP, oil and KZ_GDP, oil and AZ_Debt to GDP, where estimated *p*-values are higher than 0.05 level of significance.

The table shows that estimated Spearman's rank correlation coefficients between oil prices and spot nominal exchange rates USD/AZM and USD/KZT are negative. It implies that Kazakhstani and Azerbaijani currencies appreciate against US dollar when oil prices increases. The correlation is strong and significant at 5% level of significance for crude oil and USD/KZT exchange rate. The estimated correlations coefficients for real effective exchange rates (REER) confirm above results. Real effective exchange rates measures the development of real value of a country's currency against the basket of the trading partners of the country. Results presented in the table suggests that when oil prices are surging, real effective exchange rates are increasing. It concerns both analyzed countries. The relationship between oil prices and exchange rates is well established by the early papers of Golub [1983] and Krugman [1983]. They find that oil exporting country may experience home currency's appreciation when oil prices increase, and depreciation when oil prices fall. Lizardo and Mollick [2010] confirm that a rise in oil prices leads to a significant appreciation of the currency of oil exporting countries such as Canada, Mexico and Russia. Turhan et al. [2014] reveal that

Table. Correlation coefficients between oil prices and selected macroeconomic indicators of Azerbaijan and Kazakhstan in the period from 2000 till 2017

Variable	Number of observations	Shapiro–Wilk test statistic results	*p*	Correlation coefficient	*p*
USD/AZM	18	0.73	< 0.001	–0.29[S]	0.246
USD/KZT	18	0.79	0.001	–0.59[S]	0.012
AZ_REER	18	0.84	0.006	0.25[S]	0.306
KZ_REER	18	0.79	0.001	0.47[S]	0.051
AZ_GDP	18	0.93	0.218	0.32[P]	0.191
KZ_GDP	18	0.95	0.358	0.54[P]	0.020
AZ_Debt to GDP	18	0.86	0.102	–0.78[P]	< 0.001
KZ_Debt to GDP	15	0.87	0.039	–0.58[S]	0.026

[P] – Pearsons's correlation coefficient, [S] – Spearman's rank correlation coefficient

Source: Own calculation based on data from World Bank and Reuters Datastream.

the link between oil prices and exchange rates has intensified in the period between 2000–2013. It is worth emphasizing that stronger home currency makes the country's export of other goods in a tradable manufacturing and agricultural sector less competitive. It hampers the overall growth of non-resource tradable sector and may lead to natural resource curse.

The table reports the estimated correlations coefficients between oil prices and growth rate of Azerbaijani and Kazakhstani GDP. Pearson correlation coefficients are positive. It implies that oil price increase is associated with higher growth rate of GDP. However, a decline in oil prices hampers economic growth. The results are significant at 0.05 significance level only for Kazakhstan. Positive relationship between oil prices and GDP growth rate is generally specific to oil-dependent economies. Mork et al. [1994] study the link between oil-price movements and GDP fluctuations. They suggest that the correlation coefficient between those two variables is positive for countries where oil-producing sector constitutes a considerable and large portion of country's income.

Moreover, the results presented in the table reveal strong, negative and significant relationship between oil prices and public debt to GDP ratios both for Azerbaijan and Kazakhstan. It may suggest that oil prices' fall leads to the increase of public debt in oil-dependent economies. However, it needs to be emphasized that during the decline of oil prices, the oil-rich country's GDP is expected to decrease, an increase of public debt to GDP ratio is, therefore, driven by both increase of public debt and decrease of GDP. Nevertheless, it altogether shows that the oil prices' decline has negative impact on economic performance of oil-dependent countries such as Azerbaijan and Kazakhstan.

SUMMARY

The paper shows that both Azerbaijan and Kazakhstan generate high oil rents to GDP ratios. The Azerbaijani ratio reached a record high level of 41.81% in 2006. The highest level of oil rents to Kazakhstani GDP was observed in 2005, when the ratio reached the maximum level of almost 26%. Moreover, the paper reveals that fuels export constitutes a huge portion of total Kazakhstani and Azerbaijani merchandise export. The average 2000–2017 fuels as a share to merchandise export ratio equals 88.85 and 66.82% in Azerbaijan and Kazakhstan respectively. It implies that majority of the countries' export revenues come from fuels extraction.

The empirical analysis of co-movements between the crude oil prices and chosen macroeconomic indicators shows that correlation between oil prices volatility and Kazakhstani and Azerbaijani public debt to GDP ratio is negative, strong and significant. Moreover, it has been shown that Kazakhstani and Azerbaijani currencies appreciate against US dollar when oil prices increases. However, the correlation is strong and significant at 5% level of significance only for Kazakhstan. In addition, the study reveals positive relationship between oil prices and GDP growth rate. The oil price increase is associated with higher growth rate of GDP. A decline in oil prices, on the other hand, hampers economic growth. The results are significant at 0.05 significance level only for Kazakhstan.

Economies highly dependent on natural resources are more sensitive to commodities' price changes and are more likely to suffer from natural resource curse. The research findings are important from the view of development of country's income sources diversification.

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UZALEŻNIENIE ROZWOJU GOSPODARCZEGO BYŁYCH REPUBLIK ZWIĄZKU RADZIECKIEGO W REGIONIE MORZA KASPIJSKIEGO OD WYDOBYCIA ROPY NAFTOWEJ NA PRZYKŁADZIE AZERBEJDŻANU I KAZACHSTANU

STRESZCZENIE

Celem artykułu jest przedstawienie uzależnienia rozwoju gospodarczego Azerbejdżanu i Kazachstanu od branży wydobywczej w latach 2000–2017. Omawiane państwa, byłe republiki Związku Radzieckiego w basenie Morza Kaspijskiego, znajdują się wśród 15 najbardziej uzależnionych od wydobycia ropy naftowej gospodarek. Wykazano, że w przypadku obu krajów zyski generowane z produkcji ropy naftowej stanowią dużą część ich produktu krajowego brutto. Dodatkowo pokazano, że całkowity eksport towarów obu państw opiera się głównie na eksporcie ropy i gazu ziemnego. W artykule zbadano zależność między ceną ropy a wybranymi wskaźnikami makroekonomicznymi Kazachstanu i Azerbejdżanu. Wykazano, że w przypadku obu krajów istnieje ujemna, silna i istotna statystycznie zależność między ceną ropy a wskaźnikiem długu publicznego względem PKB. Dodatkowo pokazano, że istnieje istotna statystycznie zależność między ceną ropy a kursem walutowym i wzrostem gospodarczym w Kazachstanie.

Słowa kluczowe: ropa naftowa, zależność państw od ropy naftowej, „klątwa surowcowa", realny efektywny kurs walutowy, wzrost gospodarczy, region Morza Kaspijskiego

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ORIGINAL PAPER

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ANIMAL WELFARE AS ONE OF THE CRITERION DETERMINING POLISH CONSUMERS' DECISIONS REGARDING THEIR PURCHASE OF MEAT

Barbara Gołębiewska , Monika Gębska ✉, Joanna Stefańczyk

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ABSTRACT

The aim of this study was to determine factors influencing consumer decisions on the purchase of meat and find out how important in making the decisions is the criterion of animal welfare. The study was based on reports and other publications of the European Commission, literature review, as well as field research carried out among consumers, using an interview questionnaire (the PAPI method). The purpose of the research was to analyse diversity of customer buying habits, depending on such variables as their age, education, place of residence (urban or rural area) and the level of income. The results of the χ^2 test prove that there are correlations between the education, place of residence and income of the respondents and their decisions to purchase meat from farms maintaining animal welfare. No correlations were found between the age of the respondents and their decisions to purchase meat from farms maintaining animal welfare. The findings also prove that less than 50% of the society of Poland has encountered the concept of animal welfare. The key criteria for decisions on the purchase of meat and meat products were the price and easy preparation.

Key words: animal welfare, consumer, meat

INTRODUCTION

Animal production plays a very important role in Polish agriculture. However, it is characterized by a somewhat difficult, specific nature, as it has to take into account the needs of farmers, as their source of income, and expectations of consumers as recipients of food products. In the recent years, consumer expectations have been changing, as societies of developed countries, under the influence of information campaigns of environment-friendly organisations and movements for animal rights protection, have become increasingly interested in the conditions of living of farm animals. For instance, studies conducted in Norway have shown that Norwegian consumers would like to get more opportunities to purchase products from animals kept under "friendly" conditions, at the same time indicating certain gaps in information campaigns dedicated to these products, underlining the need for simple information, such as "a simple welfare warranty sign" [Kjorstad 2006]. As it has been noted by Bougherara and Combris [2009], use of a similar sign for environment-friendly products had been increasing for a decade, achieving a global scale. Ongoing consumer pressure has led to introduction of numerous legal solutions, protecting animals against excessive exploitation.

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According to the Food and Agriculture Organization of the United Nations [FAO 2009], in year 2050, global agriculture will have to produce 50% more food in comparison with the recent years. At the same time, as a result of changing attitudes towards animals, consumer expectations will shape animal production by pressing it to meet the increasing demands with regard to animal welfare [Krupiński et al. 2011]. This translates directly to production conditions, which the farmers have to take into account when calculating profitability of their activity. With reference to the above, Krupiński et al. [2011] have proposed five directions of research development in the field of animal breeding and production for the coming decades. This includes one, considered to be particularly important in terms of animal production: "the possibility of quality shaping of resources and animal products with regard to consumer expectations". The global trend of increase in interest in animal welfare, as well as the increasingly restrictive standards of animal maintenance, have forced farmers (and this trend can be expected to intensify) to adapt their farms to the new standards, for instance, by investing in modernization of hen houses, construction of exercise areas, which is associated with additional costs. Farmers are able to gain some advantages thanks to improvement of quality of life of animals at their farms by selling products that are labelled as coming from farms that maintain a high level of animal welfare (such as eggs from free-range systems or meat produced using environment-friendly methods).

According to Kokocińska and Kaleta [2016], efforts are made to maximize production while maintaining animal welfare. In many cases, however, difficulties are encountered due to the conflict between economy and animal comfort and needs.

MATERIAL AND METHODS

Accurate determination of the level of animal welfare is difficult to evaluate, as such assessment is highly subjective. Nevertheless, certain measures have been developed, indicating the consequences of animal welfare or its insufficiency. These include animal health and physiological parameters, behaviour and production performance. Therefore, a very important role is played by scientific research aimed at determination of welfare level, indicating the direction for improvement of animal comfort. If animals are bred under the conditions of high level of welfare, this results, on the one hand, in lower costs – for instance, of veterinary care or breeding replacements – and, on the other hand, in better meat quality. The aim of the study is to determine factors that differentiate consumer decisions with regard to purchase of meat from farm animals maintained under conditions of welfare.

The study has been based on materials and reports of the European Commission, as well as a consumer survey conducted. The survey was performed using the PAPI method on a sample of 744 respondents, who purchased animal products. Sample selection was based on the criterion of animal product consumption (consumers, who do not eat – and thus do not purchase – animal products, were eliminated). The study was aimed at determination of changes in consumer choices, taking into account animal welfare, depending on age, place of residence, education and income level of respondents. As for income, due to the problematic nature of the question, income ranges were applied. These were (taking into account the average level of earnings in Poland) up to EUR 1,000, 1,001–2,000, 2,001–3,000, 3,001–5,000 and above 5,000. Two categories of place of residence were applied: urban and rural areas. Cities were classified according to number of inhabitants: up to 10,000, 10,000–100,000, 100,000–500,000 and above 500,000. Research was conducted using an interview questionnaire, containing closed questions (scaled questions). Respondents evaluated every issue in terms of significance of a given feature. The study focused mainly on consumer assessment of their willingness to purchase animal products from farms caring for animal welfare during production. The researchers focused on willingness to pay for meat from production in a system that ensures animal welfare. Knowledge of the term "animal welfare" among consumers was assessed, depending on their income level, education and place of residence. Attention was paid to the product selection criteria. The results were processed using the chi square independence test and C-Pearson's contingency coefficient.

RESULTS AND DISCUSSION

Productions methods, which are compliant with the welfare principles, differ from the generally applicable methods by focusing strongly on welfare of animals in their environment. In Europe, there is a developed legislative system dealing with the mode of treatment of farm animals. Transnational law regulates maintenance of animals in all Member States of the European Union [Blandford et al. 2002]. At present, the EU policy and legislation concerning animal welfare is exerting positive influence on the world, the image of the EU, as well as the issue of helping animals [European Parliament 2017].

Nevertheless, it cannot be stated that the problem is entirely unknown on other continents. Studies and analyses have been conducted in many other parts of the world, including China [You et al. 2014], North America [Ventura et al. 2016], Australia [Erian and Phillips 2017], where social knowledge on maintenance of welfare in poultry production has been studied, as well as in Chile [Schnettler et al. 2008], Canada [Spooner et al. 2014], as well as the USA [Brown and Hollingsworth 2005]. According to You et al. [2014], in China, the concept of welfare of breeding animals is still at an early stage of development, and further efforts are necessary to improve the public concept of animal welfare in the process of establishment of standards and legal provisions. The results obtained by Ventura et al. [2016] suggest that education and animal breeding presentations may solve some problems; however, the necessity to apply new practices is in conflict with the deeply rooted values of animal care. Research conducted by Spooner et al. [2014] in Canada, concerning animal welfare assessment, were conducted among inhabitants of rural and urban areas, not involved in animal production. Brown and Hollingsworth presented the process of cooperation, used by retail sellers and producers in the USA to enhance animal care and welfare in commercial food production.

Development of interest in animal welfare in agricultural production has been observed in the world since the mid-20th century [Budzyńska 2015]. In 1996, Bennet and Larson found that interest in animal welfare and conditions of animal maintenance in farming had increased over the period of 15–20 years. They also noted that greater interest was visible in wealthier and more developed countries [Bennett and Larson 1996]. To be more precise, farm animal welfare is a concept, which gained attention as late as in the 1960s as a result of a publication by R. Harisson *Animal Machines* [Van de Weerd and Sandilands 2008], which initiated the debate on grave conditions of living of animals, associated with intensive breeding of poultry and farm animals. This social debate gave rise to introduction of the European Convention for the Protection of Animals kept for Farming purposes.

In the recent years, research in the field has been intensified. Examples include the works of Dawkins [2008] on animal suffering, a study by Grandin [2012] on audits in the field of welfare maintenance, as well as research conducted by Hansson and Lagerkvist [2014], who dealt with identification of farmers' attitudes towards welfare of farm animals. Interesting observations can be found in the study by Dawkins. Among other things, the author asks whether animals are healthy and whether they get what they want, thus suggesting that most people understand these two categories as welfare. She also indicates that "suffering" is not an elusive, non-scientific term, but it can be used both to define and to assess animal welfare in practice.

Many definitions of welfare have been developed. Broom [1988] defines animal welfare as a state, in which an animal is able to cope with pressure of a given living environment. Hughes and Duncan [1988] have defined it as the state of complete health of an animal, which lives in harmony with its surroundings. Welfare has its determinants, which were presented by Brambell [1965]. Later on, these were included in the Farm Animal Welfare Code in 1979, developed by the Farm Animal Welfare Council. The basic indicators are the "five freedoms of animals" [Manteca et al. 2012]:

- freedom from hunger and thirst – by ready access to fresh water and a diet to maintain full health and vigour;
- freedom from discomfort – by providing an appropriate environment including shelter and a comfortable resting area;
- freedom from pain, injury and disease – by prevention or rapid diagnosis and treatment;

- freedom from fear and distress – by ensuring conditions and treatment which avoid mental suffering;
- freedom to express normal behavior – by providing sufficient space, proper facilities and company of the animal's own kind.

A review of the meaning of animal welfare has been conducted by Lawrence et al. [2018], who assessed what has been referred to as positive animal welfare. Welfare fits into the concept of transformation of natural resources. This has been indicated by Gębska and Gołębiewska [2016], who state that farming is beginning to focus not only on production levels, but also its conditions, impact on the natural environment, on animals, as well as social perception. The most significant factor is the human being, directly involved in animal breeding, whose obligation based on ethical norms is to protect animals and care for them. Humans have overexploited wild animals, living in their natural environment, and they have ruthlessly abused and mistreated farm animals [Mroczek 2013].

The report of the European Commission shows how this phenomenon is perceived by the societies of EU Member States. According to research results, almost one half of all Europeans (46%) understand animal welfare with reference to the obligation to respect all animal rights, while a little less (40%) declare it is associated with the mode of treatment of farm animals to ensure a better quality of their life. The percentage of citizens, who understand animal welfare as going beyond animal protection (18%) is very similar to the percentage of those believing it to be equivalent to animal protection (17%). Also a similar percentage of respondents has declared that animal welfare enhances the quality of products of animal origin. In most EU Member States, a small percentage of respondents declare that protection of farm animals is not an important issue. Poland, unfortunately, has found itself among the "small percentage" (8%). We also have one of the lowest shares of responses recognizing the significance of welfare. In Poland, only 33% respondents declare that maintenance of welfare is very important, while the EU average is 57%. According to the majority of Polish respondents, these issues are "somewhat important". Poland has also occupied one of the last places in terms of assessment of informational campaigns as a good method of influencing attitudes of young people towards animals. A decisive majority of Europeans (17 states) agreed that such campaigns were ("certainly") a good method. In Poland, this percentage amounted to 28%, while the EU average was 48% [European Commision 2016].

Consumer interest in welfare issues is diversified depending on the country of residence. According to Malak-Rawlikowska et al. [2010], interest in this problem in Poland, Spain and Italy is very low. On the other hand, in Sweden, the Netherlands, Germany and Great Britain, there is a high level of activity of non-governmental organisations, which provide counselling and promote selection of products characterised by improved level of animal welfare standards. Gębska et al. [2013] underline that increased interest of consumers in the quality and mode of production of foods, particularly of animal origin, has resulted in introduction of provisions on the conditions of animal maintenance and welfare in the EU legislation.

As it has been indicated by Ozimek and Żakowska-Biemas [2011], Polish consumers pay increasing attention to food quality and are deeply concerned about its great diversity – in particular, in terms of sensory characteristics, health and safety. According to European Commission's document COM(2012)06, consumers are also concerned about the way of treatment of animals. However, their ability to respond and to demand introduction of higher standards in terms of farm animal welfare is limited.

Interesting research has been conducted by Bell et al. [2017]. The authors have found that sometimes, consumers tend to ignore information concerning production systems and animal maintenance to avoid a sense of guilt. Research was conducted in the state of Oklahoma, and it was found that about one third of all respondents admitted to ignore the meat production method willingly.

Results obtained by Cornish et al. [2016] indicate that the level of overall concern for animal welfare is associated with various demographic and individual characteristics of the society, such as age, gender, religion, place of residence, eating meat and knowledge in the field of animal welfare. This issue has been analysed in this study for various consumer groups in Poland.

Research conducted in Poland indicates that the concept of animal welfare has not become very popu-

lar so far. Only 45% of all respondents declared they knew and understood the term. The criteria taken into account by consumers purchasing meat included, in the first place, the price and Polish origin of the product (the figure).

The criterion of the habit was important for 46% of respondents, while 40% declared that the price and ease of preparation were also of significance. Calorific value of the product was either averagely important or not important at all, as well as the mode of production, taking into account animal welfare. This indicates that most respondents do not care about the production methods being environment-friendly in terms of animal welfare (and thus healthy for humans).

Results of the study showed that among 744 respondents 28.2% (210 persons) declared, that they buy a meat from animals reared at farms where are good animal welfare conditions. The percentage varied depending on socio-demographic factors (Table 1).

The higher the education level, the greater was the number of persons declaring purchase of products from animals maintained under welfare conditions. Increase in the income level also influenced consumer decisions. The results were more diversified in terms of age of the respondents. The greatest share of consumers purchasing meat from production under conditions of welfare animal was found in the youngest group (19–29 years of age). In Poland, the results are somewhat different from the EU average. The socio-demographic analysis according to the Special Eurobarometer Report [European Commission 2016] shows that respondents aged 40–54 pay more attention to animal welfare information (56%) in comparison with the younger group (15–24 years of age – 46%) and 50% of older respondents, aged above 55.

Interestingly enough, high diversity in positive responses was observed among groups according to place of residence. Most respondents caring about animal welfare when purchasing meat came from the rural areas (above 50%). In cities, the results ranged between 9–16%.

In order to determine whether a correlation existed between consumer decisions (depending on characteristics of consumers) with regard to purchase of meat from production systems compliant with animal welfare principles, the chi square independence test (χ^2) was applied. The characteristics examined included age, education, place of residence and income level (Table 2). A hypothesis was made that these variables were mutually independent.

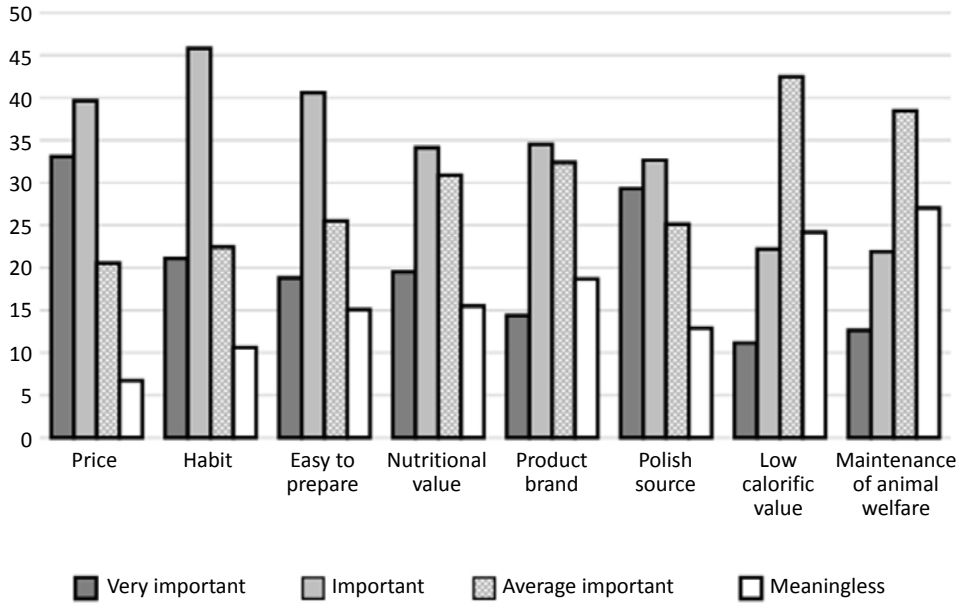

Fig. The criteria applied by respondents when purchasing meat (%)

Source: Own study.

Table 1. Percentage of consumers buying meat coming from animals rearing under good animal welfare conditions depending on socio-demographic factors

Specification		Numbers of responses	Share (%)
Total		210	100
Gender	female	136	64.8
	male	74	35.2
Age (years)	19–29	64	30.5
	30–39	43	20.5
	40–49	41	19.5
	50–59	31	14.8
	>59	31	14.8
Education	primary	10	4.8
	secondary	65	31.0
	higher	63	30.0
	vocational	72	34.3
Monthly income in the household (EUR)	≥ 1 000	8	3.8
	1 001–2 000	44	21.0
	2 001–3 000	58	27.6
	3 001–5 000	45	21.4
	> 5 000	55	26.2
Place of residence	city of up to 10 000 inhabitants	36	17.1
	city of 10 000–100 000 inhabitants	13	6.2
	city of 100 000–500 000 inhabitants	17	8.1
	city of more than 500 000 inhabitants	61	29.0
	village	83	39.5

Source: Own study.

Table 2. Results of independence tests for assessment of consumer decisions

Characteristics of respondents	Results of statistical analysis				Correlation assessment
	χ^2	*p*-value	χ 0.05	*df*	
Age	1.37	0.8499	9.49	4	none
Education	23.07	0.0000	7.81	3	exists
Place of residence	152.6	0.0000	9.49	4	exists
Income	49.57	0.0000	9.49	4	exists

Source: Own study.

It could be expected that age would be the variable determining the existence of significant correlations. Nevertheless, the χ^2 test conducted confirmed the hypothesis of independence of consumer age and purchase of animal products from systems ensuring animal welfare. Another interesting issue was verification of correlations in this regard between the place of residence and preferences of respondents. The independence test indicated a correlation between the place of residence and purchase of products from breeding systems compliant with animal welfare conditions. The C-Pearson's contingency coefficient was also determined. It assumes values from 0 to 1. The closer its value is to 1, the stronger the correlation. In the analysed case, it amounted to 0.5234 (corrected C).

Higher education level usually indicates a higher level of knowledge and awareness of the need to act on behalf of environmental protection, health protection or ethical issues. It was thus interesting to find whether a correlation existed between education level of the respondents and their choices in terms of purchase of meat of animals kept under welfare conditions. Verification of this assumption led to conclusion that a statistically significant correlation existed between the level of education of respondents and their decisions to purchase products of animal origin coming from farms caring about animal welfare, and the C-Pearson's contingency coefficient (C corrected) was 0.2246.

The hypothesis assuming lack of correlation between purchase of slaughter livestock from farms of animals kept under welfare conditions and the level of income of respondents also had to be rejected. The compatibility test (χ^2) indicated a correlation between variables. The C-Pearson contingency coefficient is 0.3220.

CONCLUSIONS

Research conducted in Poland among consumers of various kinds of meat (beef, poultry, pork, mutton) indicates that less than 50% of the society was familiar with the concept of animal welfare. Therefore, perhaps, this was not a significant criterion for choice of products obtained from animals kept under welfare conditions. The most significant criteria included the price, habits and ease of preparation of dishes made of these products. Thus, the results were consistent with those obtained by Mejdell [2006], who found that the price played the key role in consumer choices. In Poland, only about 12% of all respondents indicated that environment-friendly production methods (including compliance of breeders with animal welfare principles) was a significant criterion for product choice. Thus, it can be concluded that the issue requires action in terms of popularisation of knowledge and information. Analyses concerning factors, that determine consumer choices, on the basis of the research results obtained have led to the conclusion that age of the respondents is of no significance for selection of products from breeding farms that comply with animal welfare requirements. On the other hand, a correlation has been identified between purchase of meat from such farms and education, which is justified. Persons with higher education levels have more extensive general knowledge. A correlation has also been found to exist with regard to the place of residence of respondents. Like in other research projects, consumer choices in terms of animal welfare and income of respondents have turned out to be correlated.

According to the view prevailing in the EU Member States, animal welfare is an important issue. However, the level of knowledge in this regard is very diversified, as are definitions of animal welfare. Most members of the EU societies indicate that higher prices are justified for products from animals kept under welfare conditions, and most people are willing to pay more for products originating from animal-friendly production systems.

At present, more than a half of all Europeans believe that the range of products offered by stores and supermarkets, which would be produced in systems compliant with animal welfare requirements, is insufficient. In addition, a majority of members of the European society expect more information and product labels indicating that animals were kept under welfare conditions.

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DOBROSTAN ZWIERZĄT JAKO KRYTERIUM KSZTAŁTUJĄCE DECYZJE POLSKICH KONSUMENTÓW W ZAKRESIE ZAKUPU MIĘSA

STRESZCZENIE

Celem opracowania jest określenie czynników różnicujących decyzje konsumentów w zakresie zakupów mięsa pochodzącego od zwierząt utrzymywanych w warunkach dobrostanu. Źródłem materiałów do analiz były opracowania oraz raporty Komisji Europejskiej, literatura przedmiotu. Badania własne zrealizowano wśród konsumentów, wykorzystując kwestionariusz wywiadu (metoda PAPI). Badania dotyczyły zróżnicowania decyzji respondentów w zależności od takich ich cech, jak: wiek, wykształcenie, miejsce zamieszkania (miasto, wieś) oraz poziom uzyskiwanego dochodu. Na podstawie testu χ^2 uzyskano wynik wskazujący na występowanie zależności między wykształceniem, miejscem zamieszkania oraz dochodami konsumentów a ich decyzjami dotyczącymi zakupu mięsa zwierząt utrzymywanych w warunkach dobrostanu. Przeprowadzona analiza pozwoliła także na stwierdzenie, iż mniej niż 50% społeczeństwa w Polsce zetknęło się z pojęciem dobrostanu zwierząt. Najważniejszymi kryteriami wyboru kupowanych produktów były cena i łatwość przyrządzania.

Słowa kluczowe: dobrostan zwierząt, konsument, mięso

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MINT COUNTRIES AS POSSIBLE RISING STARS IN THE GLOBAL ECONOMY – BENCHMARKING WITH BRICS COUNTRIES

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ABSTRACT

The main goal of the paper is to analyze the selected macroeconomic, trade-related and social-related indicators concerning Mexico, Indonesia, Nigeria, and Turkey (collectively named as MINT) from 2000 till 2017, especially in comparison with BRICS countries (Brazil, Russia, India, China and South Africa). The outcomes are to be the confirmation basis, if the MINTs could play more important role in the global economy in the near future. Conducted statistical data and report based research has proved that there is no convincing evidence of such process, especially taking into consideration the resent economic and political issues in Mexico and Turkey.

Key words: MINT, BRICS, competitive advantage, international trade

INTRODUCTION

The acronym MINT that refers to the group of four countries, i.e. Mexico, Indonesia, Nigeria and Turkey, was originally created in 2014 by Fidelity Investments, a Boston-based asset management company. Although this new term has been primarily used in the economic and financial spheres [Wright 2014] as well as in academia [Durotoye 2014, Francesco and Ardita 2015, Kokotovic and Kurecic 2016], according to Fidelity projections these countries are able to display strong growth and provide high returns for investors over the coming decade. The main reasons for this grouping distinction are especially large populations, favorable demographics and emerging economies, but when compared to the BRICS countries the MINTs have noticeably smaller economies. As BRICS growth has noticeably slowed down (with the exception of China), one could ask oneself whether the MINTs have any potential to become rising stars in more and more unpredictable global economy [Barker 2014]. Therefore, the main goal of this paper is to examine some indicators concerning MINTs in comparison to BRICS with respect to this question. Descriptive analysis has been conducted based on statistical data sourced from international institutions such as UNCTAD, World Bank and WTO. Only four years since MINT term emergence seem to be too short research period, therefore statistical data from 2000 to 2017 have been examined, where applicable.

In the first part there is a general analysis of selected macroeconomic indicators, i.e. GDP shares and GDP per capita, together with foreign direct investment flows per capita. In turn, the second part is dedicated to the comparative analysis of selected trade-related indices, such as world trade shares, merchandise trade values, concentration and diver-

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sification indices, and revealed comparative advantage (RCA) index[1]. Finally, the third part concerns the analysis of the competitiveness-related indices published by UNDP and World Economic Forum, i.e. Human Development Index (HDI) and Global Competitiveness Index (GCI), respectively.

MINT *versus* BRICS – comparative analysis of selected economic indicators

One of the reasons for another prospective country group formation, i.e. MINT, are some similarities to the BRICS countries, especially concerning their geographic and demographic features [Bootle 2014, Matsangou 2015]. First of all, participants of both BRICS and MINT countries are located on four continents, and some of them are also member states of economic unions and trade blocs, like NAFTA (Mexico), MERCOSUR (Brazil), ECOWAS (Nigeria), ASEAN (Indonesia), SAARC (India) and APTA (China and India). Moreover, three BRICS countries are net natural resource exporters (Brazil, Russia and South Africa) and two others are net large natural resource importers (India and China). At the same time, India and especially China are among the largest exporters of industrial products. On the other hand, three MINT countries are net natural resource exporters (Indonesia, Mexico, and especially Nigeria). Turkey is net natural resource importer, at the same time being very important and thriving exporter of industrial products [Elliott 2014]. Demographically, the BRICS countries are comprised of three very young and dynamic populations (South Africa, India, and Brazil), one mature population (China), and one aging, stagnating population (Russia). The emphasized advantage of MINT countries are by contrast very dynamic and young populations, with expected very high population growth in the next couple of decades [Tesseras 2014, Kokotovic and Kurecic 2016].

Some significant differences between those groups have been presented in Table 1. As concerns the country share in global GDP, BRICS countries supremacy over MINTs is quite noticeable. In 2000 total GDP (PPP) share of MINTs was almost three times lower than in the case of BRICS countries (6.1 and 18% respectively), but in 2016, especially due to China's recent advancements, this distance increased more than fourfold (7 and 31.2% respectively). It is worth mentioning that in the same period high income countries' total GDP (PPP) share decreased from 63 to 47%, according to the World Bank [2018].

If one looks at GDP per capita data, the situation is quite different. Between 2000 and 2016 GDP per capita growth of Indonesia, Nigeria and Turkey was nearly the same, and among BRICS countries only India and China achieved better results. Furthermore, MINT countries' average GDP per capita was significantly higher than one of BRICS, both in 2000 and 2017. The greatest input to this indicator value growth had particularly Turkey and Mexico, and among BRICS – Russia, Brazil and South Africa. In case of the latter this could result from growing production and export of raw materials. On the other hand, almost fourfold increase of Chinese GDP per capita ranked this country only ahead of Indonesia, Nigeria and India, if we consider MINT and BRICS groups as a whole.

As concerns foreign direct investment (FDI) stock per capita, general remark is that both country groups were and still are the net FDI importers, with the exception of China and South Africa. Between 2000 and 2017 FDI inward stock per capita of Mexico was the highest one not only among MINTs, but in comparison with BRICS as well, which could be caused by growing US-based corporations interest in direct investment in that country. It is worth emphasizing that Chinese achievements in this area were similar to Indonesian ones, and much better only than outcomes of India and Nigeria. Taking into consideration the values of FDI outward stock per capita, one can realize that in period under scrutiny there was visible both BRICS and MINTs expansion, which particularly concerns India, China, Russia, and Mexico.

[1] For detailed definitions, explanations and methodology, see e.g. UNCTAD statistical database, http://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=120, the World Bank statistical database, https://wits.worldbank.org/wits/wits/witshelp/Content/Utilities/e1.trade_indicators.htm [accessed: 20.08.2018].

Table 1. Selected general economic indicators of MINT and BRICS countries between 2000 and 2017

Itemization	Year	Mexico	Indonesia	Nigeria	Turkey	Brazil	Russia	India	China	South Africa	BRICS
GDP (PPP) as world percentage	2000	2.3	2.0	0.6	1.2	3.3	2.1	4.3	7.6	0.7	18.0
	2016	1.9	2.5	0.9	1.7	2.6	3.0	7.2	17.7	0.6	31.2
GDP per capita (USD at constant prices (2010)	2000	8 997	2 138	1 327	8 237	8 829	6 500	751	1 736	5 839	2 139
	2016	9 872	3 974	2 456	14 117	10 826	11 309	1 855	6 773	7 490	5 185
	2000=100	110	186	185	171	123	174	247	390	128	242
Foreign direct investment inward stock per capita (USD at constant prices (2017)	2000	2219	219	361	552	1273*	377	29	279	1763	208
	2017	3 787	941	512	2 238	3 719	3 102	282	1 058	2 644	1 027
	2000=100	171	430	142	406	292	823	980	378	150	495
Foreign direct investment outward stock per capita (USD at constant prices (2017)	2000	151	61	63	108	519[a]	243	3	40	1109	56
	2017	1 394	250	75	513	1715	2 655	116	1 051	4 766	839
	2000=100	924	412	119	477	331	1 091	3 799	2 619	430	1503

[a] 2001 data.

Source: Own calculations based on UNCTAD [2018], UNCTAD statistical database, http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=en [accessed: 20.08.2018], World Bank database, http://databank.worldbank.org/data/source/world-development-indicators [accessed: 20.08.2018].

When we take a closer look, we can reach the conclusion that such impressive outcomes have arisen from so-called low base effect, particularly in the case of two former countries.

Comparison of selected merchandise trade indices

General trends in merchandise trade of BRICS and MINT countries have been presented in Figures 1 and 2. In 2000 almost all of those countries had merchandise trade surplus, the most visible in Russia and Indonesia. On the other hand, Turkey and Mexico recorded quite high trade deficits (USD 27 and 13 billion respectively). Among the countries under scrutiny the unquestionable leaders were China and Mexico, which in case of the latter partially resulted, among others, from NAFTA membership and its related benefits.

After almost two decades the most visible change in BRICS group is dominant role of China, which for last several years has reinforced its top position in the international merchandise trade, with still growing foreign trade surplus. As regards other BRICS countries, there was both positive trade balance changes (Brazil and Russia) and negative ones (India and South Africa). In MINT group only Mexico had recorded the similar foreign trade results in 2017. The positive change in this group is quite balanced foreign trade of Mexico, Indonesia and Nigeria, of course with much less turnovers of two latter countries. As can be seen, trade deficit of Turkey had increased threefold (from USD 27 to 77 billion), but, to be honest, trade deficits of South Africa and India enlarged significantly more in the same period.

The noticeable and actually unavoidable consequence of those merchandise trade trends are changes

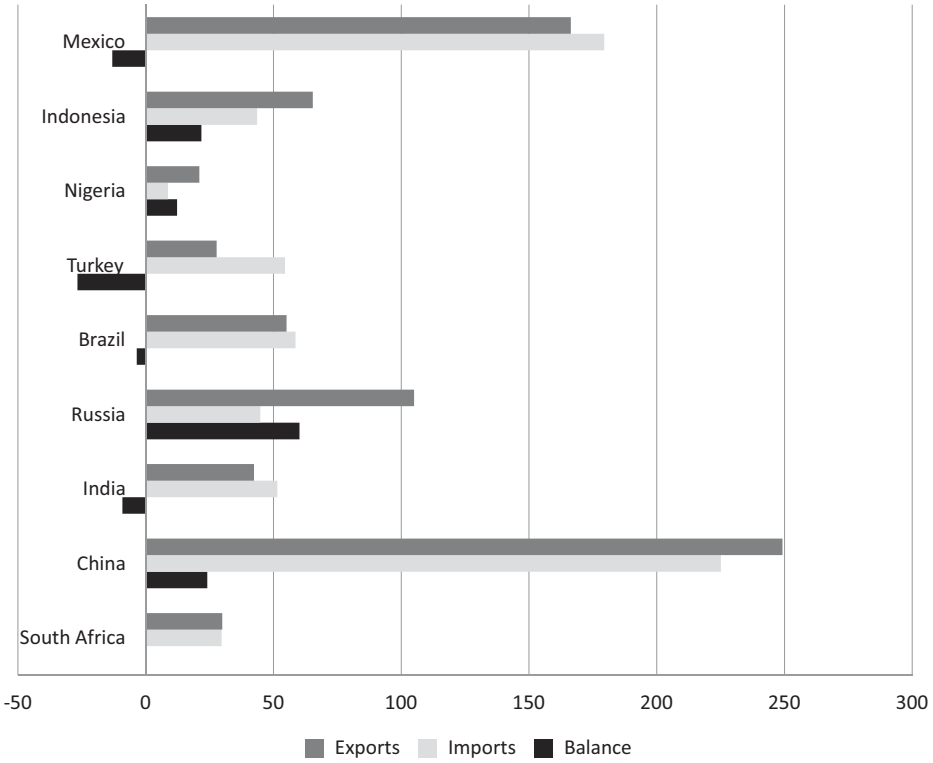

Fig. 1. Total merchandise trade of BRICS and MINT countries in 2000 (USD billion)

Source: Own preparation based on WTO statistical database, http://stat.wto.org/Home/WSDBHome.aspx [accessed: 21.08.2018].

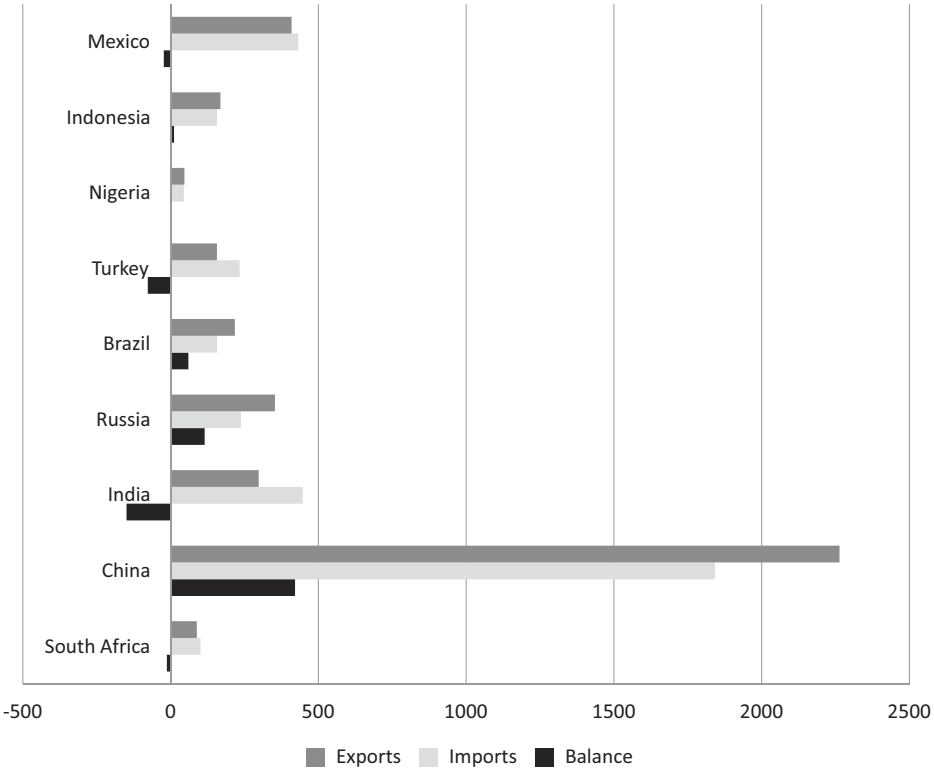

Fig. 2. Total merchandise trade of BRICS and MINT countries in 2017 (USD billion)

Source: Own preparation based on WTO statistical database, http://stat.wto.org/Home/WSDBHome.aspx [accessed: 21.08.2018].

of BRICS and MINTs world merchandise trade shares. According to data presented in Table 2, China's world export and import shares increased more than threefold, reaching 13 and 10% respectively in 2017. Although there was no such impressive progress among other countries under scrutiny, the outcomes of Mexico and especially India are also worthy of attention. As concerns specifically MINT group, Indonesia and Nigeria engagements in global merchandise trade have remained relatively tiny, and Turkey results seem to be unsatisfactory, taking into consideration its regional ambitions and close economic relationships with the European Union.

Additionally, comparison of concentration and diversification indices has been provided in Table 2. Concentration index value closer to 1 indicates a country's exports or imports are highly concentrated on a few products, and such situation occurred only in Nigeria's

Table 2. Trade shares, concentration and diversification indices for MINT and BRICS countries between 2000 and 2017

Country	Share in world trade (%)		Concentration index		Diversification index	
	2000	2017	2000	2016	2000	2016
			Exports			
Mexico	2.6	2.3	0.14	0.12	0.39	0.41
Indonesia	1.0	1.0	0.13	0.13	0.49	0.55
Nigeria	0.3	0.3	0.92	0.73	0.88	0.84
Turkey	0.4	0.9	0.10	0.08	0.58	0.44
Brazil	0.9	1.2	0.09	0.13	0.51	0.56
Russia	1.6	2.0	0.28	0.31	0.65	0.65
India	0.7	1.7	0.15	0.12	0.57	0.44
China	3.9	12.8	0.08	0.11	0.46	0.41
South Africa	0.5	0.5	0.14	0.12	0.54	0.51
BRICS	7.5	18.2	0.06	0.08	0.31	0.27
			Imports			
Mexico	2.7	2.4	0.09	0.09	0.28	0.29
Indonesia	0.6	0.9	0.08	0.07	0.36	0.32
Nigeria	0.1	0.2	0.06	0.10	0.46	0.41
Turkey	0.8	1.3	0.08	0.08	0.27	0.28
Brazil	0.9	0.9	0.08	0.07	0.28	0.30
Russia	0.7	1.3	0.05	0.05	0.35	0.28
India	0.8	2.5	0.16	0.16	0.46	0.41
China	3.3	10.2	0.10	0.15	0.37	0.36
South Africa	0.4	0.6	0.13	0.10	0.30	0.24
BRICS	6.1	15.5	0.08	0.11	0.25	0.27

Source: Own preparation and calculation based on UNCTAD statistical database, http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=en [accessed: 20.08.2018].

export. Moreover, between 2000 and 2016 concentration index values for most of BRICS and MINT countries did not change or even slightly decreased, which can be explained as a transition toward homogeneously distributed trade among a series of products.

The diversification index takes values between 0 and 1, and value closer to 1 indicates greater divergence from the world trade structure. Based on this explanation, the biggest difference in regard to world export pattern can be noticed only in Nigeria and Russia. In other countries diversification index value ranges from 0.40 to 0.60 (exports) and from 0.30 to 0.40 (imports), which implies that their trade structures are similar or getting closer to the world pattern.

In turn, values of revealed comparative advantage (RCA) index for different manufactures categories have been provided in Table 3. As concerns MINT countries, only Turkey retained quite high relative advantage in labor-intensive and resource-intensive manufactures export, increasing at the same time its advantage in medium-skill and technology-intensive manufactures export (similarly to Mexico). Comparative advantage in Indonesian export has been built only in labor-intensive and resource-intensive manufactures, and Nigeria did not exhibit export comparative advantages in any manufactures category.

On the other hand, BRICS comparative advantages were concentrated mainly in low-skill and technology-intensive manufactures, with visible trend of declining RCA values in period under scrutiny (except India). The only meaningful change of RCA concerned China, but even in this country comparative advantages were evident in export of manufactures on lower processing stages than in export of more sophisticated products.

Comparison of selected competitiveness-related indices

If we searched for any competitiveness related analogies between MINTs and BRICS, one of the commonly quoted one would be Human Development Index (HDI). HDI values for those countries in 2000 and 2017 have been presented in Table 4. In the former group 2017 HDI absolute values were quite similar in Mexico, Indonesia, and Turkey, but the greatest

Table 3. Revealed comparative advantage (RCA) index for MINT and BRICS countries between 2000 and 2017

Country	Labor-intensive and resource-intensive manufactures		Low-skill and technology-intensive manufactures		Medium-skill and technology-intensive manufactures		High-skill and technology-intensive manufactures	
	2000	2017	2000	2017	2000	2017	2000	2017
Mexico	0.99	0.55	0.75	0.70	1.59	1.93	0.90	0.84
Indonesia	2.56	1.71	0.45	0.63	0.28	0.43	0.59	0.38
Nigeria	0.04	0.07	0.01	0.04	0.00	0.00	0.00	0.02
Turkey	3.79	2.48	1.63	1.68	0.65	1.28	0.39	0.38
Brazil	1.05	0.50	1.40	1.08	0.73	0.62	0.60	0.29
Russia	0.20	0.23	1.48	1.00	0.18	0.18	0.27	0.24
India	2.82	1.73	1.20	1.37	0.30	0.60	0.51	0.75
China	2.78	2.43	1.62	1.52	0.79	1.03	0.87	1.23
South Africa	0.60	0.36	2.21	1.42	0.59	0.77	0.38	0.34
BRICS	1.91	1.93	1.56	1.42	0.60	0.86	0.65	0.99

Source: Own calculation based on UNCTAD statistical database, http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=en [accessed: 20.08.2018].

Table 4. Human Development Index (HDI) change in period 2000–2017

HDI Rank (2017)	Country	2000	2017	2000 = 100
74	Mexico	0.702	0.774	110
116	Indonesia	0.606	0.694	115
157	Nigeria	0.445[a]	0.532	120
64	Turkey	0.655	0.791	121
79	Brazil	0.684	0.759	111
49	Russia	0.720	0.816	113
130	India	0.493	0.640	130
86	China	0.594	0.752	127
113	South Africa	0.630	0.699	111

[a] 2003.

Source: Own preparation based on UNDP database, http://hdr.undp.org/en/content/human-development-index-hdi [accessed: 24.08.2018]; UNDP [2016].

relative improvement occurred in Turkey and Nigeria. Nevertheless, MINT countries were still located in 2017 HDI ranking at distant positions.

Human Development Index ranking advancements are much more noticeable in BRICS countries and the biggest leap has been made especially by India and China. On the other hand, despite the least change of HDI values Brazil and Russia are located at the highest positions in this group.

Figure 3 illustrates Global Competitiveness Index (GCI) values for BRICS and MINTs in respect to medians for all countries included in the research conducted by World Economic Forum. In absolute terms all BRICS and MINT countries have improved, but if

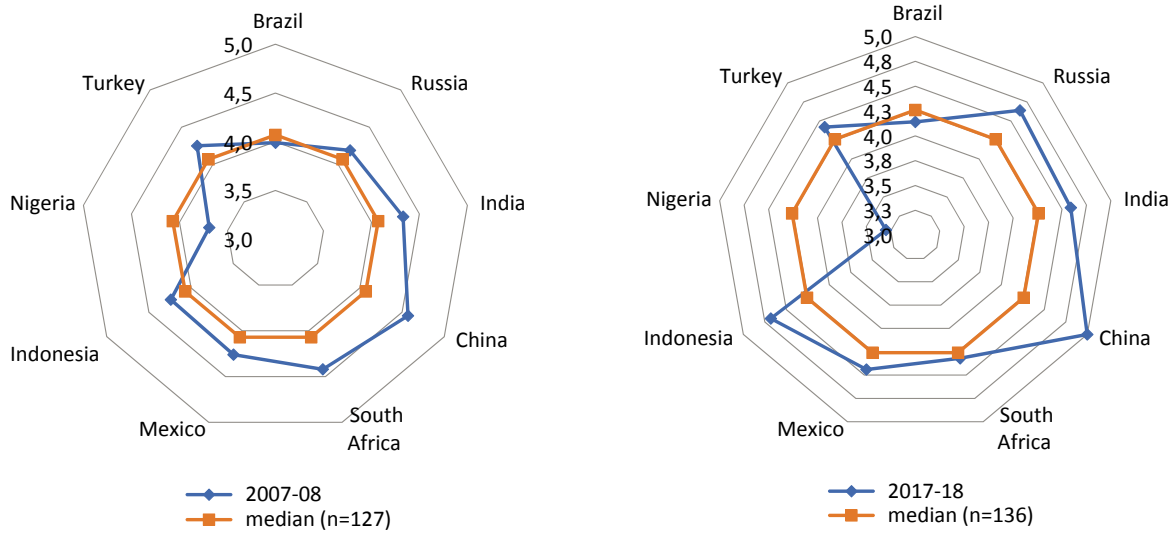

Fig. 3. Global Competitiveness Index for BRICS and MINT countries in period 2007–2017

Source: Own preparation based on World Bank statistical database, https://tcdata360.worldbank.org/indicators/gci?country=BRA&indicator=632&viz=line_chart&years=2007,2017 [accessed: 23.08.2018]; WEF [2018].

one looks at the distance from the median, some important issues can be perceived. In the first edition of GCI from 2007–2008 most of BRICS countries exceeded the median, especially China. MINTs distance from the median was almost identical, except Nigeria, which was far behind. In the latest GCI edition a noticeable improvements of China, India and Russia are visible, with the slight downturn of Brazil and South Africa. Among MINTs impressive progress of Indonesia deserves the recognition. In case of Nigeria GCI value decreased most of all (from 3.7 to 3.3), which was the worst result among all the countries included in this research.

CONCLUSIONS

Both gathered data and conducted analysis do not reate any solid basis for the statement of growing importance of the MINTs in the world economy, especially in comparison with BRICS. Therefore, the main conclusions are as follows:

1. Between 2000 and 2017 there was a noticeable improvement of most MINTs macroeconomic, trade-related and social-related indicators scrutinized in this paper, but there is also no indisputable evidence of any probable leadership of MINTs among developing countries, not mentioning newly industrialized economies (such the Four Asian Tigers or China).
2. Despite the growing foreign direct investment flows and moderate HDI improvement, Mexico's shares in global GDP and merchandise trade have decreased. Persisting problems with corruption, crime and inefficient government bureaucracy, as well as proclaimed by President of United States Donald Trump the attitude change towards bilateral USA–Mexico relations and uncertain future of NAFTA can be the serious barriers for further Mexican success.
3. According to the latest edition of the Global Competitiveness Report, Indonesia is inching its way up the competitiveness ladder, and its current position is driven mainly by its large market size and a relatively robust macroeconomic environment [WEF 2018]. Moreover, thanks to the innovation and business sophistication achievements Indonesia is one of the top innovators among the emerging economies. On the other hand, this country has still visible problems with corruption and inefficient government bureaucracy, and its relatively tiny trade is based mainly on the least manufactured goods.
4. Outcomes of Nigeria in period 2000–2017 could not be recognized as satisfactory ones, which has been primarily connected to its natural resource exploitation oriented economy. Despite its recent success in reducing corruption and strengthening institutions, Nigeria needs reforms on transport and power infrastructure, the business environment, and education investment, which can possibly result in its international competitiveness improvement.
5. Although Turkish economic and trade achievements were quite impressive in period under scrutiny, its international competitiveness declined, especially due to policy instability and unpredictability, inadequately educated workforce and complicated geopolitical situation. Serious macroeconomic mistakes made recently by Turkish government, which have led to the current internal crisis, will be for sure the long-term growth disincentive.

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KRAJE MINT JAKO POTENCJALNE WSCHODZĄCE GWIAZDY W GOSPODARCE ŚWIATOWEJ – ANALIZA PORÓWNAWCZA Z KRAJAMI BRICS

STRESZCZENIE

Głównymi celami artykułu są przeanalizowanie wybranych wskaźników makroekonomicznych, handlowych i społecznych dotyczących Meksyku, Indonezji, Nigerii i Turcji (określanych wspólnie mianem MINT) w latach 2000–2017, a także porównanie ich z odpowiednimi wskaźnikami krajów BRICS (Brazylia, Rosja, Indie, Chiny i RPA). Rezultaty analiz mają umożliwić zweryfikowanie tezy, czy kraje MINT mogłyby odgrywać istotniejszą rolę w gospodarce światowej w najbliższej przyszłości. Badania przeprowadzone na podstawie danych statystycznych oraz raportów międzynarodowych umożliwiają sformułowanie wniosku, że aktualnie brak przekonujących dowodów na występowanie takiego procesu, zwłaszcza po uwzględnieniu niedawnych problemów polityczno-gospodarczych Meksyku i Turcji.

Słowa kluczowe: MINT, BRICS, przewaga konkurencyjna, handel międzynarodowy

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ORIGINAL PAPER

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DIVERSIFICATION OF THE ECONOMIC POTENTIAL OF HOUSEHOLDS IN PROVINCES OF POLAND

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ABSTRACT

Household disposable income, although it is not the only measure of quality of life and standard of living, is a key factor affecting the level and structure of consumption. Regional differences related to the economic situation of households were evaluated with the use of data describing the level of household disposable income per person, wages and disposable income. Although GDP can be only indirectly identified with the economic potential of households, the study also included disposable income per capita and the GDP achieved by administrative units. Based on descriptive characteristics of variables assumed for the analysis, the method of *k*-means was applied to group objects (provinces). The aim of the paper is to group the provinces based on the variables assumed for the analysis. The applied method of multidimensional analysis made it possible to group provinces into segments. Each of the segments contains provinces that are most similar to each other in terms of features assumed for the analysis. The presented results permit us to draw the indirect conclusion that in provinces with higher GDP per capita, the population acquires higher income and, consequently, consumption expenditures make up a smaller portion of the obtained income.

Key words: regional differentiation, GDP, disposable income, households

INTRODUCTION

Differences in the level of wages earned by a population in a given region are the effect of various mechanisms and regularities determining regional development. Often, very erroneously, it is assumed that interregional disproportions can be of a temporary nature and after taking certain actions, differences in the disproportions between provinces can be eliminated. However, interregional disproportions are not a short-term phenomenon. Differences between developed regions and economically poorer regions persist over a longer period of time and can even deepen [Grosse 2002]. According to the unsustainable development theory, differences between regions are unavoidable [Chądzyński et al. 2007] and the existence of imbalance is treated as a driving force for development. Polarization in a socio-economic space means that its individual elements develop at various rates. According to the polarization theory [Korenik 2011], the presence of a driving economic unit in any area can lead to transformation of the entire regional structure and affect its development. According to Friedmann [Friedmann and Alonso 1964], regions in a better economic situation develop as a result of their domination over those less developed [Stawasz 2004]. The existing regional development very often deepens over time due to accumulation and the interactions between various economic, political and cultural factors. Pursuant to this theory, areas of high economic development are developing at an increasing rate, while the poorer areas are sinking deeper into stagnation. In the

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socio-economic development of every country, one of measures of the economic situation is the level of income of its inhabitants. Income differentiation at the regional level is determined by various development disproportions, primarily concerning the standard of living of its population.

The aim of this paper was to group the provinces based on the variables assumed for the analysis. The analysis used materials originating from secondary sources, mainly the studies on household budgets, carried out by the Central Statistical Office (GUS), and statistical yearbooks and covered 16 provinces of Poland.

The level of differentiation of living conditions and regional disproportions are affected by such factors as the level of average wage, income per person in a household, the GDP level and other factors not taken into account in the analysis (e.g. investment opportunities for investors). The literature emphasizes that differences in the level of population income are reflected in the level of macro- and microeconomic indicators [Grzywińska-Rąpca 2011].

RESULTS

With reference to the economic situation, the most synthetic indicator reflecting the level of economic development of provinces is GDP. The contribution of individual provinces to the national GDP is presented in Figure 1.

Inhabitants of the province of Mazowieckie contribute to the GDP to the highest extent (Fig. 1). The share of this province in creating GDP in 2015 amounted to 22.17%. It was followed in this regard by the province of Śląskie, generating 12.38% of the GDP. The province of opolskie contributed to the generated level of the GDP to the lowest extent (2.10%), which made a difference of more than 20% when compared to the province of Mazowieckie.

The data describing regional differentiation of the economic situation of provinces, taking into account variables assumed for the analysis, are presented in Table 1.

Based on the data provided in Table 1, regional disproportions can be observed resulting from differences

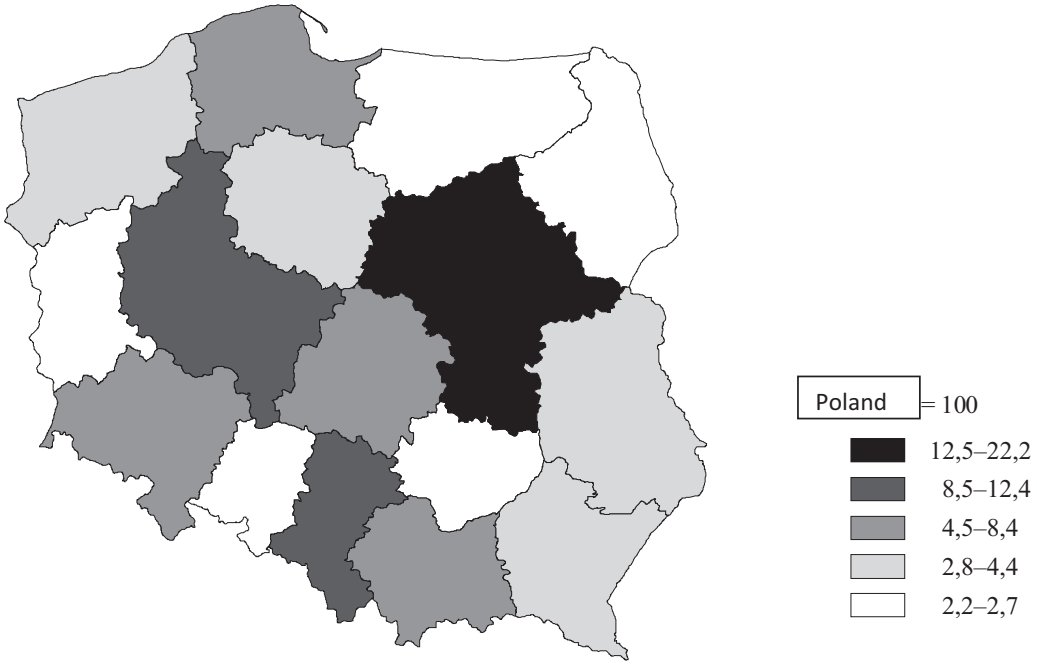


Fig. 1. Contribution of individual provinces to the national GDP in 2015

Source: Own study based GUS data.

Table 1. Numerical characteristics of variables (data of 2015)

Province	Average monthly gross wages	Average monthly disposable income per person in total	Gross disposable income per capita	Gross domestic product per capita
	PLN			
Dolnośląskie	4,204.24	1,471.84	29,013	52,203
Kujawsko-Pomorskie	3,540.25	1,245.69	24,469	38,190
Lubelskie	3,699.48	1,226.74	23,522	32,074
Lubuskie	3,567.60	1,419.58	24,759	39,052
Łódzkie	3,790.76	1,362.03	28,165	43,772
Małopolskie	3,906.96	1,305.45	26,263	42,160
Mazowieckie	5,094.46	1,756.15	33,674	74,682
Opolskie	3,793.28	1,288.74	24,871	37,816
Podkarpackie	3,527.62	1,081.64	21,825	33,176
Podlaskie	3,647.08	1,257.93	22,630	33,272
Pomorskie	4,132.13	1,380.92	26,746	44,955
Śląskie	4,221.45	1,420.54	31,402	48,670
Świętokrzyskie	3,580.62	1,202.80	24,111	33,841
Warmińsko-Mazurskie	3,495.02	1,280.51	23,557	33,179
Wielkopolskie	3,728.52	1,287.79	28,871	50,790
Zachodniopomorskie	3,793.68	1,426.85	26,727	39,569

Source: Own study based on GUS data.

in the levels of variables assumed for the analysis which describe the economic situation of provinces. Average gross disposable income per capita in 2015 amounted to PLN 26,288.00. The highest level of this feature was recorded in the province of Mazowieckie. The lowest level of this variable was recorded for the province of Podkarpackie. The average gross disposable income per capita in this province was lower than the national mean by 16.98%. The lowest levels of the presented economic measures were demonstrated by the provinces of Warmińsko-Mazurskie, Lubelskie and Podkarpackie. This is typical for the eastern part of Poland which is considered to be one of the poorest and most marginalized regions, featuring a low level of wages, unfavourable structure of household expenditures and a significant scale of poverty. Such a situation, along with an unfavourable structure of economy, proves the low quality of life and standard of living of the population in this area. Despite numerous activities, on both the national and regional scale, the income level of inhabitants is diversified. Gross domestic product per capita in 2015 was the highest in the province of mazowieckie. At the same time, GDP per capita generated in the province of Mazowieckie exceeded the average value for the country by 76.39%, which amounted to PLN 74.682 per capita. The following provinces recorded values above the average national value in generating GDP per capita: Dolnośląskie, Łódzkie, Pomorskie, Śląskie and Wielkopolskie.

In order to analyse regional diversification of the examined variables, basic descriptive statistics were determined (Table 2).

Table 2. Basic descriptive statistics of variables assumed for the analysis

Specification	$\bar{x}$	*SD*	Min	Max	*CV* (%)
Gross domestic product per capita	42 337.56	10 793.86	32 074.00	74 682.00	25.49
Disposable gross income per capita	26 287.81	3 261.21	21 825.00	33 674.00	12.41
Average monthly gross wages	3 857.70	405.03	3 495.02	5 094.46	10.50
Average monthly disposable income per person in total	1 338.45	149.93	1 081.64	1 756.15	11.20

Source: Own study based on GUS data.

Variability in the gross domestic product per capita is almost twice higher than in case of gross disposable income per capita. In order to group provinces based on the variables assumed for the analysis, standardized[1] values of variables were determined according to the formula: $z_{ij} = x_{ij} - x_j / S(x_j)$, in which $i = 1, 2, \ldots, n, j = 1, 2, \ldots, m$. Values of variables after standardization are presented in Table 3.

Table 3. Values of variables after standardization

Province	Average monthly gross wages	Average monthly disposable income per person in total	Disposable gross income per capita	Gross domestic product per capita
Dolnośląskie	0.8556	0.8897	0.8356	0.9140
Kujawsko-Pomorskie	–0.7838	-0.6187	-0.5577	-0.3843
Lubelskie	–0.3906	–0.7451	–0.8481	–0.9509
Lubuskie	–0.7162	0.5411	–0.4688	–0.3044
Łódzkie	–0.1653	0.1573	0.5756	0.1329
Małopolskie	0.1216	–0.2201	–0.0076	–0.0165
Mazowieckie	3.0535	2.7861	2.2649	2.9966
Opolskie	–0.1590	–0.3316	–0.4344	–0.4189
Podkarpackie	–0.8149	–1.7129	–1.3685	–0.8488
Podlaskie	–0.5200	–0.5371	–1.1216	–0.8399
Pomorskie	0.6776	0.2833	0.1405	0.2425
Śląskie	0.8981	0.5475	1.5682	0.5867
Świętokrzyskie	–0.6841	–0.9048	–0.6675	–0.7872
Warmińsko-Mazurskie	–0.8954	–0.3865	–0.8374	–0.8485
Wielkopolskie	–0.3189	–0.3379	0.7921	0.7831
Zachodniopomorskie	–0.1581	0.5896	0.1347	–0.2565

Source: Own study.

[1] Following the classical standardization, normalization parameters typically assume the value: $p = 1$; $a = \bar{x}_j$; $b = S(x\,\bar{x}_j)$.

A negative value of indicators is demonstrated when some objects are characterized by a significantly poorer level [Zeliaś 2000]. The variable for a given province takes a value lower than the average for all provinces.

Based on standardized data, objects (provinces) were grouped using the *k*-means method. The starting point was to determine the number of clusters. Further, based on the performed analyses, the membership of objects in the clusters was determined [Panek and Zwierzchowski 2013]. Intragroup differentiation is described as the sum of distances between the intragroup objects and the centroid of groups into which they have been classified [Jóźwiak and Podgórski 2011].

As a result of applying the *k*-means method, five groups of provinces were distinguished (Table 4). Provinces forming subsequent clusters are characterized by diversification as regards diagnostic features assumed for classification purposes.

Table 4 also presents distances from the centroid of the proper cluster (calculated on the basis of standardized data). The values show which of the provinces in the identified groups are located further from the centre of a given cluster and, therefore, differ the most in terms of the analysed structure from other provinces in

Table 4. Elements of identified clusters

Province	Distances from the centroid of the proper cluster
Cluster 1 elements	
Dolnośląskie	0.22
Śląskie	0.22
Cluster 2 elements	
Łódzkie	0.20
Małopolskie	0.26
Pomorskie	0.36
Wielkopolskie	0.41
Cluster 3 elements	
Kujawsko-Pomorskie	0.28
Lubelskie	0.18
Podkarpackie	0.51
Podlaskie	0.20
Świętokrzyskie	0.12
Warmińsko-Mazurskie	0.25
Cluster 4 elements	
Lubuskie	0.25
Opolskie	0.33
Zachodniopomorskie	0.27
Cluster 5 elements	
Mazowieckie	0

Source: Own study.

the cluster. In the second group identified, the provinces most differing from each other are Łódzkie and Wielkopolskie, while in the third group, it is Podkarpackie. The fifth cluster is a single-element cluster, made up of the province of Mazowieckie. This means that province of Mazowieckie (according to the variables assumed for the analysis) is the most remote from the other 15 provinces. In order to compare identified clusters, cluster statistics were determined (Table 5, Fig. 2).

Figure 3 presents the mean values of variables for individual clusters. It is worth noting the values determined for the second cluster (Łódzkie, Małopolskie, Pomorskie, Wielkopolskie) and for the fourth cluster (Lubuskie, Opolskie, Zachodniopomorskie). The mean

Table 5. Basic descriptive statistics for clusters

Variable	$\bar{x}$	*SD*	Variance
Descriptive statistics for cluster 1			
Gross domestic product per capita	0.75	0.23	0.05
Disposable gross income per capita	1.20	0.52	0.27
Average monthly gross wages	0.88	0.03	0.00
Average monthly disposable income per person in total	0.72	0.24	0.06
Descriptive statistics for cluster 2			
Gross domestic product per capita	0.29	0.35	0.12
Disposable gross income per capita	0.38	0.37	0.14
Average monthly gross wages	0.08	0.44	0.19
Average monthly disposable income per person in total	–0.03	0.30	0.09
Descriptive statistics for cluster 3			
Gross domestic product per capita	–0.78	0.20	0.04
Disposable gross income per capita	–0.90	0.30	0.09
Average monthly gross wages	–0.68	0.19	0.04
Average monthly disposable income per person in total	–0.82	0.47	0.22
Descriptive statistics for cluster 4			
Gross domestic product per capita	–0.33	0.08	0.01
Disposable gross income per capita	–0.26	0.34	0.11
Average monthly gross wages	–0.34	0.32	0.10
Average monthly disposable income per person in total	0.27	0.52	0.27
Descriptive statistics for cluster 5			
Gross domestic product per capita	3.00	0.00	0.00
Disposable gross income per capita	2.26	0.00	0.00
Average monthly gross wages	3.05	0.00	0.00
Average monthly disposable income per person in total	2.79	0.00	0.00

Source: Own study.

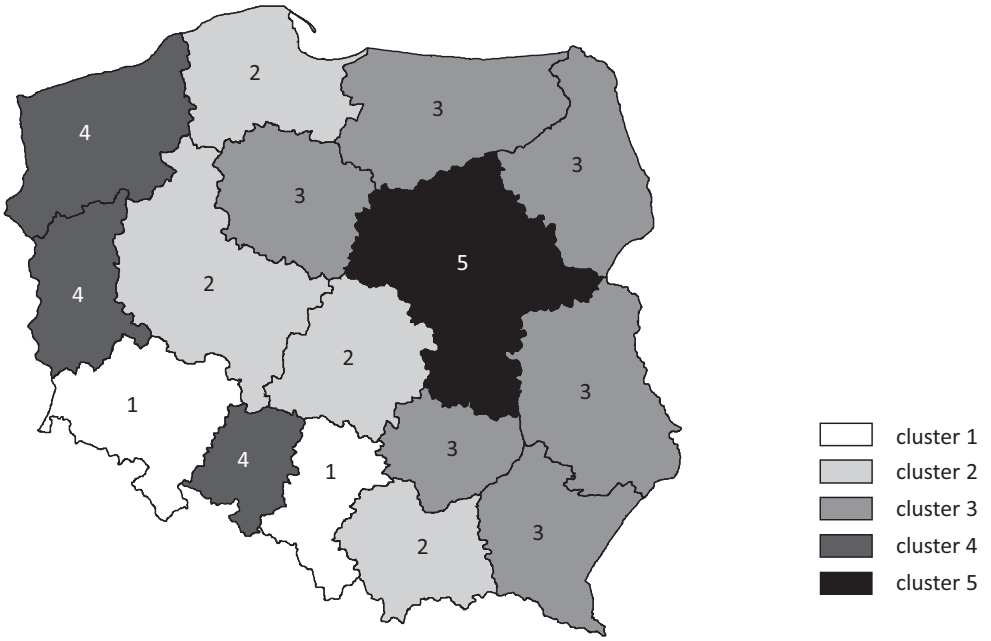
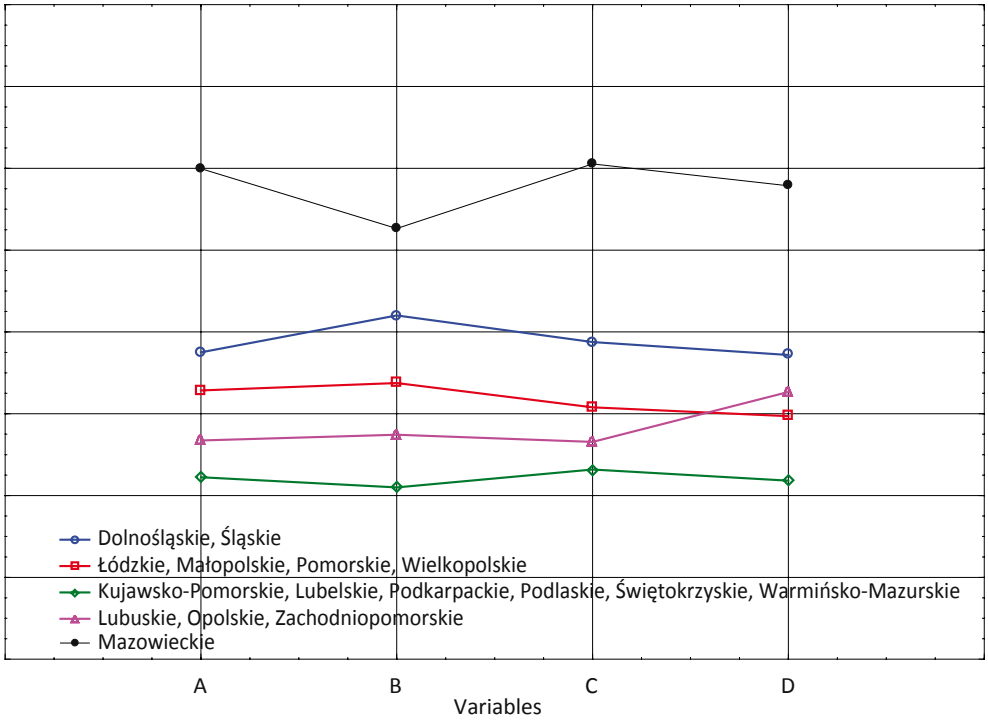


Fig. 2. Geographical distribution of cluster elements obtained as a result of grouping provinces

Source: Own study.



A – gross domestic product per capita, B – gross disposable income per capita, C – Average monthly gross wages, D – average monthly disposable income per person in total

Fig. 3. Mean values of variables for clusters obtained as a result of grouping provinces

Source: Own study.

values of gross domestic product per capita, gross disposable income per capita and average monthly gross wages are higher than the values for the fourth cluster. On the other hand, the average value of monthly disposable income per person in total is higher for the second cluster.

In order to supplement the study, an analysis of discriminatory variable variance was carried out (Table 6).

The results of the analysis of variance presented in Table 6 show the plausibility of applying diagnostic variables. The variables used for the analysis discriminate clusters at the significance level of 0.01. The classification of a given object (province) to a specific cluster is made upon the principle of minimizing variability inside the cluster and maximising the variability between clusters. A high variability between the identified clusters and a relatively low variability inside the clusters proves the proper grouping of provinces with regard to the analysed variables. Based on the *F*-test evaluation (Table 6), it can be concluded that variables well discriminate the clusters.

Table 6. Analysis of variance

Variable	Intergroup variance	*df*	Intragroup variance	*df*	*F*	*p*
Gross domestic product per capita	14.37	4	0.63	11	62.71	0.000000
Disposable gross income per capita	13.64	4	1.36	11	27.58	0.000011
Average monthly gross wages	14.03	4	0.97	11	39.73	0.000002
Average monthly disposable income per person in total	13.02	4	1.98	11	18.10	0.000084

Source: Own study.

SUMMARY

To summarize the analysis, regional disproportions of the economic situation can be observed in Poland. Although the literature [Harjes 2007, Rodriguez-Pose and Tselios 2008, Berloffa and Modena 2012] increasingly often indicates that high concentration of income is a desirable phenomenon, income inequalities also have a negative effect on economic development.

This study will make it possible to formulate conclusions regarding the aim of this paper. Households representing provinces in eastern Poland have lower gross disposable income per person in the household. The province of Mazowieckie was the most diverging from others. Large spreads in values representing variables assumed for the analysis caused that Mazowieckie formed a separate, single-element cluster. High means were obtained for the cluster represented by provinces of Dolnośląskie and Śląskie. Higher values of the parameters assumed for the analysis, describing the economic situation of provinces, was certainly affected by the better economic situation of those regions (infrastructure, investments and capital).

The presented results permit us to draw the indirect conclusion that in provinces with higher GDP per capita, the population earns a higher income and, consequently, consumption expenditures make up a smaller share in the income received. The observed phenomenon is a characteristic feature for polarization of development. Although the existence of differentiation is acceptable in the economy, persistent and increasing diversification in individual areas has become one of the challenges in the contemporary economy. Prolonged and excessive differences between the levels of phenomena describing the economic situation of provinces and, consequently, living conditions, are not favourable for the process of social and economic development, and can often be one of the main barriers to regional development. The analyses described in the paper are a part of the research carried out on the subject of diversification of provinces and the obtained results confirm the plausibility of using multidimensional analyses in the examined regions.

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ZRÓŻNICOWANIE POTENCJAŁU EKONOMICZNEGO GOSPODARSTW DOMOWYCH W WOJEWÓDZTWACH POLSKI

STRESZCZENIE

Dochód rozporządzalny gospodarstw domowych chociaż nie jest jedynym miernikiem jakości i poziomu życia to jest podstawowym czynnikiem kształtującym konsumpcję, jej poziom i strukturę. Do oceny regionalnych różnic związanych z sytuacją ekonomiczną gospodarstw domowych wykorzystane zostały dane opisujące poziom dochodów rozporządzalnych na osobę w gospodarstwie domowym, wynagrodzenia oraz dochody do dyspozycji. Chociaż PKB może być tylko pośrednio identyfikowany z potencjałem ekonomicznym gospodarstw domowych, to uwzględnione zostały także dochody do dyspozycji na mieszkańca oraz poziom PKB uzyskiwany przez jednostki podziału administracyjnego. Na podstawie charakterystyk opisowych przyjętych do analizy zmiennych zastosowano metodę *k*-średnich w celu pogrupowania obiektów (województw). Celem artykułu jest pogrupowanie województw na podstawie przyjętych do analizy zmiennych. Zastosowana metoda analizy wielowymiarowej pozwoliła na pogrupowanie województw. Każdy z segmentów zawiera województwa najbardziej podobne do siebie ze względu na przyjęte do analizy cechy. Przedstawione wyniki pozwalają pośrednio na wysnucie wniosku, że w województwach o wyższym poziomie PKB na mieszkańca ludność uzyskuje większe dochody, a w konsekwencji ich wydatki konsumpcyjne stanowią mniejszy udział w uzyskiwanych przychodach.

Słowa kluczowe: zróżnicowanie regionalne, PKB, dochód rozporządzalny, gospodarstwa domowe

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THE ROLE OF SPORTS BROADCASTS IN GAINING COMPETITIVE ADVANTAGE BY TV STATIONS

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ABSTRACT

The aim of this paper is to explore the role of sports broadcasts in achieving competitive advantage by TV stations over their rivals on the basis of primary and secondary sources. Firstly, the study provides a review of the transformations of the television market in Poland resulting in more intense search for new content and sources of funding. Secondly, it presents analysis of viewership and advertising revenues of TV stations holding rights for sports broadcasts. Finally, it investigates what factors determine viewers' decision to pay for premium content. The conducted analysis covers broadcasts of selected sporting events, namely football matches played as part of championships and ski jumping. TV stations holding rights to broadcast important sports events have higher advertising revenues, bigger audience market shares and launch additional channels, special platforms and use social media to deliver their content to all segments of the audio-visual market.

Key words: television, audience, sports broadcasts, advertising revenue, premium content

INTRODUCTION

Nowadays, TV broadcasts of sporting events are most watched TV shows which attract large audiences. Content and viewership are obviously the basic tools of direct competition on the television market. The more viewers watch the show the bigger is the advertising revenue allowing for further investments in content and technologies.

The television market is currently undergoing major changes resulting from transformations in the broadcasting structure. The key factor influencing these changes is technological progress leading to an increase in the number of available broadcasting channels and an ever stronger competition for the viewer [Küng 2012]. Alongside the declining viewership of traditional television, sports along with TV series draw multimillion audiences. However, new technologies and the development of the Internet have made it necessary for the stations to attract viewers by offering new products in this area, for example – access to premium content. In the case of sports broadcasting premium content is digital content accessed by a fee through additional paid channels, pay-per-view services, special platforms and live video broadcasts in social media [Kosman 2014].

The aim of this paper is to explore the role of sports broadcasts in achieving competitive advantage by TV stations over their rivals. The study uses primary and secondary sources, in particular – television audience measurement (TAM) data. The results of the conducted analyzes are presented in graphical and descriptive form. The study focuses on selected sporting events, namely football matches played as part of the championships and ski jumping. The diagnostic survey method was used to identify the determinants of viewers' decision to purchase access to premium content.

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TELEVISION MARKET CHANGES DETERMINING THE SEARCH FOR NEW CONTENT AND FUNDING

As a result of the process of digitization and the emergence of the Internet the entire structure of media industry has been changed, including existing business models and new strategic relationships. In addition, technological progress has improved the prospects of wider dissemination of content and globalization has contributed to the benefits of the economies of scope.

According to Hjarvard [2008], the media is transforming forms, content and organization. With regard to form of communication, modern means of communication are used, enabling the viewer to follow events anywhere and at any time [Nosal 2010]. With regard to content, e.g. broadcasts of sporting events contain more and more graphics and visuals providing the viewer with additional information, e.g. on time, distance, statistics or other parameters of sports games.

Acquiring attractive content to draw a large audience is a key element of direct competition between television broadcasters. The size of the audience in the early phase of television was determined, in the first place, by the technically restricted reach of the station, which later changed with the emergence of cable, satellite and digital terrestrial television. A good example are the universal programs broadcast by TVP1 (Polish Public Television Channel 1), TVP2 (Polish Public Television Channel 2), Polsat and TVN called the Big Four. At the beginning of the 21st century the Big Four attracted the majority of the television audience but in recent years they have been losing viewers despite diversification of content and access [Kurdupski 2016]. In 2017, TVP1 had the largest audience market share in the 4+ age group (around 11.16%), followed by Polsat (11.07%). For comparison, in 2007 it was respectively 24.34 and 16.7%. In 2007, the share of the Big Four was 76.14%, and 10 years later it decreased almost twice to the level of 42.3%. This was the result of shifting the viewer's interests towards other channels because according to television audience measurement, in 2017 a statistical Pole spent an average of 4 hours, 18 minutes in front of a TV screen [Kurdupski 2018] and it was similar to previous years. In 2016, it was 4 hours 21 minutes, and 4 hours 23 minutes in 2015 [Jaska and Werenowska 2017].

In the analyzed period, commercial stations gradually began to attract more and more viewers in the age group of 16–49. In 2007 Polsat TV station had more viewers than TVP2 and in 2011, for the first time Polsat achieved higher audience market shares than TVP1. In 2017, public broadcaster's channels held the third and fourth positions. The audience of this station is older and therefore the ranking of shares differs from the one in the age group 4+. The TV market has changed dramatically in the last decade, and one of the changes is almost a fourfold increase in the number of speciality channels.

The first thematic channels on the Polish TV market were primarily news channels. Hence, in Table 1, if there is no data provided, it is because the channel was created later. The audience market shares of thematic channels are much lower than those for universal channels, but this is a phenomenon typical of television markets due to the fragmentation of the audience. Viewers' loyalty and regular use of a given channel is not as common as it used to be. Thanks to media with multi-channel systems, this rule is no longer valid. Nowadays, broadcasters offer new, more diverse forms of content delivery and the content itself is addressed to precisely selected target audiences. Big TV stations give way to much smaller but specialized media [Jaskiernia 2016].

The increasing market share of other than the Big Four channels resulted from the viewers interest in more diverse range of options, as well as from the development of audience measurement technologies, which the smaller broadcasters looked forward to. Broadening the scope of television audience measurement (TAM) was crucial for future broadcast programming and the expenses incurred on television advertising [Dzierżyńska-Mielczarek 2014].

Mobile TV is another factor shaping the potential viewer's attitude. This form of viewing is even called the third screen right next to a personal computer and a traditional television set. The recipients can personalize their own activity as a potential viewer, as well as control the provided content.

Nowadays, the use of audiovisual content delivered through on-demand services is gaining popularity, and is often referred to as post-TV [Bielak et al. 2011]. A few years ago video on demand (VoD) serv-

Table 1. The share of thematic channels in the audience market in 2010–2017 in the 16–49 age group

Channel	2010	2011	2012	2013	2014	2015	2016	2017
	SHR (%)							
TVP Info	2.81	2.22	2.01	1.16	1.11	1.37	1.24	1.40
TVN 24	3.40	3.60	2.29	2.35	2.38	2.45	2.31	2.09
TTV	–	–	0.64	1.05	1.45	1.61	1.91	2.42
TVP Seriale	–	0.61	0.76	1.34	1.55	1.43	1.79	1.61
TVP ABC	–	–	–	–	–	0.66	0.76	1.38
Polsat News	0.41	0.66	0.74	0.81	0.91	0.79	0.75	0.66
Fokus TV	–	–	–	–	-	0.67	0.95	0.91
Stopklatka	–	–	–	–	0.63	0.95	1.00	0.93
TVP3	–	–	–	–	–	0.57	0.56	0.45
TVP Rozrywka	–	–	–	0.46	0.87	1.15	0.95	0.77
ATM Rozrywka	–	–	0.52	0.82	0.85	0.83	0.86	0.77
TVN Style	0.77	0.48	0.72	0.91	0.90	0.92	0.92	0.93

Source: Own elaboration based on reports from wirtualnemedia.pl.

ices were viewed as not very competitive and with not much potential for growth. However, everything has changed after the success of video streaming services such as Netflix and Hulu [Jaskiernia 2016].

Video services can be divided into those offered by video file sharing platforms (such as YouTube or Dailymotion) and those that offer video on demand (e.g. player.pl, vod.pl or netflix.com). Video on demand services are offered by traditional television broadcasters, cable and satellite operators, as well as internet portals and telecommunications service providers.

An increasing number of Poles are opting for paid VoD subscriptions. By 2021, it is expected that there will be 3 million subscribers in our country. These forecasts were prepared by Digital TV Research as part of forecasts for the VoD market in Eastern Europe [Lemańska 2016]. Paid options are gradually being developed by such services as ipla.tv or player.pl. Undoubtedly, the growing popularity of online VoD services can be largely credited to Netflix, which debuted on the Polish market in September 2015.

The development of this segment of the audiovisual market is determined, among others, by investments in the production of films and TV series, which are most watched by those who use on-demand services. This, in turn, involves incurring considerable expenses and it is therefore necessary to use specific methods of monetization of video content and access platforms. The creator of video content has the opportunity to earn revenue from the publication of video materials, e.g. by placing information from the sponsor, testing or locating products or product lines. Many creators of video content provide, for a fee, a blog or vlog space for advertising purposes. It is also possible to place partner's links next to videos, i.e. redirecting to an online store that offers products shown on the video blog. Popular bloggers can also create so-called sponsored entries, provide direct links to online shops, use crowdfunding or raise money through integration with online payment services. Another form of monetization of the content of video files producers (especially the well-known ones), is to post videos on platforms that provide content from users, such as YouTube or cda.pl. Under the YouTube's partnership project the producer's channel is made part of the advert display system and ads are played before or during the video.

SPORTING EVENTS BROADCASTING RIGHTS AND THE SIZE OF AUDIENCE AND ADVERTISING REVENUES SIZE

Currently, media coverage to a greater extent determines many aspects of sports competition. The increasing number of broadcasting hours has significantly influenced the subordination of sports events to television requirements. The increased competitiveness and financial strain has forced media companies to put pressure on organizers of sports events to make them more attractive for TV viewers. This produced increased audience's interest, which in turn resulted in higher broadcasters' profits. Therefore, sport has considerably contributed to the process of mediatization [Kopecka-Piech 2013].

The sports broadcasting contracts in the television broadcaster's portfolio allows to build a larger audience and that is why the key Polish broadcasters compete strongly to be able to cover the biggest sporting events.

The ranking of the 10 most watched programs in 2017 (Table 2) is dominated by sports broadcasts (8 items). The list also includes a news program and TV series. The largest audience was drawn by the qualifying football match for the World Cup when Poland played Montenegro. It was broadcast by Polsat and drew an average of 8.5 million people (Polsat Sport 950,000). The share of the station at that time was 52.97% (Polsat Sport 6%). The second place is occupied by another qualifying match Poland–Romania, which was watched on Polsat channel by an average of 7.26 million people and it was a 50.26% share (Polsat Sport 726,000 people and 5% share) [Szewczyk 2018].

The young generation increasingly often declares that they have given up the traditional forms of accessing information in favour of using the content of the Internet. Online platforms can successfully complement the TV offer. The Polsat group (present on the ipla.pl platform) and the Eleven Sports group (offering Elevensports.pl) have the most extensive online sports content. Thanks to such platforms live broadcasts can be viewed via computer, mobile devices or on Smart TV. Internet sports broadcasts are also delivered by TVP and Eurosport, on sport.tvp.pl and Eurosport Player.

In the last decade, the most watched broadcasts of sporting events in Poland included: ski jumping, football and volleyball, especially the championships

Table 2. TV shows with the largest audience in 2017

No	Top 10			Group 4+	
	TV show	TV station	Date	AMR	SHR (%)
1	World Cup qualifying matches, Poland–Montenegro match	Polsat	07.08	8 496 385	52.97
2	World Cup qualifying matches, Poland–Romania match	Polsat	10.06	2 257 887	50.26
3	*Teleexpress* (TV news show)	TVP1	06.01	7 217 265	43.89
4	World Cup in ski jumping, 4-Hills-Tournament, Bischofshoffen	TVP1	06.01	6 910 749	41.27
5	World Cup qualifying matches, Poland–Montenegro match	Polsat	26.03	6 881 346	41.07
6	World Cup in ski jumping, individual competition, Zakopane	TVP1	22.01	6 793 411	45.78
7	*M jak miłość* (TV series)	TVP2	02.01	6 652 463	39.88
8	World Cup in ski jumping, individual competition in Willingen	TVP2	29.01	6 425 896	45.72
9	World Cup qualifying matches, Poland– Kazakhstan match	Polsat	04.09	6 265 747	40.10
10	World Cup qualifying matches, Denmark–Poland match	Polsat	01.09	5 921 097	39.78

Source: Kurdupski [2018].

and Olympics. The free-to-air channels still enjoy the highest viewing rates.

So far the most special sporting event in Poland was the European Football Championship in 2016, which for the first time in the history of Polish television was broadcast by two free-to-air TV channels, namely Polsat and TVP1. Polsat bought the championship broadcast rights for EUR 35 million from UEFA. For the period of the championships, they launched two dedicated channels (Polsat Sport 2 and Polsat Sport 3), which broadcast coded matches, among them the best group matches and games of the 1/8 finals. The station has prepared over 200 hours of direct live coverage, and the two new channels offered a set of 51 matches without advertising breaks and in the highest technological quality. Two months before the tournament in France, it turned out that the public broadcaster (TVP) did not give up and finally, on the sub-license basis, bought from their main competitor the right to show a few matches for PLN 40 million. TVP broadcast the events on TVP1 and on sport.tvp.pl.

The competition for the viewer was won by TVP and it was probably the result of viewers' habits, as earlier only the public broadcaster acquired rights to broadcast such important sports events, (the only exception was year 2008, when Polsat also had the rights to broadcast European Football Championship for the first time in the history of Polish TV market).

Broadcasts from Euro 2016 are also worth characterizing from the business perspective. Polsat's advertising revenues from Euro 2016 broadcasts amounted to approximately PLN 40 million while TVP 1 received PLN 19 million [Bugajski 2016]. TVP showed fewer matches, but had a larger audience (Table 3). When it comes to concrete broadcasts, the record-breaking viewership and the largest advertising revenues in history were recorded during the Poland–Portugal match. According to Starcom's calculations, Polsat's net profit for this broadcast amounted to PLN 5.8 million, and in the case of the public broadcaster, this amount was estimated at PLN 3.2 million [Telekabel.pl 2016].

During half-time and after the matches both stations had the opportunity to compete in the sphere of advertising revenues. The financial result estimated for the Romania–France opening match and the Poland–Northern Ireland match is better for Polsat. The analysis prepared by SMG media agency for the Business Insider Polska portal shows that Polsat's advertising revenues for both games amounted to PLN 3.6 million while the estimate for TVP was PLN 3.2 million (Table 4).

Table 3. Viewership of matches broadcast simultaneously by TVP and Polsat

Date	Football match	AMR 4+		
		TVP1	Polsat	Polsat Sport
10.06.2016	France–Romania	4 271 486	2 973 295	522 948
12.06.2016	Poland–Nothern Irland	7 018 506	4 117 575	868 804
16.06.2016	Germany–Poland	7 933 688	5 481 850	936 474
21.06.2016	Ukraine–Poland	6 734 874	5 169 434	734 720
25.06.2016	Switzerland–Poland	6 557 201	4 540 004	815 797
27.06.2016	Italy–Spain	1 897 958	2 406 983	483 856
30.06.2016	Poland–Portugal	8 071 256	6 884 811	1 018 755
02.07.2016	Germany–Italy	2 841 884	2 995 484	467 933
06.07.2016	Portugal–Wales	3 669 578	3 584 173	481 941
07.07-2016	Germany–France	4 339 647	3 365 701	612 394
10.07.2016	Portugal–France	5 183 538	4 450 167	598 839

Source: Own elaboration based on data from AGB Nielsen.

Table 4. Advertising revenues of TVP and Polsat for selected Euro 2016 matches[a]

TV station	Revenues based on price list	Net income	Advertising length	Number of spots
Advertising revenues from France–Romania football match				
TVP1	1 939 200	930 816	00:15:20	35
Polsat	1 424 400	762 766	00:39:10	103
Advertising revenues from Poland–Northern Ireland football match				
TVP1	4 697 850	2 254 968	00:18:50	45
Polsat	5 345 615	2 862 577	00:41:25	110

[a] Net estimates based on advertisements price list and the discount policy of TVP and Polsat.

Source: Own elaboration based on Pallus [2018].

There are three factors which explain the differences in advertising revenues presented above [Pallus 2018]:

- TVP charged high rates for broadcasting advertisements which resulted in significantly lower demand for spots. Polsat generated nearly three times as many ads, which length was more than double that of the public broadcaster's. TVP had problems with filling in the airtime surrounding the broadcasts from the studio;
- Polsat deliberately removed the broadcast from the studio at half-time, and thus the station could fit more spots in the slot with the largest audience;
- Polsat's viewership was about 20% higher because there were parallel match broadcasts on Polsat Sport.

Sports events involving the Polish national team draw the largest audiences and attract advertisers who are willing to pay more for the airtime. During Euro 2012, TVP exclusively broadcast 31 matches. The SMG report shows that about 30% of advertising revenues from matches come from the matches of the Polish national team and the finals. The remaining 27 games were the source of 70% of the advertising revenues [Telekabel.pl 2016].

Another example illustrating the importance of sports broadcasting in building the station's position on the advertising and audience market is the 2018 World Cup Russia. According to TVP, it was a great success of the broadcaster both in terms of record audience and advertising revenues. The net profit was estimated at PLN 10 million. TVP broadcast almost 900 hours of sports show, including over 50% of live broadcasts, 64 matches on free-to-air channels (TVP1 and TVP2), TVP Sport programming was dedicated only to this event and additionally there were 4K broadcasts on the new TVP 4K channel. There was an increase in the number of Internet users by over 40% visiting websites both dedicated to sports and providing news. A record online TV viewership was recorded during the Poland–Senegal match. All online channels (website, mobile applications like TVP Sport and vod.pl) attracted nearly 600,000 users. The Japan–Poland match (580,000 users) was almost equally popular. However, the largest online audience which used TVP Sport application was drawn by Poland–Senegal match – 81,000 viewers.

FACTORS DETERMINING THE CHOICE OF PREMIUM CONTENT IN THE OPINION OF THE RESPONDENTS

In order to identify the determinants of purchasing premium content, a survey was conducted in the first half of 2018, which involved 110 people. The empirical material was collected by Kuć. The respondents were mainly young people aged 19–24 (95%) with secondary education (45%) and higher education (55%). Half of the respondents lived in cities with over 250,000 residents, and about 40% of respondents declared monthly income per family member of PLN 801 to 1,500. The three most-chosen types of broadcasts include free-to-

-air channels (82.0%), thematic channels (54.5%) and Internet platforms (41%). Broadcasts on mobile applications and text services were indicated by 13.6% of respondents, while social media live broadcasts were watched by almost one in ten respondents. The very modern forms of communication still lag behind, namely pay-per-view options and mobile applications dedicated to specific events. About 73% of respondents never decided to pay a fee to access a service created for a specific sporting event. This form is little known in our country and is used mainly by Polsat TV station, especially for martial arts and volleyball broadcasts.

The factors that most determine viewers' choice of paid sports broadcasts include: viewing mobility (3.8 points on a Likert scale) and diverse content (3.89 points on a Likert scale). Premium channels are the ones which provide a wide range of broadcasts and services. The weakest factor that determines the choice of premium content is its presence in the service packages delivered by Internet or digital TV providers.

Lack of interest in premium content results from the lack of need to access a wider range of broadcasts (3.44 points). Secondly, the respondents pointed to a sufficient content of free-to-air channels (3.0 points) and too high access fees (2.91 points). A detailed distribution of responses is shown in the figure.

Access fees to online platforms and paid channels are one of the basic factors determining the clients' decision regarding their purchase. There is a relationship between the place of residence and the inclination to allocate additional financial resources for this purpose (Table 5). The rural population would not decide to spend more than PLN 250 annually on channels and platforms and 67% of this group would limit this expenditure to PLN 100. In cities of up to 50,000 residents, every fifth respondent would decide to pay from PLN 201 to 500. People who are prepared to pay more than PLN 500 are residents of cities over 250,000 inhabitants (9%).

The surveyed group was also asked to evaluate the quality of TVP and Polsat services provided via

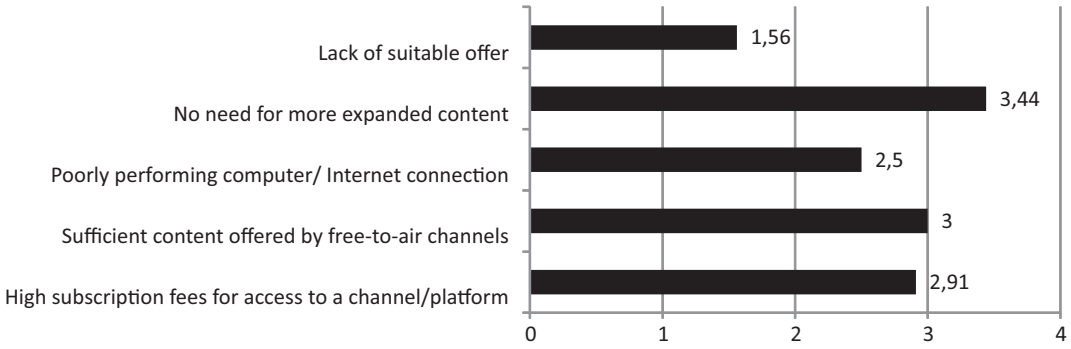

Fig. Determinants of resignation from premium content (Likert scale)

Source: Own research results.

Table 5. Declared expenditures on paid channels and platforms by place of residence (%)

Place of residence	Declared amount			
	up to PLN 100	PLN 101–250	PLN 201–500	more than PLN 500
Rural areas	66.7	33.3	0.0	0.0
City of up to 50 000 residents	40.0	40.0	20.0	0.0
City of 51 000–250 000 residents	0.0	33.3	66.7	0.0
City over 250 000 residents	18.2	27.2	45.5	9.1

Source: Own research results.

traditional TV channels and the Internet. The rating was again made on a Likert scale and it turned out that in both cases free-to-air TV channels were better assessed (TVP 3.82 points, Polsat 3.64 points) than the Internet services (sport.tvp.pl 3.59 points, Polsat platform 3.27 points).

CONCLUSIONS

On the Polish market TVP, Polsat, Eurosport, NC+, Eleven and SportKlub are sports channels that currently have the majority of broadcasting rights for sporting events and compete for such contracts in subsequent seasons. The competition among broadcasters to attract and retain viewers has a positive impact on improving the quality and form of broadcasts and maintaining their existing strengths. This is important due to the ongoing changes in the audiovisual content market, i.e. the fragmentation of the audience and new technological possibilities for disseminating content. However, according to the conducted survey, viewers are not willing to pay additional fees for access to online platforms and paid channels because the content delivered by free-to-air channels satisfies their needs. The viewers who use modern media appreciate their mobility and the range of content.

The presented viewing rates and advertising revenues confirm that the contract for sports event broadcasts in the television broadcaster's portfolio is a source of competitive advantage in the advertising and audience market, however, it is also important to launch additional channels and diversify forms of content dissemination.

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ZNACZENIE TRANSMISJI SPORTOWYCH W BUDOWANIU PRZEWAGI KONKURENCYJNEJ STACJI TELEWIZYJNYCH

STRESZCZENIE

Celem artykułu jest przedstawienie znaczenia transmisji sportowych w budowaniu przewagi konkurencyjnej stacji telewizyjnych na podstawie źródeł pierwotnych i wtórnych. Scharakteryzowano zmiany na rynku telewizyjnym determinujące poszukiwanie nowych treści i form finansowania, wielkość audytorium i wpływy reklamowe stacji posiadających prawa do transmisji sportowych, a także czynniki wyboru kontentu premium. Przeprowadzona analiza została ograniczona do meczów piłki nożnej rozgrywanych w ramach mistrzostw i skoków narciarskich. Stacje posiadające prawa do ważnych wydarzeń sportowych mają większe wpływy reklamowe, większe udziały w rynku widowni i uruchamiają dodatkowe kanały, specjalne platformy i social media do upowszechniania posiadanego kontentu. Tym samym wzrastają ich udziały w rynku widowni, reklamy i są oni obecni ze swoją ofertą w wielu segmentach rynku audiowizualnego.

Słowa kluczowe: telewizja, audytorium, transmisje sportowe, wpływy reklamowe, kontent Premium

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THE RESILIENCE OF REGIONS TO ECONOMIC RECESSION: THE ANALYSIS OF EMPLOYMENT TRENDS

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ABSTRACT

The aim of the paper is to identify the reactions of Polish regions to the negative macroeconomic shocks triggered by the global economic crisis dated for 2008–2010. In the course of the research, econometric forecasting and statistical hypothesis testing methods were used. The research was based on the analysis covering dynamics of increase in the employment using the indicator of employed persons in enterprise sector (as a fixed-based index of dynamics). The findings showed that the crisis of the end of the first decade of the 21st century had different course and impact on regional economies in Poland. Negative impact of the breakdown on regional labour markets prevailed, while positive outcome (a new, more dynamic growth rate of employment) was recorded in only one region.

Key words: Poland, regions, economic resilience, econometric forecasting, employment trends, comparison of slopes

INTRODUCTION

The increasing economic risk and uncertainty that accompany the acceleration of growth dynamics of various phenomena and economic sectors, provoke the discussion on the reactions of spatial-economic systems to crises. The identification and measurement of economic resilience is currently one of the key problems of evolutionary approach to economic development studies.

Major challenge faced by researchers within the field of regional economic resilience is to develop a research method that allows for measurement and evaluation of recession's impact on economies. The lack of universal methods in this area is a result of a multi-dimensional approach to the concept of regional resilience and the need to study various aspects related to changes in the economy caused by macroeconomic disturbances. Domański [2018] emphasizes that resilience is not a simple static state of the regional economy, but a sequential and complex process depending on the nature, depth and span of the crisis, previous growth path and many other determinants of this path (structure of the regional economy, resources, capacities and competences of the local and national institutions, etc.). Wojtyna [2011] further argues that the diversification of the recession-induced impact on economies may result from institutional features of the economy (such as regulatory solutions) and structural features (mainly the degree of openness and flexibility of the markets). Therefore, according to Kudłacz [2012], regions placed under pressure of the same phenomena, differ with respect to time needed for resuming the old growth path or stabilizing the new one.

The main goal of the paper was to identify the reactions of Polish regions to the negative macroeconomic

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shocks triggered by the global economic crisis dated for 2008–2010. The theoretical frame of the study was the concept of economic resilience. Adapted to the regional context, resilience was perceived as the ability of regions to respond to macroeconomic disturbances, reflected by the degree of crisis-driven changes in regional economies.

The methodological goal of the paper was to present the possibilities of using econometric forecasting methods and statistical hypothesis testing methods in regional resilience research. In this aspect, a research procedure was proposed to analyse changes of regional economies' growth paths by statistical comparison of the slopes of regression lines.

The research was based on the analysis covering growth dynamics of employment using the rate of employed persons in enterprise sector (as a fixed-based index of dynamics). The analysis spanned the period 2005–2017 using quarterly time-series.

ECONOMIC RESILIENCE CONCEPTS

Fluctuations of economic activity have been a commonly addressed issue for many years, yet they are still gaining interest among researchers. One of the increasingly popular approach to business cycle research is economic resilience that describes how recessions affect national, regional or urban economies.

The resilience research was developed on the background of the physical, engineering and ecological sciences [Holling 1973]. Much later the concept was adapted for regional and spatial economic analyses. Their main goal was to identify how local societies and regional economies reacted to external disturbances. Researchers examined how long it took regional systems to resume the pre-crisis state and how deep shocks determined trajectories of regional growth [Martin 2012, Domański 2018].

Martin [2012] argues that spatial economists' growing interest in the issue of resilience is the outcome of the evolutionary perspective within economic geography and the application of models developed in other disciplines for the analysis of reaction of spatial economics systems (urban and regional) to major disturbances and perturbations (called shocks) hindering their growth. According to Simmie and Martin [2010], such shocks can take form of periodic economic recessions, unpredictable rise of major competitors elsewhere, unexpected plant closures, as well as challenges arising from technological change and the like. Martin [2012] emphasizes that the global economic crisis in the years 2008–2010 had the greatest impact on the development of the economic resilience research.

In spite of numerous attempts to conceptualize and define the term of regional economic resilience, it still rises concerns. On a general level, it is described as an ability of a region to predict, prepare for, react to and recover from a crisis situation [Foster 2007]. In this context, the attention of researchers focuses on resilience mechanisms, i.e. the ability of regional socio-economic systems to continue the existing growth path [Zaucha et al. 2014]. Other definitions equate the term with the systemic property that ensures stability of a system against interference [McGlade et al. 2006]. In microeconomic terms, resilience to crisis is defined as long-term development capacity of enterprises while maintaining good business performance despite the economic recession [Romanowska and Mierzejewska 2016].

More detailed interpretations refer to similarities of the concept to resilience researched in the field of physical and ecological sciences, as well as within the complexity theory. In case of physical sciences, the concept of engineering resilience prevails. It is understood as the ability of a system to return to, or resume, its assumed stable equilibrium state following a shock or disturbance. In case of ecological sciences, the focus is on "far from equilibrium" behaviour of a region. It describes the scale of an economic downturn a region can absorb before it is destabilized and moved to another stable position. It is assumed that after exceeding the border of elasticity, the system undergoes changes of the structures and relationships. As a result, the system redirects its equilibrium path (changes its course compared with the pre-existing one). Due to its roots in the ecosystem resilience and stability research, this approach is called ecological resilience. In the third case (the complexity theory), another sphere of resilience is explored. The concept is called adaptive resilience and may be traced back to the complex adaptive systems theory. It focuses on adaptive capability of regions that enables continuous adjustment

and reorganisation of economic structures and functions in order to minimize the impact of destabilizing disturbances [Pimm 1984, Holling 2001, Simmie and Martin 2010, Boschma 2015].

The existing body of literature describes regional resilience in four main dimensions: resistance, recovery, re-orientation, and renewal. Resistance means the degree of volatility that translates into the depth of reaction to the shock. Recovery is identified with the speed and degree of resumption of the previous state by regional economy after experiencing disturbances. Re-orientation refers to changes in direction and structure of the regional economy in response to the shock. Renewal determines the degree and rate at which regional economy returns to the previous growth path or moves to a new path [Martin 2012, Martin et al. 2016].

Based on the approaches mentioned above, one can distinguish some model reactions of regional economies to severe external shocks (Fig. 1).

In the first reaction type (a) the growth path is recovering from the disturbance caused by the recessionary shock and it is back on the pre-existing trajectory. This situation is identified with returning of a region to its previous steady growth path after the shock. The other types are related to achieving stability in a situation that is far from equilibrium, with positive or negative impact of a recessionary shock on a region's growth path. The positive impact of a shock on a regional economy can manifest itself in two ways. The regional economy, rebuilding itself after the recession, may return to pre-recession growth rate, yet at a higher level (b) or enter the path of lasting, more dynamic growth (c). Negative impacts of economic shocks occur when a region's economy fails to resume the previous growth path but achieves the same growth rate on an inferior path, i.e. on a lower level, (d), or undergoes steady decrease both in the growth level and rate (e).

RESEARCH PROCEDURE

A comprehensive analysis of the different reactions of regional economies to the crisis would require considering both the depth of the recession, its duration, the speed of recovery of the economy and the level of resuming the state from before the crisis. It is crucial to check whether it is a full recovery to the pre-recession growth path, or a shift to another, less or more dynamic path. These phenomena are vividly reflected by changes in production and employment, thus in numerous studies resilience is usually measured by the GDP growth rate and the employment dynamics.

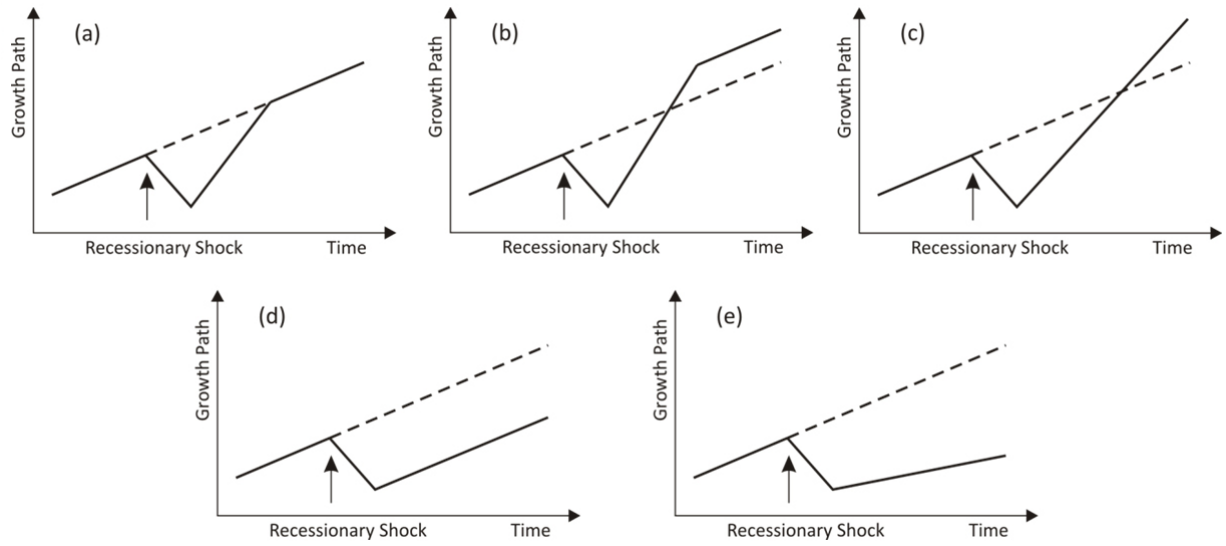

Fig. 1. Reactions of regional economies to severe shocks (explanations in the text)
Source: Simmie and Martin [2010] and Martin [2012].

This paper presents research on resilience in terms of the speed and degree of regional economies' recovery after the recession that occurred at the end of the first decade of the twentieth century. The assessment of regional resilience was conducted by means of analysis of the current and previous growth paths (before and after the recessionary disturbances) using the employment rate as a quantitative measure sensitive to changes within the regional economy and adequately reflecting the depth and pace of economic fluctuations [Bosworth et al. 1996, Smith 2003, Cichocki et al. 2015]. Previously, the scope of changes of employment as a reaction to the global financial crisis was analysed e.g. by Kwiatkowski [2011], Marelli et al. [2012], Cezes et al. [2013], Zieliński et al. [2014], Gabrielczak et al. [2016], Ferreiro and Gómez [2017].

The point of departure for the formal analysis was to chart for all Polish regions the course of changes in time using the employment index. As a base period, the first quarter of 2005 was adopted. The span of the analysis was determined by the availability of statistical data obtained from the Local Data Bank of the Polish Central Statistical Office (GUS).

In the next step, the time series were divided into three stages. The first period (here called a pre-recession phase – PR) spanned the time up to the recessionary shock. It was reflected in a clear change of the growth trajectory in the form of a continuous and significant decrease in the employment index. The phase spanning the period between the breakdown in the regional labour markets and the increase in the dynamics of the analysed rate was referred to as recession phase (RP). The last sub-period was denoted in the paper as a recovery phase (RE). It covered the years after the recession, when the growth paths were in the stage of recovery, rebuilding their previous shapes, yet in different time and scope.

On the basis of the analysed variable in the pre-recession phase, an ordinary least squares method was used to estimate the linear[1] trend function:

$$y_{t(\mathrm{PR})} = b_1 t_1 + a_1 \ (t_1 = 1, 2, \ldots, n_1)$$

Next, the trend was extrapolated on the subsequent time series (between the recessionary shock and the year 2017). This way predicted values were obtained, i.e. the values that would theoretically have occurred in the regional economy if it had not been for the recession. Similarly, the linear trend function was estimated on the basis of the recovery phase data:

$$y_{t(\mathrm{RE})} = b_2 t_2 + a_2 \ (t_2 = 1, 2, \ldots, n_2)$$

Finally, coefficients of the estimated trends were compared. For this purpose, t statistic was used to test the statistical hypothesis about the equality of two slopes of regression lines (H_0: $b_1 = b_2$ to H_1: $b_1 \neq b_2$). To verify the H_0 hypothesis, test statistic is used based on the following formula [McClave and Benson 1988, Andrade and Estévez-Pérez 2014]:

$$t = \frac{b_2 - b_1}{\sqrt{\frac{s_{yx_1}^2}{sd_{x_1}^2 (n_1 - 1)} + \frac{s_{yx_2}^2}{sd_{x_2}^2 (n_2 - 1)}}}$$

where:

$$s_{yx_1} = sd_{y_1} \sqrt{\frac{n_1 - 1}{n_1 - 2}(1 - r_1^2)}$$

y – endogenous variable – employment index in the pre-accession phase (y_1) and recovery phase (y_2);
x – exogenous variable (time variable t_1 and t_2);
b – estimate of the slope of regression line in pre-recession phase (b_1) and recovery phase (b_2);
n – size of the sample in the pre-recession phase (n_1) and recovery phase (n_2);
sd – standard deviation for the values of two variables in both samples;
r – Pearson's correlation coefficient between variables y and x in pre-recession phase (r_1) and recovery phase (r_2).

[1] The linear form has been chosen as the best fitted to the empirical data among four tested functions: linear, exponential, logarithmic and power.

Assuming the H_0 hypothesis is true, the test statistic has Student's *t*-distribution, which is defined by $n_1 + n_2 - 4$ degrees of freedom. The *p*-value determined on the basis of the test statistic is compared with the significance level α. If the condition $p \leq \alpha$ is met, the hypothesis H_0 about the equality of the slope lines should be rejected in favor of the alternative H_1 hypothesis. If opposite case occurs ($p > \alpha$), evidence exists to reject H_0.

A statistically significant change in the value of the slope *b* (decrease or increase) was interpreted as the impact (respectively negative or positive) of the shock on the growth rate of the analysed variable. Proving the statistical equality between the slopes of regression lines was interpreted as resumption of the previous growth rate distorted by the shock.

RESULTS

The study revealed that the global economic crisis affected labour markets in all Polish regions, but the recession phase in individual regions differed with respect to the beginning time and duration (the table). The earliest decrease in the number of employees was recorded in Lesser Poland, i.e. as early as third quarter of 2007. It should be noted, however, that this tendency was neither clear nor long-lasting and it interweaved with small increases and periods of stagnation. In other regions, the breakdown was observed in 2008 (in the first quarter – three regions, second and third quarter – six regions each).

The downturn in most of the analysed regional labour markets lasted up to the forth quarter of 2009.

Table. Impact of the economic crisis on the regional labour markets – identification of the recession phase and estimation of the slope of the pre-recession and recovery phase trends

Region	Recession		Slope coefficient b^x (regression R^2)		Change^{xx} ($b_2 - b_1$)
	start	end	pre-recession	recovery	
Dolnośląskie	2008 1Qr	2012 4Qr	1.31 (0.94)	0.75 (0.89)	–0.56***
Kujawsko-Pomorskie	2008 2Qr	2014 1Qr	1.01 (0.91)	0.75 (0.92)	–0.26*
Lubelskie	2008 3Qr	2014 4Qr	0.82 (0.85)	1.01 (0.92)	0.19
Lubuskie	2008 3Qr	2013 1Qr	1.36 (0.94)	0.6 (0.83)	–0.76***
Łódzkie	2008 3Qr	2012 4Qr	1.26 (0.94)	0.64 (0.89)	–0.62***
Małopolskie	2007 3Qr	2013 4Qr	1.09 (0.88)	1.14 (0.92)	0.05
Mazowieckie	2008 3Qr	2013 2Qr	1.22 (0.97)	0.93 (0.93)	–0.29**
Opolskie	2008 3Qr	2013 4Qr	0.59 (0.86)	0.65 (0.86)	0.06
Podkarpackie	2008 2Qr	2015 3Qr	1.23 (0.97)	1.04 (0.93)	–0.19
Podlaskie	2008 2Qr	2013 4Qr	0.81 (0.81)	0.84 (0.82)	0.03
Pomorskie	2008 2Qr	2013 4Qr	1.08 (0.96)	1.21 (0.93)	0.13
Śląskie	2008 2Qr	2013 4Qr	0.72 (0.90)	1.03 (0.92)	0.31*
Świętokrzyskie	2008 2Qr	2015 1Qr	1.1 (0.95)	1.01 (0.84)	–0.09
Warmińsko-Mazurskie	2008 1Qr	2014 1Qr	0.92 (0.96)	0.59 (0.91)	–0.33**
Wielkopolskie	2008 3Qr	2012 4Qr	1.4 (0.98)	1.46 (0.99)	0.06
Zachodniopomorskie	2008 1Qr	2014 3Qr	0.82 (0.92)	0.97 (0.87)	0.15

[x] Slope coefficients *b* statistically significant at $p < 0.0001$.
[xx] Statistically significant at *0.05, **0.01 and ***0.001 level.

Source: Own elaboration based on data obtained from GUS (Polish Central Statistical Office).

However, after the first symptoms of recovery, the second wave of recession and a longer period of stagnation occurred, yet they spanned different periods in individual regions. In some regions (Dolnośląskie, Łódzkie and Wielkopolskie), a long-lasting recovery began in the forth quarter of 2012. Most of the regions under examination returned to the path of dynamic growth in 2013 and 2014. Świętokrzyskie and Podkarpackie regions struggled longest with the recession phase (until the first and third quarter of 2015 respectively).

In the light of the results obtained, it was observed that the reactions of regional economies to recessionary shocks were diversified. The negative impact of the crisis on the labour market prevailed, and until the end of the analysed period none of the regional growth paths reached the level of the extrapolated pre-crisis trend.

The most common reaction of regional economies to the recessionary shock was resuming the pre-recession growth rate (slopes of the lines did not differ in a statistically significant way) while the level of growth path decreased (decrease in the value *y*-intercepts) – Figure 2. This applied to nine out of 16 Polish regions (Lubelskie, Małopolskie, Opolskie, Podkarpackie, Podlaskie, Pomorskie, Świętokrzyskie, Wielkopolskie and Zachodniopomorskie). In seven of these regions, values of the slopes of lines in the recovery phase were higher than in the pre-recession phase. However, on the basis of the *t*-statistic, it was assumed that these differences were statistically insignificant.

Only in one region (Śląskie) the economy entered the path of more dynamic growth. The labour market in this region, after experiencing the recessionary shock, gained new dynamics, which was reflected in a higher growth rate of the number of employed persons. However, the new trajectory did not exceed the extrapolated trend from the pre-recession period and if the situation does not improve radically, it will not happen in the near future (Fig. 3).

In six regions (Dolnośląskie, Kujawsko-Pomorskie, Lubuskie, Łódzkie, Mazowieckie and Warmińsko-Mazurskie) a decrease was recorded both in the level and in the growth rate of the employment index (Fig. 4). Although in these regions the post-crisis trend lines boasted increasing slopes, the negative impact of the recessionary shock on the growth rate was clearly visible. Differences in the value of the slopes of lines (in the pre-recession and recovery phase) were statistically significant at the level of $p < 0.05$.

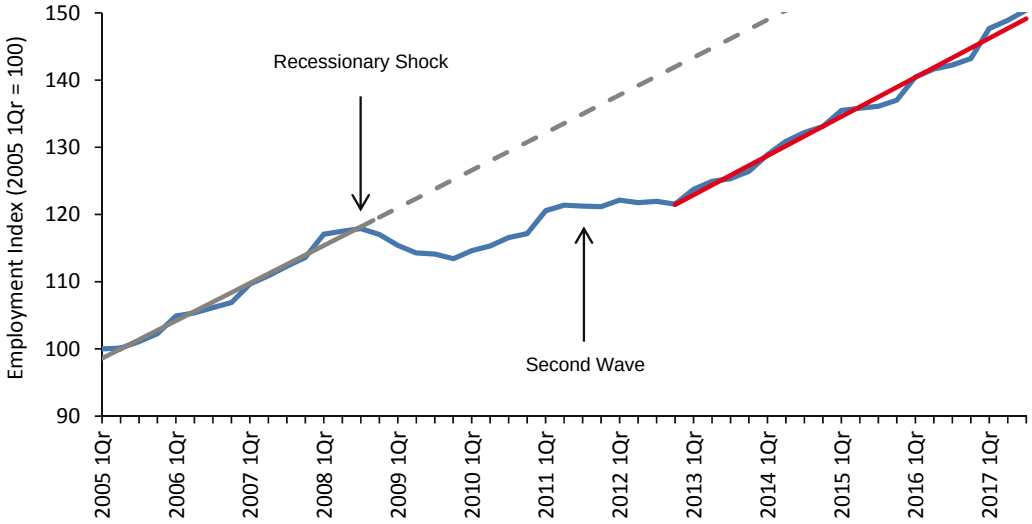

Fig. 2. Resuming the interrupted growth rate yet on a lower level in reaction to recessionary shock on the example of Wielkopolskie region

Source: Own elaboration based on data obtained from GUS (Polish Central Statistical Office).

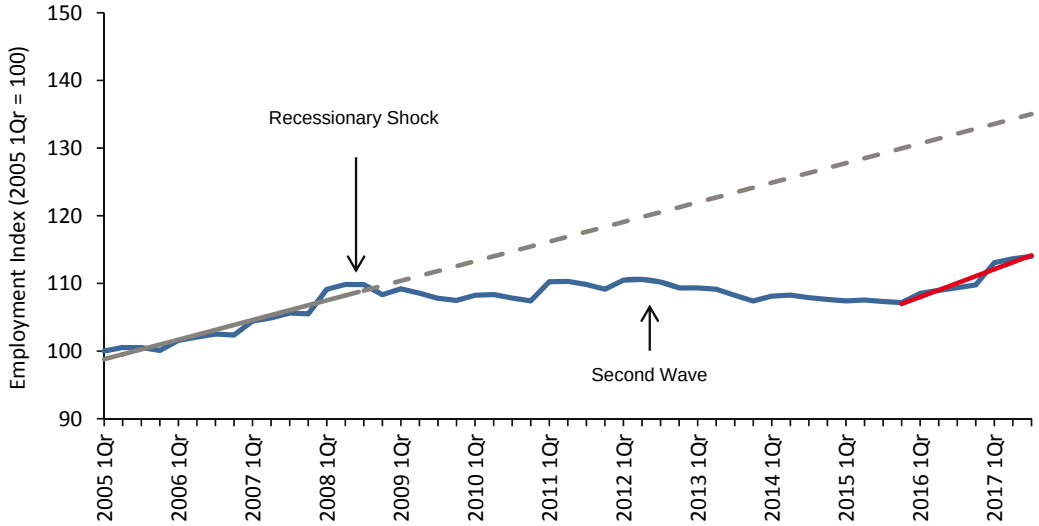

Fig. 3. Increased dynamics of growth in the aftermath of the crisis – example of Śląskie region
Source: Own elaboration based on data obtained from GUS (Polish Central Statistical Office).

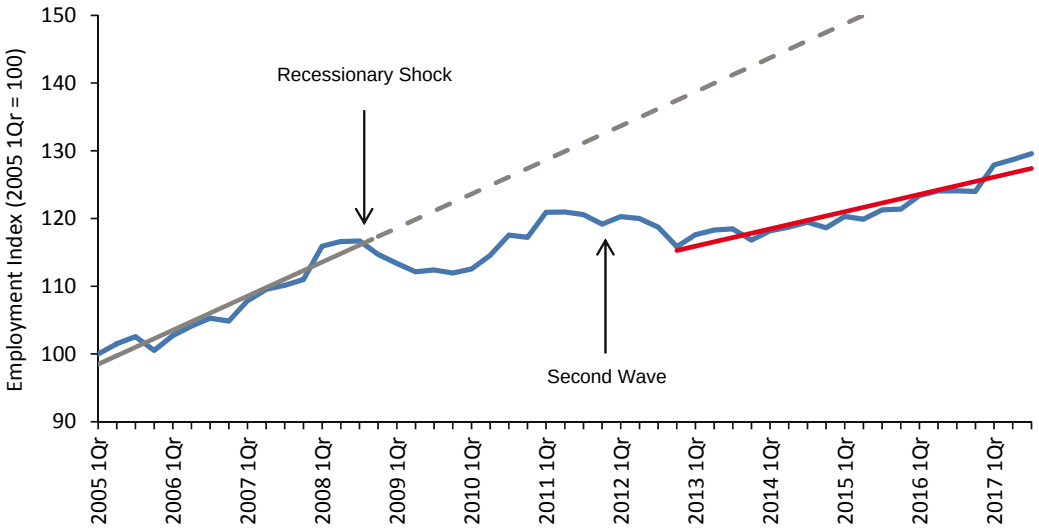

Fig. 4. Decreased rate and level of growth path in the aftermath of the crisis – example of Łódzkie region
Source: Own elaboration based on data obtained from GUS (Polish Central Statistical Office).

SUMMARY

The conducted research showed that the global economic crisis at the end of the first decade of the twentieth century affected all regional labour markets in Poland. It also led to the conclusion that the recessionary shock had different course and impact on the regional economies. The vast majority of the regional employment growth paths lost their pre-recession rate. Only one region gained a new, more dynamic growth path.

It is difficult to identify regularities that link the scope of the response (measured by the change in the growth path of the employment index) with factors

like: location, economic situation or demographic potential of the regions. The negative impact of the crisis could be observed both in well-developed regions with large population (Mazowieckie, Dolnośląskie), as well as in those least developed and populated (Warmińsko-Mazurskie, Lubuskie).

While the negative impact of the recession on the regional labour markets prevailed (i.e. decrease in the level of regional employment growth paths), the fact that most of the regions resumed the growth rate lost as a result of the recession, appears to be a positive circumstance. However, it should be emphasized that the final impact of the crisis on the regional economies becomes apparent with considerable delay. Reaching the steady state is a long-term process. Therefore, it is advisable that further research should be conducted with the use of longer time series, which are currently unavailable in public statistics.

The conducted study proved the usefulness of the applied procedure based on the estimation of trends and statistical comparison of the differences in the slopes of the lines. The statistics used are rarely applied in economic studies and described in statistical textbooks, yet apparently they facilitate obtaining a full picture of changes in the analysed processes. The methodological challenge will be to develop a method that will enable the identification of the depth of the crisis as well as the range of reactions of economies in the recovery phase.

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ODPORNOŚĆ REGIONÓW NA RECESJĘ GOSPODARCZĄ: ANALIZA TRENDÓW ZATRUDNIENIA

STRESZCZENIE

Celem artykułu jest rozpoznanie reakcji gospodarek regionalnych w Polsce na negatywne szoki makroekonomiczne wywołane globalnym kryzysem gospodarczym (umownie datowanym na lata 2008–2010). W postępowaniu badawczym wykorzystano metody prognozowania ekonometrycznego oraz testy statystycznej weryfikacji hipotez. Badaniom poddano dynamikę wzrostu poziomu zatrudnienia, wykorzystując wskaźnik liczby pracujących w sektorze przedsiębiorstw (przeliczony w formie jednopodstawowego indeksu dynamiki). Stwierdzono, że kryzysowe zjawiska gospodarcze końca pierwszej dekady XXI wieku miały różny przebieg oraz wpływ na gospodarkę regionów w Polsce. Dominował negatywny wpływ załamania na regionalne rynki pracy, a tylko jedno województwo zyskało nowy, bardziej dynamiczny trend wzrostu liczby pracujących.

Słowa kluczowe: Polska, regiony, odporność gospodarcza, prognozowanie ekonometryczne, trendy zatrudnienia, porównanie współczynników nachylenia

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ORIGINAL PAPER

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PROCESS MANAGEMENT IN LOCAL GOVERNMENT SHARED SERVICES CENTRES – FROM AN INVENTORY OF SHARED SERVICE PROCESSES TO SLA DESIGNING

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ABSTRACT

The efficiency and quality of performed tasks constitute one of the indicators of functioning of an organisation in both the public and private sector. The article presents the experience of the Shared Services Centre (SSC) in Toruń in the managing processes conducted as a part of provided shared service. The management of the processes which are presented by the authors of the article includes inventories of taken-over processes, their standardisation, optimisation and the principles of constructing service level agreements (SLAs) concluded by the SSC with the served units.

Key words: shared services centres, process management, public sector management

INTRODUCTION

The concept of shared services is quite simple and it has been adapted from other areas of business activities, for instance from production. A few decades ago, enterprises operating on a global level supplied the market with goods using their branches placed in different regions of a country or the world, which in turn supplied local, regional and also national markets. After some time it was discovered that if products were mass produced in specialised companies and then delivered to customers (local, regional and also national ones), it would be more efficient and more profitable (a classic example) of specialisation and returns to scale. SSCs used the same concept of business organisation and operating, i.e. they concentrated on providing shared services to entities located in different places in one area [Bangemann 2016]. Such a solution enabled achieving basic objectives that were assigned to such organisations or limiting expenses with improving quality through standardisation of processes and their repeatability [Tomasino et al. 2014]. These fundamental objectives found at the basis of SSCs in the private sector have been implemented in the public sector, which has been going through important changes consisting of the evolution of paradigm for public governance since the beginning of the 1980s[1]. The process started with implement-

[1] It should be emphasised that Shared Services Centres operating in the public sector can differ significantly from those in the private sector, because they operate within precise legal, organisational or political frameworks imposed by self-government or public system.

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ing the concept of New Public Management in Great Britain [Sandford 2015]. It consisted of the implementation of management tools typical for the private sector in public organisations [Samberg 2017]. The main objective of such an approach was to increase the efficiency of the public sector operations resulting from a growing deficit of the public finance sector [Holzer and Fry 2011]. The reforms of new public governance based on such principles as the promotion of competitiveness in the area of providing services; empowerment through transferring control functions from the bureaucratic sphere to citizens (communities); measuring activity and concentrating on outputs and financial results [Local Government Association 2003], instead of on expenditure [Local Government Association 2010]. Despite the lack of supporters of such an approach to public governance, such concepts as the quality of provided services, flexibility of management, evaluation of implemented tasks, shifts of interest from observing legal procedures to effects of operations seem to be constantly in the discussion on determining how the public sector should be organised [Branda 2006]. Thoughtless use of private sector tools in public organisations has been criticised, and has resulted in constant searching for new solutions of public governance [Hall 2017]. However, in the new paradigms of public governance proposed currently, i.e. new public governance or neo-Weberian state, the efficiency issues mentioned above are still indicated as an important element of the public sector organisation [Henderson 2015].

LOCAL GOVERNMENT SHARED SERVICES CENTRES IN POLAND

The process of implementation of functioning in business solutions belonging to the area of SSCs in the public sector in Poland was started in 2015 with an amendment to the Local Government Act of 2016. The aforementioned amendment enabled municipalities to perform tasks under a shared service. The legislator left an open catalogue of tasks performed under a shared service and indicated only its basic scope of administrative, financial and organisational tasks. In case of personal scope, the legislator strictly defines the catalogue of entities that can be placed under a shared service. This catalogue includes: (1) organisational units of a municipality, (2) community cultural institutions and (3) other community legal entities established under separate legislation for performing public tasks and included into the public finance sector. The group of entities does not include enterprises, research institutes, banks and commercial law companies established by self-governments. The biggest municipalities showed initiative in the area of creating new organisational structures supporting managing budget entities. When the local authorities decided to establish SSCs within their structures, entities performing the same statutory tasks and having unified IT systems, including financial and accounting systems, were placed under a shared service. The two specifications mentioned above, i.e. performing the same statutory tasks and using unified IT systems, were the key points for designing shared services in self-governments which were designed for education units. Out of 18 analysed municipalities[2] where voivodship and local authorities are placed, SSCs as organisational units were established on resolutions of the City Councils in 8 following municipalities: (1) Bydgoszcz [Res. XXXII/590/16], (2) Gdańsk [Res. XXVIII/711/16], (3) Katowice [Res. XXXIII/662/16], (4) Łódź [Res. XXVII/688/16], (5) Opole [Res. XXXVIII/750/17], (6) Toruń [Res. 466/16], (7) Wrocław [Res. XXX/601/16] and (8) Zielona Góra [Res. XLI.498.2016]. This constitutes over 44% of all the municipalities that were analysed. In all of the municipalities that decided to establish local government SSCs, except for the Łódź municipality, only education units were placed under a shared service (Fig. 1).

[2] The research to diagnose the interest of local authorities in creating Shared Services Centres and determining the scope of entrusted tasks was conducted in municipalities where the authorities of self-governmental or governmental administration are located. Appropriate resolutions of a resolution-passing body – a city council, according to which shared services centres were established and material and personal field of application of provided services was determined constituted the basis of the study prepared by the authors. The research was conducted between June and December 2017.

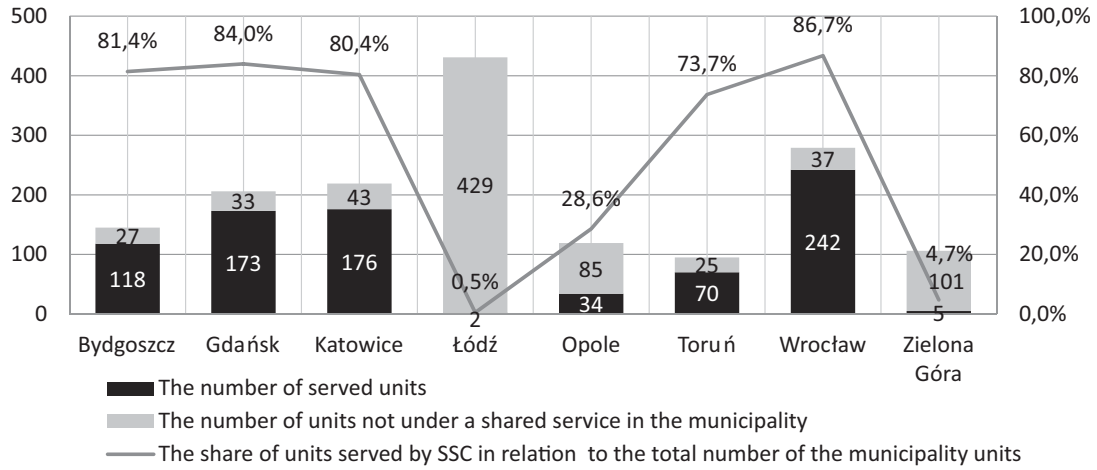

Fig. 1. The number of units serviced by selected local government shared services centres in Poland in 2017
Source: Own study based on the statutes of SSCs in individual municipalities.

The material scope of provided services in the area of handling units is wide and it includes: accounting, payroll and personnel services, IT, legal advice and others.

Financial and accounting services are common to all the analysed CSSs, thus it is safe to assume that they constitute basic services in the catalogue of shared services.

The article presents the model of accounting processes management within the provided services from the moment they are taken from served units, through the process of their modelling, until the moment of their standardisation and drafting service level agreements (SLAs). The authors illustrate the abovementioned process with the example of the Shared Services Centre in Toruń – a unit providing a shared service in the area of accounting, reporting, payroll, settlements and centralisation of VAT settlements for organisational entities in Toruń[3]. The Standardisation of accounting processes is illustrated with the example of Toruń Shared Services Centre.

When a shared service is received by a certain group of municipal organisational units, e.g. by education units, a unification (standardisation) of processes within provided services (accounting, payroll and other) should be performed[4]. The process of standardisation is analysed and presented in detail in the article with the example of an accounting service. The process was preceded with an inventory of processes performed by the served units. All possible processes within a provided financial and accounting service were listed and their determinants, which influence their frequency, were specified. It resulted in creating a matrix of processes occurring in particular served units and their frequency and/or number. It was assumed that a given process manifested the same labour intensiveness in particular units and only the frequency/number was the factor differentiating a given

[3] Toruń Shared Services Centre (TSSC) provides a shared service for all the education units in the municipality (68 units in total) in the area of accounting, reporting, payroll and settlements and it provides the service of VAT centralisation for all the organisational units of the municipality (95 units in total). TSSC has been providing a shared service since 1 January 2017. The standardisation of accounting processes has been performed on the basis of the data collected between January and September 2017.

[4] Before it is included in a shared service, each education unit that is now served by TSSC used its own accounting policy with a chart of accounts, interpreted budget classification for particular economic events individually, it used a different terminology of payroll and settlements, etc.

process in a unit. Moreover, the processes were classified by the following topics: (1) accounting processes that included (a) drawing up annual plans (planning resources for the following year, drawing up unit plans of budget revenue and expenditure for a given year, planning budgetary needs until the end of a given year, drafting requests for resources[5], (b) accounting processes (accounting of the following: proofs of sale, proofs of purchase, bank statements, cash-desk reports, cash register income, payroll, loans, benefits, payment of benefits from a company social benefits fund on the basis of drawn-up lists, EU project proofs and proofs of purchase) and payments: entering bank transfers, (c) settlement processes (clearing of the following: tuition fees of preschool children, payments for meals for preschool children, payments for meals for school children, payments for boarding houses; reconciliation of the following: balances of receivables with counterparties, balances of commitments with counterparties, stocks, stock books with accounting situation; (2) reporting, including among others: monthly, quarterly and six-month reports (overtime settlement, settlements of payments, budgetary accounts; EU projects reports, settlement of liabilities, preparing accounting data for the education information system), (b) annual reports (balance, profit and loss account, statement of changes in the fund with a description, a trial balance, pre-numbered form and cash register report, an inventory and settlements statement, information on liabilities, statements on awarded contracts and municipal assets, preparing information for a consolidated financial statement). In the analysed case, TSSC placed 68 education units of the municipality under a shared financial and accounting service. Each of the units conducted the aforementioned processes, but their construction, i.e. number and the scope of performed activities, accounting and detailedness were not unified. In the period of the shared service provision, i.e. in the first, second and third quarter of 2017, the number of accounting documents amounted to 69,085 in total, of which purchase invoices constituted the majority (45%). The process of standardisation of accounting processes was preceded with an inventory, that included the analysis of accounting documents in terms of the form and date of payment of liabilities and receivables. Particular units did not apply an integrated and unified policy in this area, and the form and mode of payment depended on the current decisions taken by the managers of the units and did not constitute an element of the financial policy of a given unit. A cash payment (24%) and 14-day deadline for payment (56% for sales invoices and 46% for purchase invoices) were the most frequently used forms of payment regulations, for both liabilities and receivables. At the stage of the inventory of processes, they were not standardised but a description of particular units by means of the number of implemented processes was made. Preparation of process mapping for a given unit enabled their comparing in accounting terms (Fig. 2), which was used in scaling of the workload of individual employees allocated with the number of implemented processes and enabled achieving the returns to scale when work productivity was calculated[6].

The significant differences in the number of processes conducted by the served units resulted from the scope and scale of their activity. Among the main determinants differentiating the number of accounting processes the following can be found: (1) the number

[5] A request for resources in the public sector units constitutes a stage initiating expenditure. It includes verification of available funds in a unit's financial plan and their reservation.

[6] The disproportion among the units served by TSSC is significant. In the smallest (in accounting terms) units over a thousand processes are implemented annually, and in the biggest units – over 40 thousand. The conducted inventory of processes enabled comparing one another in the area of accounting complexity. In TSSC, like in other analysed self-government SSCs, the process of taking over employees performing activities under a shared service (e.g. accounting staff) was implemented in accordance with art. 23' of the labour code. Assigning two facilities to accounting services improved the work productivity and thus resulted in financial savings – an economic effect. The inventory of processes was a necessary condition in this process because the allocation of units served by particular employees was conducted on the basis of the character of an education unit (e.g. a boarding house, a swimming pool, external service provision) and first of all on the basis of the total of processes of the assigned units, so that the workload for one employee would be standardised.

of sales invoices, (2) the number of purchase invoices, (3) the number of students/children in the unit and boarding house, (4) the number of payments due to catering, accommodation, tuition and others, (5) the number of implemented EU projects and (6) the number of chapters, paragraphs and tasks included in the unit budget. The number of budget paragraphs and chapters resulting from the tasks of a given unit is correlated to invoices, that significantly influences the multiplication of processes. In case of completion of a few tasks by a unit, the same invoice is distributed to many chapters and paragraphs, there is treated as separate processes. Bank statement accounting, catering payment settlements, entering bank transfers are accounting processes the repetition rate and number of which result from the presented determinants (e.g. the number of invoices, of students, etc.) and influence the number of completed processes in a unit in a given period of time. Although the number of processes conducted by particular units under a shared service is characterised by high variability (63.32%) and the number of processes of particular served units differs on average by 8,805 processes from the average amount for a studied group, the determinants specifying the value of processes for a served unit are characterised by a greater stability. It proves that despite the fact that served units differ one from another, the same units in the following months are characterised by similar labour intensity, which is of key importance for the management of processes under a shared service in the area of the use of human resources in serving the units, budgeting costs and first of all in the process of creating unified standards of conducted processes (Fig. 3, the table). Purchase invoices are basic documents processed by TSSCs and they constitute about 70% of all accounting documents. Considering the character of the served units (education units), seasonality can be observed in their activity (holiday season: July and August), when the number of processed accounting documents (of all kinds) is half as small as in other months.

The number of documents generated by the served units is characterised by a high degree of predictability, and after eliminating the holiday months (when the entities are much less active), a corrected coefficient of variation of the number of processed documents can be obtained and depending on their types it alternates between 8.09 and 16.41%. The biggest number of invoices, i.e. purchase and sales invoices is estimated at their average amount. It is of key importance for optimisation of the processes management and specifying their labour intensity (in the process of standardisation).

With specified particular groups of accounting processes conducted in the served units, the process of their standardisation, that constitutes the basis for introducing the rules of a provided shared service, can be started. It is necessary for designing a SLA[7] between a served unit and a SSC [Cordall 2018]. The problem of the lack of standardisation of particular accounting processes had a few reasons. Firstly, each unit had its own accounting policy, rules of accounting, reporting expenditure and income, which in effect made and still makes it impossible for instance to compare budget expenditure according to paragraphs. Secondly, each facility differently defined the scope of activities performed by the Chief Accountant, the circulation and description of accounting documents and activities performed by other employees participating in a process. Thirdly, the timeliness of realised accounting processes resulted only from external regulations concerning for instance the deadline of periodical reports, payments of liabilities, etc. Fourthly, no unit quantified the number of realised processes, their frequency and labour intensity, neither did they standardise them internally. A consequence of the above mentioned conditions is the necessity to introduce standardisation of each accounting process provided within a shared service, according to the material and personal scope, the time of realisation and competence and responsibility of the participating parties. The scope of changes connected with the

[7] A Service Level Agreement (or SLA) is the part of a contract which defines exactly what services a service provider will provide and the required level or standard for those services. The SLA is generally part of an outsourcing or managed services agreement, or can be used in facilities management agreements and other agreements for the provision of services. This article is primarily aimed at customers and provides some simple tips for drafting effective SLAs.

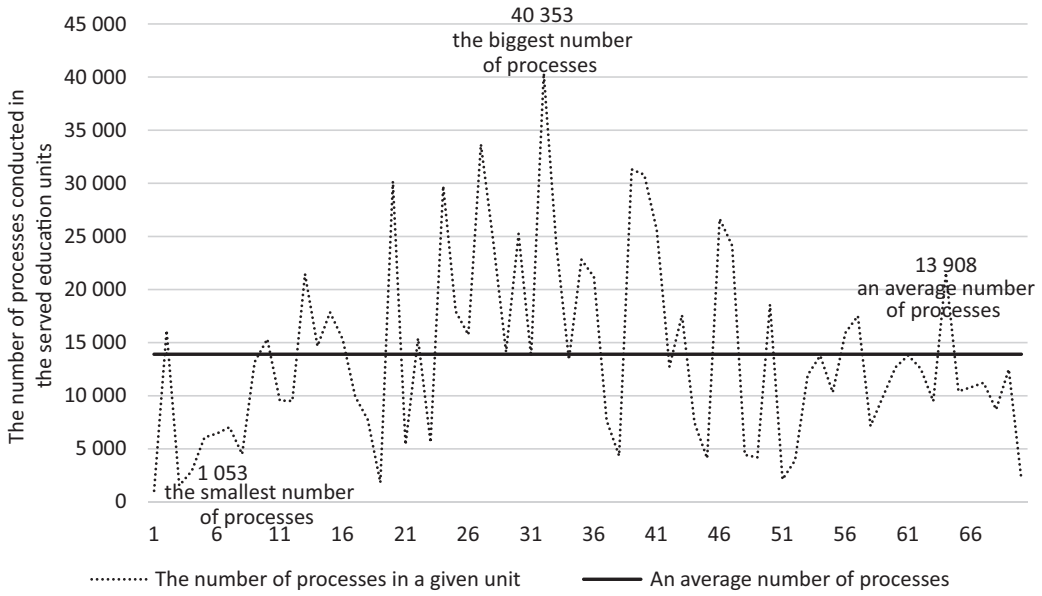

Fig. 3. The number of processed accounting documents of the units served by TSSC (January–September 2017**)**
Source: Own study based on TSSC data.

Table. Characteristics of accounting documents processed by TSSC (January–September 2017)

Specification	Average number of documents	Standard deviation	Coefficient of variation (%)	Corrected coefficient of variation (without seasonality) (%)
Sales invoice	1 122	354.5	31.58	8.09
Purchase invoice	3 487	736.9	21.13	9.89
Accounting note	94	33.3	35.46	16.41
Cash report	277	39.5	14.25	10.60
Total	4 980	1 132.1	22.73	8.73

Source: Own study based on TSSC data.

introduction of unification of accounting types in units concerned first of all the elimination of differences in accounting of events belonging to the same category, that have the effect in different accounting records and results from among others vagueness of interpretation of rules and the lack of uniform enforcement and use of regulations in all the served units. As a consequence, differences occurred, such as for instance non-compliance of accounting records with regulations in some units, non-uniformity of data in financial reports, inconsistencies in data in additional financial settlements required by the municipal authorities, no possibility of a reliable analysis of financial data and thus a different presentation of data in a unit's financial reports – balance, income statement and consequently the lack of reliable examination of a consolidated balance of a municipality. Unification of accounting records and interpretation of regulations will result in a reliable presentation of data and appropriate (complying with the provisions) account

of economic events in the units. A unified account of economic events in all units in legal and accounting terms in financial reports will unify the forms of reports (for analysis), and the received homogenous data, when analysed, will enable to find the anomaly in the units (in a group of units with a similar profile, e.g. schools with swimming pools) and specify the reasons. The most frequent differences in the process of standardisation were the differences in the classification of accounting the same accounting event, for instance expenses incurred on repairs, conservation or review of fixed assets were recorded depending on the description in different budget paragraphs and accounts. The standardisation of book-keeping procedures was not implemented in a TSSC only, but also in the served units. On the part of the served units, the scope of information describing an economic event constituting the object of accounting was not only unified, but also competences and duties of particular employees participating in the circulation of accounting documents were defined. Moreover, payment dates and the number of purchase documents from counterparties were standardised. An individual supplier was required to issue from one to four invoices a month – depending on the character of supply (cf. Fig. 4) [Peel et al. 2011].

After the processes of standardisation and optimisation are finished, the stage of creating procedures of providing shared services can be started [Department for Communities and Local Government 2006]. The existing self-government organisational units operate in traditional, hierarchical organisational and managerial structures, where vertical dependence is a basic management relation. Creating a SSC and entrusting it with the provision of supporting processes (e.g. accounting, payroll, personnel or IT ones) changes the relationship between a serving unit and a served unit entirely. Firstly, a SSC is based on horizontal and thus flexible organisational structures. Secondly, the relations between a SSC and served units are not based on reporting relations but on cooperation and for this reason the formalisation of rules of cooperation is essential. Separating tasks performed so far by particular self-government/public organisational units and relocating their conducting to a specialised unit, a SSC, results in the necessity to define precisely the

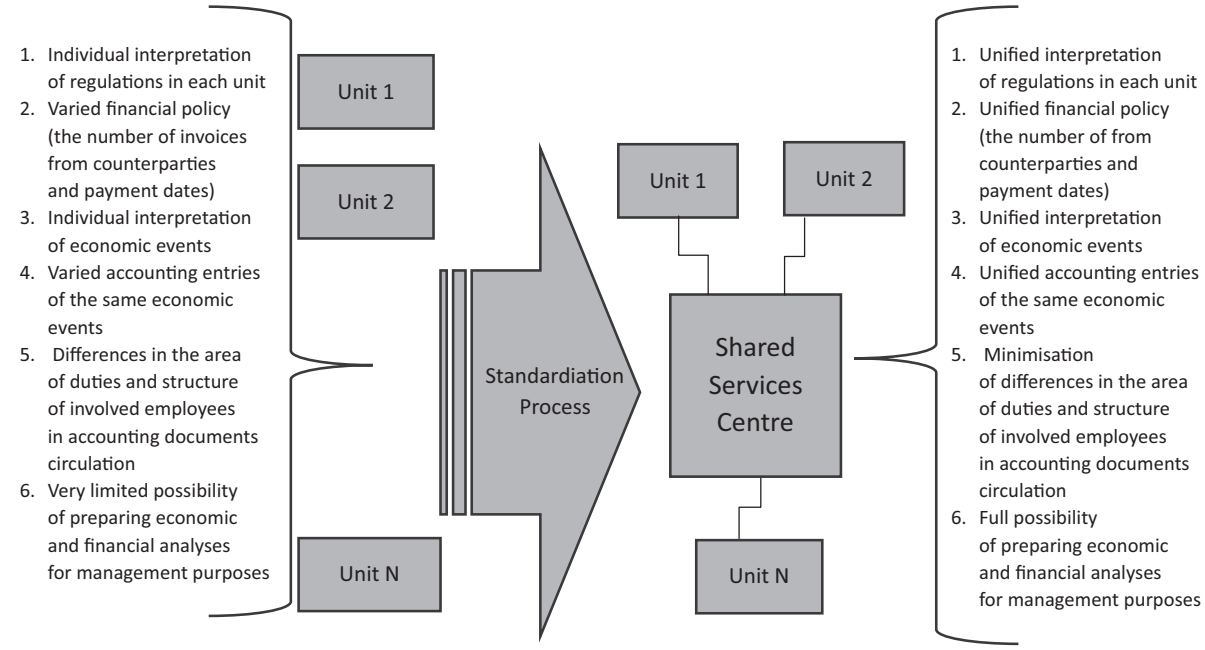

Fig. 4. The scope and effects of accounting processes standardisation in self-government shared services centres illustrated with the example of SSC in Toruń

Source: Own study based on TSSC data.

responsibilities of individual parties participating in the process implementation – providing a service. In the traditional model of management, without SSCs, the scope of competences and responsibilities of particular employees engaged in processes is important, but the whole responsibility for their organisation, implementation and supervision rests with the manager of a unit. The introduction of the abovementioned model, a SSC, causes a division of competences and responsibilities between the served unit and a SSC. In this scenario it is of key importance to define the risk matrix, responsibility and time of particular processes implementation. For the needs of TSSC the Business Process Model and Notation (BPMN) developed by the Object Management Group was used. Its accuracy and usefulness for describing the processes of enterprise resource planning (Enterprise Resource Planning systems) is its great advantage.

Within the activity of TSSC, three process areas, in which procedures specified for this entity will take place, have been identified: (1) management processes – concerning activities of managerial character (consistent with the scope of internal control), like for instance creating the vision of a unit, strategy planning, indicating objectives, identifying and analysing risks. It must be remembered though that a budget unit, which TSSC will be, will largely depend on management decisions made at a higher level, i.e. in the Municipality of Toruń; (2) operational processes – the biggest process area concerning providing services to served unit, obviously in factual terms resulting from the unit statute. Therefore, operational processes concern fulfilling basic duties of the unit, for which it was created (cf. Fig. 5) and (3) supporting processes – their basic aim is to support operational processes. Each operational process is assigned with sub-processes and

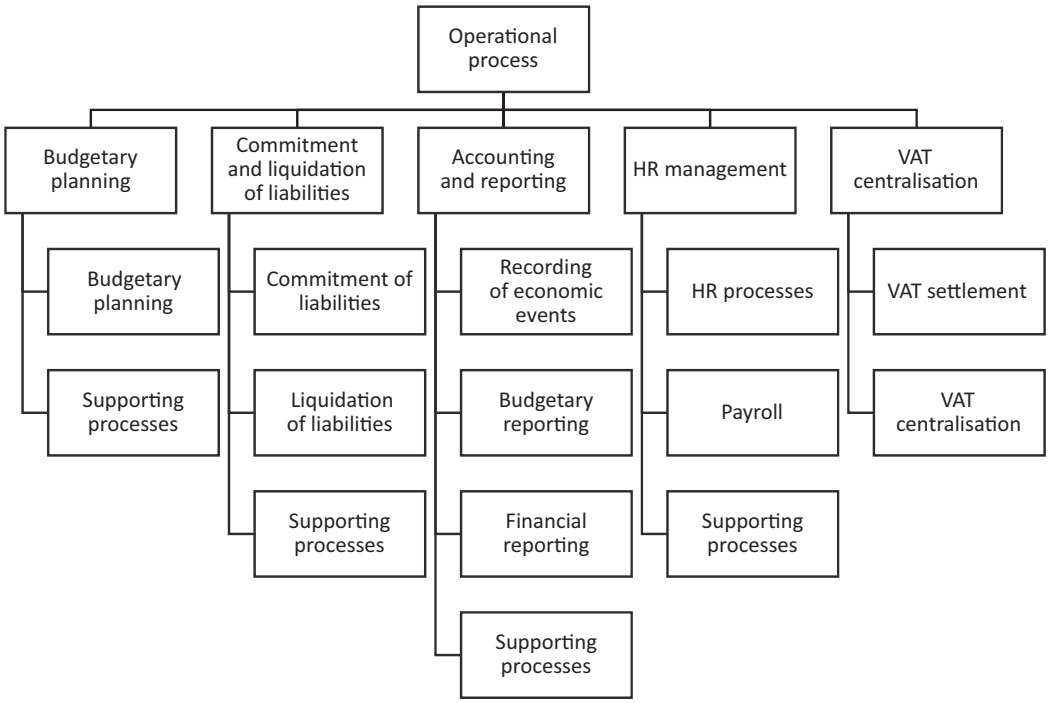

Fig. 5. A list of operational processes in TSSC

Source: Own study based on TSSC data.

[8] Created within Business Process Management Initiative. It is currently owned by Object Management Group. Current version of the standard is 2.0. The objective of OMG created in 1989, that included IBM, Apple Computer and Sun Microsystems, was to specify standards of cross-platform, distributed, object-oriented programming.

tasks, the role and responsibility of particular people and units participating in its flow. Another stage of SLA creating is building RACI matrix for each process, in which the owners of processes, subjects/people responsible for its achievement at every party of a process are specified [Dollery et al. 2016]. The main advantage of a RACI matrix is an unambiguous interpretation of tasks assigned to each unit and its employee participating in a process. Although the description of procedure and standardisation may imply interpretational problems – mainly in conflict situations, delays in tasks implementation, the RACI matrix is free from such faults. If a collection (manual) of processes is to constitute a basis for designing IT systems supporting delivered shared services, the standardisation process should include a graphic notation of business processes, for instance according to the OMG standard version 2.0[8].

CONCLUSIONS

Creating the rules and principles of shared services in self-government shared services centres is a time-consuming and labour-intensive process that requires a detailed knowledge of the processes in the units under a shared service. The standardisation of processes, that constitutes a basis for the rules of shared service policy, must be preceded by an inventory of processes, and then their remodelling (optimisation) must follow. Many of the process elements from for instance the area of accounting or payroll service must be unified and verified in terms of the necessity of their implementation (avoiding duplicating of unnecessary activities and processes). Standardisation is a starting point for the work on creating the rules of shared service policy, i.e. a document that in self-governments is adopted by the order of a municipal executive body (the president or mayor) or a legislative body (the City Council). Using the BPMN or RACI matrix is not obviously essential in this area, but it enables very easy designing of IT systems supporting the implementation of those processes, it unifies risk maps and responsibility for their implementation. Establishing SSCs and entrusting those units with conducting supporting processes is without doubts a favourable solution for self-governments, and as British experience shows [Department for Communities and Local Government 2006], they require the involvement of their management in the process of creation. They implement new organisational forms, use flexible organisational forms, review procedures and conduct their standardisation, which constitutes a milestone in improving the quality of provided services.

Summing up, it should be emphasized that accounting, payroll and tax services belong to the canon of services forming the basic subject matter of SSCs, operating both in private and public sector [Delloitte 2018]. It should be underlined that there are basically no significant differences in the scope of the shared service provided in the public and private sector. Differences appear at the level of implementation and management of SSCs, because in public sector SSCs implement shared services to local government units whose statutory objectives are not profit oriented (whereas in private sector SSCs are basically profit oriented) – at the same time qualifications and managerial competences of the staff employed in the serviced units vary considerably from those in private sector entities [Modrzyński and Gawłowski 2018]. After all, SSCs base on the experience of the private sector, and the implementation of business processes in the public sector will certainly have a positive influence on mutual learning and relations between those two areas.

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Resolution XXVIII/711/16 of the City Council of Gdańsk of 25 August 2016 on establishing the budget entity "Shared Services Centre in Gdańsk" through joining Centrum Obsługi Placówek Oświatowych Nr 1 in Gdańsk and Zespół Ekonomiczno-Administracyjny Szkół in Gdańsk and granting it a by-law.

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Resolution XXXIII/662/16 of the City Council of Katowice of 29 November 2016 on designating the Group for Handling Education Entities in Katowice (Zespół Obsługi Jednostek Oświatowych w Katowicach) as a handling entity to ensure delivery of a shared service to organisational units of the City of Katowice falling under the public finance sector.

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ZARZĄDZANIE PROCESAMI W SAMORZĄDOWYCH CENTRACH USŁUG WSPÓLNYCH – OD INWENTARYZACJI PROCESÓW USŁUGI WSPÓLNEJ DO PROJEKTOWANIA UMÓW SLA

STRESZCZENIE

Efektywność i jakość realizowanych zadań stanowią jeden ze wskaźnikó funkcjonowania organizacji, zarówno w sektorze publicznym, jak i prywatnym. W artykule przedstawiono doświadczenia Toruńskiego Centrum Usług Wspólnych w procesie zarządzania procesami realizowanymi w ramach świadczonej usługi wspólnej. Zarządzanie procesami, które przedstawili autorzy w niniejszym artykule, obejmuje inwentaryzację przejmowanych procesów, ich standaryzację, optymalizację oraz zasady tworzenia umów o gwarantowanym poziomie świadczeń (SLA) zawieranych przez Centrum Usług Wspólnych z jednostkami obsługiwanymi.

Słowa kluczowe: centra usług wspólnych, zarządzanie procesami, zarządzanie sektorem publicznym

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ORIGINAL PAPER

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INNOVATIVENESS OF POLAND AND POLISH REGIONS AGAINST THE BACKGROUND OF OTHER EUROPEAN UNION COUNTRIES

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ABSTRACT

The aim of the study is to analyse the diversity of the innovation scale of particular voivodships in Poland as well as to present Poland's innovativeness in comparison to other countries. The authors of this paper have carried out scientific studies and analyses, taking into consideration the data for 2010–2017, published, among others, by Central Statistical Office (Główny Urząd Statystyczny), the European Commission and the Patent Office of the Republic of Poland (Urząd Patentowy Rzeczypospolitej Polskiej). The scope of the analyses concerned the innovative activities of Poland against the background of other countries, in particular, the European Union Member States as well as the diversification of the innovative activity of entrepreneurs conducting business activity in particular voivodships in Poland. It should be noted that there is a significant regional differentation in this respect.

Key words: innovativeness, enterprises, intellectual property, exclusive right, patent, protection law, registration right, voivodships

INTRODUCTION

The term "innovation" is derived from the Latin word *innovatio* which means "renewal" or *innovare*, which signifies the ideas related to "renewing, refreshing, changing" [Kopaliński 2006]. Referring to the issue of innovation, the literature on the subject points to many diversified approaches to basic characteristics of the concept of innovation, its terminology interpretation as well as the classification of its functions [Montoya-Weiss and Calantone 1994, Drucker 1998]. The concept of innovation was introduced to economic sciences by Schumpeter [1949], who perceived innovations as processes of introducing new products or improving existing products, introducing new production methods or improving them as well as introducing new sales methods, opening new sales markets, shaping new sources of raw materials, semi-finished products or other resources, opening a new market as part of a particular type of activity or introducing a new kind of production organization. Schumpeter showed that three sequences can be distinguished in the innovation cycle, in the process of introducing them. They include: the idea (innovation), the introduction of innovation (innovation) and its diffusion. Schumpeter's view on innovation was the starting point for further considerations regarding the importance of innovation in the economy. In turn, according to Kotler [2004], innovations should be perceived as a process comprising generating ideas, their selection, devising and verifying concepts, economic analysis, preparing and testing products and their commercialisation. However, according to Simpson et al. [2006], innovation is a process consisting in transforming the

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existing possibilities into new ideas and implementing their practical applications, and the above-said process consists of 4 stages: invention, innovation, design and diffusion.

According to Oslo Manual [OECD 2005], innovation may be defined as "the implementation of a new or significantly improved product (good or service) or a process, a new marketing or organisational method in business practices, workplace organisation or external relations".

As Sławińska [2015] emphasises, large diversification of the definitions related to innovations encountered in the scientific literature on the subject contributed to the fact that the innovation theory also includes many different classifications. These classifications allow us to distinguish different types of innovations which can be characterised by the effects they cause, originality of the changes or their nature, or their importance from the point of view of the influence they exert on the trade sector.

The most basic and frequently used classification is the division of innovations with ragerd to their technological or non-technological character [OECD 2005]. In this respect one may distinguish four types of innovations:

- product innovation – introduction of goods or services, which are new or significantly improved in relation to its features and the problems they help to solve;
- process innovation – implementation of a new or markedly improved production or delivery method;
- marketing innovation – implementation of a new marketing method which encompasses significant changes in the appearance or packaging of the product, product positioning or promotion or its price;
- organisational innovation – implementation of a new organisational method in the company's business practices, workplace organisation or external relations.

Product, process and marketing innovations are related to the introduction of new or significantly improved goods or services, production or delivery methods or marketing methods. Organisational innovations are connected with the changes and improvements within the organisation at times leading to the emergence of other types of innovations. These innovations may be based on the application of knowledge or technology, on the new ways of using the existing knowledge or available technology or the combination of these two factors [OECD 2005].

Innovations can be regarded as a new product or the result of the innovation process in an enterprise, a new consumption pattern or the result of the innovation process whose subject is a consumer. In today's world, consumers have a significant impact on producers, even though so far they may not be fully aware of the power they hold. Thus, not only the initiative, but also the idea and concept for innovation frequently originates from the user-consumer [Ozimek 2009].

Innovative activities include all scientific (research and development), technical, financial organisational and commercial activities, whose aim is to devise, create and implement innovations. Innovative activity in an enterprise is a complex process. It requires the involvement of a number of production factors such as: capital, knowledge and time, and the structure of the implemented investments is to a large extent determined by the access to sources of finance. As Repetowski [2008] claims: "The starting point for the innovations is a theoretical concept, an idea. However, the idea itself is not an innovation, and it is not an invention either. It remains only a certain idea, which marks the beginning of the innovation process. Innovations are the result of technological, social, economic, legal, cultural and organisational processes that can be shaped".

The innovation implementation, the ability to create new solutions, acquire and use new knowledge constitute – besides possessing the so-called strategic resources – factors which are conducive to the creation of the competitive advantage of an enterprise. Combining the skills of proper organisation of processes, appropriate coordination of the activities and creating a successful image of an enterprise and its products can be seen as a specific guarantee of the success of the enterprise in the market [Limański 2011]. As Prandecki [2013] states, "devising innovation policy requires not only ensuring proper conditions for entrepreneurs to allow them to implement innovations, but also creating appropriate markets willing to accept the proposed innovations. For this reason, the emphasis

should be placed not on the innovations, but rather on the innovativeness and creativity of the entire society". Innovative activities are all scientific, technological, organisational, financial and commercial activities, which actually implement or are intended to implement innovations. Certain innovative activities are innovative in its nature, others are not new activities, but they are necessary to implement innovations. Innovative activities include also research and development, which are directly related to the development of specific innovations [OECD 2005].

The aim of this article is to analyse the diversification of the innovation scale of particular voivodships in Poland and presenting Poland's innovativeness as compared to other countries.

MATERIAL AND METHODS

The article is based on the analysis of secondary data. In this article the authors have carried out the examination of selected studies and analyses taking into consideration the data available for 2010–2017, published by, among others, by Central Statistical Office (Główny Urząd Statystyczny), the European Commission, the Patent Office of the Republic of Poland (Urząd Patentowy Rzeczypospolitej Polskiej). The scope of the conducted analyses concerned the innovation activity of Poland against the background of other countries of the European Union, and the diversification of the innovative activities of entrepreneurs engaged in business activity in the regions of particular voivodships in Poland. The analyses were supplemented with the data from the Local Data Bank (Bank Danych Lokalnych)[1].

The hypothesis which the authors undertake to verify in this article points to the emergence of diversity with regard to the level of competitiveness between the countries as well as specific voivodships in Poland.

POLISH REGIONS' INNOVATIVENESS LEVEL IN THE LIGHT OF SECONDARY DATA

In the latest Global Innovation Index 2018 depicting the level of innovativeness of particular countries, Poland ranked 39 among the 126 countries evaluated in the classification [SC JCB, INSEAD, WIPO 2018]. According to the European Innovation Scoreboard [EC 2018a] report, prepared for the European Commission addressing the issue of innovativeness within the EU, Poland belongs to the group of countries which have been described as Modest Innovators. Apart from Poland, this group includes also countries such as: Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Portugal, Slovakia and Spain. When analysing the innovation level in 2010–2017, it was noted that innovation performance in Poland increased by 3.2% (the EU in general recorded an increase of 5.8%). Analysing the scores of Modest Innovators[2] group, with the consideration of 10 innovation dimensions[3], it was noted that the greatest Summary Innovation Index was indicated in the case of countries such as Lithuania (increase by 20.1%), Malta (15.2%) and Latvia (11.6%). When examining the results in particular categories of the innovation dimension, it may be observed that in Poland the greatest increase was recorded in the Innovation-friendly environment category (88.1%). The latter was also the highest score in the group of the presented countries. In the case of the remaining categories, the decrease was recorded in four of them: Innovators (–22.7%), Finance and support (–11.5%), Linkages (–9.9%) as well as in the case of Human resources (–2.9%) – Table 1.

The findings of the Regional Innovation Scoreboard Report providing information on the innovativeness divided into the 220 regions located in 22 the EU countries and in Norway, Serbia and Switzerland[4] point

[1] Local Data Bank, https://bdl.stat.gov.pl/BDL/start [accessed: 06.10.2018].

[2] The EU national innovation systems are measured by the Summary Innovation Index, which is an indicator calculated as an unweighted average of the 27 indicators. On this basis four groups were distinguished: Innovation Leaders, Strong Innovators, Moderate Innovators and Modest Innovators.

[3] Human resources; Research systems; Innovation-friendly environment; Finance and support; Firm investments; Innovators; Linkages; Intellectual assets; Employment impacts; Sales impact.

[4] Countries such as: Estonia, Cyprus, Latvia, Lithuania, Luxembourg and Malta are treated as one region.

Table 1. Innovation performance per dimension (2010–2017)

Specification	Summary Innovation Index	Human resources	Research systems	Innova-tion-friendly environment	Finance and support	Firm invest-ments	Innovators	Linkages	Intellectual assets	Employment impacts	Sales impact
EU	5.8	19.3	13.6	33.8	7.7	11.8	–14.0	1.0	0.9	0.6	4.1
Lithuania	20.1	8.7	7.5	61.2	16.2	55.3	36.2	19.6	25.8	–22.7	4.7
Malta	15.2	20.2	110.1	57.9	–1.0	–22.1	10.6	–18.6	95.2	18.5	48.3
Latvia	11.6	15.1	43.1	24.5	70.7	–31.3	–8.1	2.1	–12.0	42.6	1.1
Spain	7.5	46.0	5.3	65.3	–4.1	10.8	–29.6	–0.5	2.4	25.4	–0.5
Slovakia	4.8	15.7	10.4	15.2	12.7	–19.7	-11.7	10.4	7.8	0.8	12.6
Poland	3.2	–2.9	11.7	88.1	–11.5	18.5	–22.7	–9.9	23.3	0.8	12.1
Italy	2.0	10.1	26.0	–14.6	1.3	5.9	–10.9	–0.7	6.4	3.5	–3.6
Hungary	–0.1	–4.6	14.4	32.9	4.1	15.3	–9.9	–15.6	4.6	–0.7	–14.4
Greece	–0.9	14.3	19.0	14.8	12.5	0.1	–18.7	4.4	22.6	11.9	–40.1
Portugal	–1.5	–23.1	39.6	74.2	–10.1	–11.0	–27.9	–15.2	9.6	33.6	–25.4
Croatia	–2.0	4.9	17.4	16.5	3.6	4.1	–17.1	–24.5	8.4	41.6	–34.2
Czech Republic	–2.9	17.4	23.9	27.2	–65.2	7.8	–31.4	–2.2	17.7	0.4	–5.5
Estonia	–3.2	30.6	42.2	48.6	7.2	–40.6	–86.7	–42.7	43.5	19.5	5.6
Cyprus	–9.2	14.3	51.3	16.8	–6.8	–75.9	–48.9	–38.0	46.1	8.2	–20.0

Source: EC [2018b].

to the fact that 53 regions were classified as regional Innovation Leaders, the subsequent 60 regions were classified in the category of regional Strong Innovators, 85 regions were in the group of regional Moderate Innovators and 22 regions were perceived as Modest Innovators. The data for 2017 show that the most innovative EU region is Stockholm in Sweden, Hovedstaden in Denmark and the south-east region of the UK. The least innovative areas were located in Romania. The data analysis concerning Poland indicated that nine voivodships in Poland were classified as Modest Innovators. The Moderate Innovators group included the following voivodships: Mazowieckie, Małopolskie, Dolnośląskie, Pomorskie, Podkarpackie, Łódzkie and Śląskie. Lubelskie, Warmińsko-Mazurskie and Świętokrzyskie, were evaluated as those with some of the weakest innovation potential among all 220 regions (210th, 212th and 213rd place respectively) – Table 2.

As the analyses of Duda [2013] indicate, the equity from retained profits and capital provided by the owners constituted the main source of financing the investment in 1999–2011. The limited access to loans (no credit history, no creditworthiness) and limited entrepreneurs' own funds are considered to be significant barriers in the development of enterprises, especially small businesses [Sawicka 2000]. Moreover, among the innovation barriers we need to point to: high costs of developing and implementing innovations; low investments in research and development activity, which to a large extent is caused by the small sales market of Polish SMEs operating mainly

Table 2. Innovation scoreboard across Poland in 2017

Voivodeship	RII – 2017	Rank	Group	Change
Mazowieckie	63.6	159	Moderate	–0.1
Małopolskie	57.2	178	Moderate	4.6
Dolnośląskie	56.9	179	Moderate	3.7
Pomorskie	55.0	181	Moderate	0.4
Podkarpackie	51.8	192	Moderate	2.9
Łódzkie	50.4	197	Moderate	4.7
Śląskie	50.3	198	Moderate	2.1
Wielkopolskie	49.3	199	Modest	2.5
Lubelskie	47.4	201	Modest	7.6
Zachodniopomorskie	47.0	204	Modest	5.6
Kujawsko-Pomorskie	46.3	206	Modest	0.0
Podlaskie	45.5	207	Modest	5.1
Opolskie	43.7	208	Modest	–0.6
Lubuskie	41.1	210	Modest	3.1
Świętokrzyskie	36.8	213	Modest	0.6
Warmińsko-Mazurskie	38.9	212	Modest	–3.3

[a] RII 2017 shows performance in 2017 relative to that of the EU in 2017. Rank shows the rank performance across all regions. Change shows the performance change over time calculated as the difference between the performance in 2017 relative to that of the EU in 2011 and performance in 2011 relative to that of the EU in 2011.

Source: EC [2017].

in the local and regional markets [Lisowska 2008]; low demand for innovative products, due to the fact that, when buying goods, the majority of Polish consumers take into account the price of products, high costs of employment of qualified staff [Duda 2013]. The entrepreneurs' low tendency to take risks, which is directly associated with the innovative activity appears to be another innovation barrier [Sawicka 1998].

According to research by Baruk [2015], micro and small enterprises are characterized by a low level of innovation in comparison with large organizations. In addition, it is business managers who frequently enhance developing ideas for innovation; however, in Poland this trend occurs the least often in comparison with other EU Member States (most frequent occurrences are reported in Finland and Portugal). Lei and Ma [2013] emphasize, in turn, that the innovativeness of the employees' knowledge has a positive impact on the efficiency of creating new products while the incentive for improving knowledge and innovation is a pay rise.

Legal protection of intellectual property motivates companies to undertake research and development (R&D) works. Thanks to it, entrepreneurs are aware that financial outlays and all the work devoted to innovative activities will be properly used and will bring measurable benefits. Investment in research and development plays a crucial role in the innovation processes and is an important component of the company's operations as it is thanks to R&D that products, technologies and services are developed. One may distinguish external and internal R&D activities. Internal R&D covers the overall R&D activity carried out within the enterprise (i.e. R&D which is intended to contribute to the development and implementation of innovation within products, processes, marketing or organizational innovations, as well as basic research not directly related to the creation of a specific innovation). External R&D activity of enterprises, in turn, mainly involves a purchase of research and development services available on the market.

Analysing the data from 2010–2016 regarding the share of expenditures incurred by enterprises for R&D, we observe that each voivodship sees their systematic growth. The largest funds for this type of activity are transferred in such voivodeships as: Małopolskie, Podkarpackie and Pomorskie. In turn, the lowest expenditures are incurred in the following voivodeships: Podlaskie and Lubelskie (Table 3).

According to the Central Statistical Office's (GUS) analyses, in 2014–2016 innovation-active industrial and service enterprises accounted for 20.3 and 14.5% of the total number of these entities, respectively (compared to 18.9 and 10.6% in 2013–2015). There was a correlation that, as in the previous research period, the highest percentage of innovation-active entities was found among entities with 250 or more employees. In the years 2014–2016, the share of innovative industrial enterprises amounted to 18.7% and was the highest in the section of Production of pharmaceutical products. In the previous research period, this share was the highest in the section of Production of coke and refined petroleum products. Among service enterprises, it amounted to 13.6%. As in the previous period, the share of both innovation-active and innovative enterprises among service enterprises was highest in the section of Insurance, reinsurance and pension funds. Similarly to the previous years, product or process innovations were most often introduced by entities employing 250 or more individuals (58.7% of industrial and 42.3% of service enterprises) [GUS 2017].

Taking into account the territorial division, the highest percentage of innovation-active industrial enterprises characterized Małopolskie Voivodeship (23.7%) and of innovative ones – Lubelskie Voivodship (22.5%), while the highest percentage of innovation-active and innovative service units was noted for Lubelskie Voivodeship (23.6 and 23.3% respectively). In the previous research period (for the years 2013––2015), the largest share of innovation-active and innovative enterprises in the industry was recorded in Opolskie Voivodeship (23.1 and 21.5% respectively), while in services – in Zachodniopomorskie Voivodeship (respectively 13.6 and 13.0%). In addition, in industrial and service enterprises, the share of entities that in 2014–2016 introduced process innovations (new or significantly improved processes) was higher than product innovations (new or significantly improved products) and it remained the same as in 2013–2015 [GUS 2017].

Table 3. Share of expenditures incurred by the enterprise sector in total R&D expenditure in 2010–2016

Rank		Specification	2010	2011	2012	2013	2014	2015	2016
			%						
		Poland	26.6	30.1	37.2	43.6	46.6	46.6	65.7
1	Voivodeship	Małopolskie	19.7	25.2	37.5	42.6	46.7	44.6	76.9
2		Podkarpackie	54.7	59.1	72.6	81.1	76.7	74.3	75.0
3		Pomorskie	48.4	47.5	41.1	52.2	57.9	60.9	71.2
4		Mazowieckie	25.5	25.9	34.5	42.1	47.8	42.9	67.9
5		Lubuskie	40.9	nd	38.3	nd	52.6	63.4	66.5
6		Śląskie	29.3	38.4	53.9	51.8	46.7	55.0	66.2
7		Dolnośląskie	34.6	45.4	50.9	53.3	58.9	58.1	66.2
8		Kujawsko-Pomorskie	20.7	29.8	38.2	37.6	54.7	65.2	65.5
9		Świętokrzyskie	35.1	nd	69.5	41.1	35.4	43.9	53.4
10		Wielkopolskie	19.7	22.3	19.4	34.4	32.7	36.3	52.1
11		Zachodniopomorskie	19.5	nd	20.2	nd	31.8	38.5	51.6
12		Opolskie	18.2	59.9	41.0	35.4	28.5	42.9	49.6
13		Łódzkie	16.7	17.7	24.4	24.6	30.3	40.6	48.3
14		Warmińsko-Mazurskie	13.9	11.7	38.0	18.8	20.6	19.7	43.3
15		Podlaskie	17.1	nd	23.3	21.4	21.0	29.8	31.9
16		Lubelskie	13.4	20.1	16.6	20.0	15.1	24.3	27.5

Source: Own elaboration based on the Local Data Bank, https://bdl.stat.gov.pl/BDL/start [accessed: 04.10.2018].

PROTECTION OF INNOVATIVE SOLUTIONS

Any innovation created in an enterprise can contribute to creating a company's competitive advantage. However, this effect will only be achieved if the solution is adequately protected, enabling the company to benefit from its own ideas [Skawińska and Zalewski 2018]. The analysis of the intellectual property dimension in Poland has shown that it has been systematically growing over the years. Taking into account Polish applications for individual objects of intellectual property protection, one can notice the greatest activity in reporting industrial designs. Similarly, in the case of patent applications (in PCT mode) and trademarks, Poland has been experiencing a systematic growth (Table 4).

Analysing the available data referring only to a selection of exclusive rights (patents for inventions and utility rights for utility models), it should be noted that individual regions of Poland show significant differences in the number of inventions and utility models applying for protection. In the analysed period of 2010–2017, the majority of applications came from the following voivodeships: Mazowieckie and Śląskie. The number of granted patents and protection rights also indicated that the following ranked the highest: Mazowieckie Voivodeship and Śląskie Voivodeship [UPRP 2018]. The lowest number of granted exclusive rights was recorded in the following voivodeships: Lubuskie, Podlaskie, Warmińsko-Mazurskie and Świętokrzyskie (Table 5).

It is also worth emphasizing the significance for the innovative activity undertaken in Poland of the following: the Act of 30 May 2008 on certain forms of supporting innovative activity and the Act of 9 November

Table 4. Intellectual assets dimension in Poland compared to EU 2010–2017

Specification	Performance relative to EU 2010 in		Relative to EU 2017 in
	2010	2017	2017
Intellectual assets	52.0	75.2	74.5
Patent Cooperation Treaty patent applications	9.6	18.8	19.6
Trademark applications	50.7	80.5	71.2
Design applications	92.6	124.2	128.7

Source: EC [2018a].

Table 5. Exclusive rights granted to national entities by the Patent Office of the Republic of Poland (UPRP) in 2010, 2016 and 2017 across voivodships

	Specification	Patents for inventions		Utility rights for utility models		
		2010	2016	2017	2010	2016
Voivodeship	Dolnośląskie	146	346	259	23	42
	Kujawsko-Pomorskie	35	105	90	29	29
	Lubelskie	55	191	159	24	32
	Lubuskie	7	24	21	9	12
	Łódzkie	94	218	199	23	36
	Małopolskie	164	351	327	52	84
	Mazowieckie	326	811	624	116	88
	Opolskie	28	78	61	8	10
	Podkarpackie	32	42	94	19	29
	Podlaskie	11	52	27	14	18
	Pomorskie	81	170	130	12	30
	Śląskie	233	477	351	90	137
	Świętokrzyskie	25	49	42	15	13
	Warmińsko-Mazurskie	18	54	41	5	26
	Wielkopolskie	95	252	231	35	41
	Zachodniopomorskie	1385	103	137	10	16
	Total	2 735	3 323	2 793	484	643

Source: UPRP [2018].

2017 on amending certain acts with the aim of improving the legal environment of innovative activity. The purpose of this law was to eliminate or limit barriers to conducting innovative activities, as well as to increase the attractiveness of tax instruments for supporting innovative activities in Poland. This amendment mainly covers issues related to the creation of knowledge and its transfer to the economy as well as to financing the

processes of creating innovative undertakings, especially increasing private expenditure on research and development.

CONCLUSIONS

With increasing competitiveness on the market and development of new technologies, one of the most important factors affecting the success of companies and their advantage over competitors is their ability to go ahead of the expected changes by undertaking broad innovative activities. Innovation, being an entrepreneurial tool, enables the creation of a new product or discovering a new application for a given item and determines its ability to remain on the market. What seems worth highlighting is a significant regional discrepancy between different regions in Poland. Taking into account the territorial division into voivodships, the highest innovation rate was achieved by Mazowieckie, Małopolskie, Dolnośląskie and Pomorskie, while the lowest by Świętokrzyskie and Warmińsko-Mazurskie. The largest expenditures on innovations were noted in Małopolskie Voivodeship, while the smallest expenditures in Podlaskie Voivodeship and Lubelskie Voivodeship.

Summing up, one should bear in mind that the success of the entrepreneur and each creator depends not only on the ability to create innovation but also on the ability to secure their own solutions through appropriate tools to protect intellectual property. Therefore, it should be ensured that proper management of intellectual property is an indispensable element of any process of creating innovative solutions. Moreover, in order for scientific, research and development units or enterprises to be willing to invest in innovative solutions, there must be a mechanism to encourage such activities, ensuring the profitability of investment incurred in creating innovative solutions and transferring them to practical implementation, which will probably benefit from legal regulations regarding innovative activity.

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INNOWACYJNOŚĆ I JEJ ZRÓŻNICOWANIE W POLSCE I WYBRANYCH KRAJACH UNII EUROPEJSKIEJ

ABSTRACT

Celami niniejszego opracowania są analiza zróżnicowania skali innowacyjności poszczególnych województw w Polsce oraz określenie poziomu innowacyjności Polski na tle innych krajów. Dokonano kwerendy wybranych badań i analiz uwzględniających dostępne dane za lata 2010–2017, opublikowanych m.in. przez Główny Urząd Statystyczny, Komisję Europejską, Urząd Patentowy Rzeczypospolitej Polskiej. Zakres prowadzonych analiz dotyczył aktywności innowacyjnej Polski na tle innych krajów, zwłaszcza krajów członkowskich Unii Europejskiej, oraz zróżnicowania działalności innowacyjnej przedsiębiorców realizujących działalność biznesową na terenie poszczególnych województw w Polsce. Należy zwrócić uwagę na znaczące zróżnicowanie regionalne występujące w tym zakresie.

Słowa kluczowe: innowacyjność, przedsiębiorstwa, własność intelektualna, prawa wyłączne, patent, prawo ochronne, prawo z rejestracji, województwa

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ORIGINAL PAPER

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THE PROBLEM OF GEOGRAPHICAL DELIMITATION OF AGRI-FOOD MARKETS: EVIDENCE FROM THE BUTTER MARKET IN EUROPEAN UNION

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ABSTRACT

Although market is a basic economic category, many studies neglect the need to define it in geographical dimension. It is fundamentally important in agribusiness, where the spatial competition and problem of market power at successive stages of supply chain occur. The aims of the paper are twofold: to discuss the problem of geographical delimitation of agricultural markets and to define geographic limits of the butter market based on Elzinga–Hogarty method. Using secondary data we find that the butter market is international in the scope, and after the abolition of the milk quota, this scope is evolving from European to semi-global.

Key words: market delimitation, delineation of geographic scope, agri-food market, butter market, European Union

INTRODUCTION

Market is the basic economic category [Tirole 1988, Werden and Froeb 1993], for which the spatial dimension is fundamentally important. Typical textbook definitions claim that market is a set of sellers and buyers making with each other voluntary trade transactions [Png and Lehman 2007], therefore it is defined by supply and demand side. However, any attempt at giving empirical meaning to the set of sellers and buyers requires to delineating the spatial limits of such set (i.e. geographical scope of the market). Markets are areas where economic agents gain profits or lose, where they exploit market power or suffer from it, and where governments test their instruments of intervention trying to regulate economic processes. Indeed, the proper delimitation of the market is the pivotal issue.

Particularly, agri-food sector markets are characterized by disproportions of concentration levels (the problem of market power), the huge government intervention and many forms of public support. This is why the market definition should not be ignored. Increasing processes of economic integration (particularly due to globalization and trade agreements) broaden local and domestic agri-food markets. Though, very often markets are not explicitly defined in their geographic dimension. In fact in many economic analyses market is treated *ad hoc* as the domestic one, because it is convenient to do so e.g. according to data availability and comparability at national level. Nevertheless, market definition, which was not accurately done, would result in not proper quality of analyses and diagnoses and with biased conclusions [Bain 1967, Scherer 1970]. For example, market regulations which are addressed to poorly delimitated market could be only partially

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effective or not effective at all. In the pure theoretical considerations of textbooks it could be stated, that "empirical difficulty of defining a market will be ignored" [Tirole 1988], but we should be able to delineate markets for pragmatic purposes.

The aims of this paper are twofold. Firstly, we will discuss the issue of geographical definition of agricultural markets. We will consider the methods of resolving this problem. Secondly, we will use one of these methods, namely Elzinga–Hogarty test for the delimitation of one of the most popular dairy products – butter. The literature of Elzinga–Hogarty method applications to the agri-food market is limited, even though E-H test is one of the most useful methods used in other markets [Werden and Froeb 1993, Brorsen et al. 1997, Wårell 2005, Gaynor et al. 2013, Kostic 2014]. To the best knowledge of the authors, this paper is the second one to use E-H test for butter market and the first one to do this basing on data after milk quota abolition[1].

LITERATURE REVIEW

Geografical issues in economics

"Our existence in time is determined for us, but we are largely free to select our location" [Lösch 1978]. The geographical issues are fundamental for economics, however, these concerns did not have been generally taken into account in mainstream economic theory for a long time [Blaug 1990, Ottaviano et al. 2002]. By the geographical considerations, we understand three issues: location, neighborhood and distance and in particular, the geographical scope of the markets.

Location theory until the Second World War was developed mainly by German authors: von Thünen, Launhardt, Weber, Predöhl, Christaller, Lösch. After World War II an important contribution in the economics of location was done i.a. by Perroux and Isard and in the nineties by Porter and Krugman [Blaug 1990, Krugman 1991, Porter 1998].

Spatial competition theory was developed by Sraffa [1926], Hotelling [1929] and [Salop 1979]. The recent review of the literature could be found in Biscaia and Mota [2013]. Spatial competition theory was applicated in agriculture by seminal paper of Sexton [1990] and further work of him and his colleagues [Rogers and Sexon 1994, Sexton 2000, Sexton and Zhang 2001, Sexton et al. 2003, Graubner et al. 2011, Russo et al. 2011, Crespi et al. 2012, Sexton 2013]. Sexton claimed that many studies of the new empirical industrial organization (NEIO) fail to properly define markets they intend to study before conducting the investigation and treat market delimitation question superficially at best. They use statistical data at the national level without questioning whether the geographic scope of the market as have in fact domestic character [Sexton 2000]. Sexton's conjecture leads us to the central problem of our paper i.e. how to delineate the geographic scope of markets? Sexton complained that usually markets are defined too broad [Sexton 2000]. This is probably true in many cases of raw agricultural inputs markets e.g. raw milk, particularly in large countries like the United States. But due to the processes of globalization, one could imagine that at the next stage of marketing chain (processing) markets for agri-food outputs (e.g. butter) are delineated too narrow. So, it is extremely important to find a method and to define the real scope of the market, as it is. This reasoning leads us to the third issue of geographical considerations, namely the problem of geographical market delineation.

Delineation of geographic scope of the market

At the beginning of the 1980s, researchers such as Stigler or Horowitz acknowledged the small contribution of economists into the solution of the problem of

[1] The European Union (EU) introduced the milk quota regime in 1984. A milk quota was one of the measures used to intervene in agriculture. Their purpose was to bring rising milk production under control. Milk quotas constituted a limit on the amount of milk that a farmer could sell every year without paying a levy [Chantreuil et. al. 2008]. The introduction of milk production quotas was a significant factor shaping the supply, demand and prices on the milk market. Quotas where an administrative instrument for influencing the market and its equilibrium [Hamulczuk and Stańko 2009]. However, regarding the liberalization of Common Agricultural Policy (CAP) milk quotas tend to lose their role as a tool of controlling of supply. Therefore, milk quotas were abandoned at the end of March 2015.

market definition in practice [Massey 2000]. Stigler wrote: "my lament is that this battle on market definitions (…) has received virtually no attention from us economists (…) the determination of markets has remained an underdeveloped area of economic research at either the theoretical or empirical level" [Stigler 1983]. However, already in the 1970s and early the 1980s quantitative methods supporting the market delimitation processes have started to be developed [Werden and Froeb 1993, Massey 2000]. These methods could be roughly separated into two basic groups of approaches: first, those based on prices and second, those based on physical flows.

Those approaches which were based on prices are based on the studies of Cournot and Marshall. Cournot defined the market as "the whole of any region in which buyers and sellers are in such free intercourse with one another that the prices of the same goods tend to equality easily and quickly" [Marshall 1920]. In line with the Marshall's law of one price: "the more nearly perfect a market is, the stronger is the tendency for the same price to be paid for the same thing at the same time in all parts of the market: but of course if the market is large, allowance must be made for the expense of delivering the goods" [Marshall 1920]. There is a variety of methods of delimitation of markets based on prices. We can take into account: analyses of correlation, the rate of adjustments, the Granger causality test, and tests of exogeneity and cointegration. In general, it is assumed, that the closer is the correlation or cointegration of price movements between two areas, the stronger is their integration, suggesting that these areas form a single market. Even though strongly grounded in the economic theory, the approaches based on prices are however sometimes criticized according to the: difficulties with access to the good quality comparable data and methodical/statistical constraints e.g.: random convergence of price movements or convergence caused by variation of a factor of production common for the considered markets; no uniform criterion, from which the link between prices is sufficiently strong etc. [Brorsen et al. 1997, Audy and Erutku 2005, Wårell 2005].

Methods grouped in another category, based on goods' flows, assume that if areas trade with each other at a significant level, it means that they belong to the same market. It is also presumed that movements of goods (in quantitative terms) reflect the substantial shifts in demand and supply which affect prices. As a such, to define a geographic dimension of the market one should only gather quantitative data on production and consumption, import (flows from outside) and export (flows into outside), thus avoiding many difficulties and traps linked to the price tests.

The Elzinga–Hogarty method

The most often used method based on data concerning movements of goods is the Elzinga–Hogarty method, i.e. E-H test [Crane and Welch 1991, Wårell 2005, 2007]. The E-H test, for simultaneous verification, uses two partial tests: LOFI (Little-Out-From-Inside), referring to the supply side of the market, and LIFO (Little-In-From-Outside), pertaining to the demand side of the market [Elzinga and Hogarty 1973, 1978].

$$LOFI = \left[\frac{production - export}{production} \right] \cdot 100\% \qquad (1)$$

$$LIFO = \left[\frac{consumption - import}{consumption} \right] \cdot 100\% \qquad (2)$$

The LOFI test (1) refers to the supply side of the market and its positive verification means that "if the firms in a hypothetical geographic market area receive little of their business from customers outside of the geographic market area, this is an indicator of the propriety of defining that area as a market" [Elzinga and Hogarty 1973]. Conversely, the LIFO test (2) refers to the demand side and its positive verification happens "if only a small proportion of the product consumed in the hypothetical geographic market area is 'imported' into the area from outside, this is an indicator of a unique geographic market area" [Elzinga and Hogarty 1973]. Positive and simultaneous verification of both tests indicates the existence of a separate geographical market.

The Elzinga–Hogarty method has some crucial advantages. Most importantly, E-H test has low

requirements of data as compared to the methods based on prices. Moreover, this is also a quite simple method in the application. Last but not least, E-H method allows to visualizing the scope of the market obtained by the procedure.

However, this method is rarely used in the agricultural economics literature. There are a lot of studies of interconnections of prices of agricultural product between countries or regions [Zanias 1993, Gil et al. 2000, Christos et al. 2012]. Particularly popular are studies of raw milk markets [Katrakilidis 2008, Bakucs et al. 2010, Jha et al. 2012, Acosta et al. 2014, Kabbiri et al. 2016]. Some authors try to broaden the scope of research taking into account the whole dairy supply chain [Serra and Godowin 2010, De Fátima Oliviera et al. 2015].

Nevertheless, the literature about applications Elzinga–Hogarty method to the agri-food markets is limited to: edible oil [Kostic 2014], sugar [Pietrzak and Mucha 2015, Pietrzak et. al. 2016a, b] and butter [Roman 2016] Roman in her studies also compared results of E-H method with cointegration test (method based on prices) on the example of butter market (2016, 2017).

In her paper, Roman [2016] – basing on Elzinga––Hogarty method – delineated the geographical scope of the butter market for one year – 2013. However, it is worth to do this type of analysis on several periods (as it was done in this article: 2013 and 2015) if we would like to assess differences before and after milk quota abolition. Our paper differs also from Roman's article [2016] in one important assumption. E-H test requires to make assumption about starting point of the analysis. Roman [2016] started her analysis from the Polish market. Such "polonocentric" approach seems to be rather subjective. In our paper we started our analysis from German market. Germany is the biggest producer of butter in EU, so this country fits better to basic point to start the E-H procedure. The adoption of a different starting point (Germany) in our analysis made it possible to compare our results with those obtained by Roman [2016] and to examine how important is the initial assumption of the initial point in the Elzinga–Hogarty method.

RESEARCH DESIGN

The basic research questions we would like to answer in empirical part of our study are as follows: how broad is the geographical scope of butter market in Europe? Does it changed after abolition of the quota system? Specifically, we focus on investigating which countries created butter market in 2013 and which ones did it in 2015 (the first year of abolition of the system).

Why we choose the butter market for empirical tests? This is due to the fact that butter is particularly well suited for spatial considerations, regarding bulky and perishable character of raw materials used. Moreover, this character is changing due to processing, butter is much less bulky and much less perishable than raw milk input. So, one could expect much broader geographical scope in the case of butter market relatively to the raw milk market. Butter is an important output of dairy industry accounting for 5% share[2] in global milk production (measured as milk equivalent, see Table 1).

Regarding the diversity of "butter" category, authors made the assumption, that butter market will be studied integrally, regardeless the type of butter, its origin and a kind of customer. Therefore data were drawn basing on the commodity code "040510 – Butter – emulsion of milk fat and water that is obtained by churning cream" (FAO database).

We used secondary data in order to verify the geographical scope of the butter market. We are based on data sets collected by the Food and Agriculture Organization, The United Nations – Statistics Division, Canadian Dairy Information Centre, United Nations Comtrade Database – International Trade Statistics and European Commission – Eurostat.

To define the geographical scope of butter market we decided to use the Elzinga–Hogarty method. This is due to the advantages of this approach discussed in the literature review. Moreover, one should be aware that alternative methods, namely those based on prices require the usage of the long time series. For the period after the abolition of milk quotas this assumption could not be met at all (the available data would cover only 2 years). This is additional argument for using E-H method.

[2] In some countries butter accounts even for 19% (Ireland) or 16% (Denmark) of processed milk.

Table 1. Basic data about the milk and butter production in analysed countries

Country	Milk production				Butter production				Butter production as a percentage of milk production (%)	
	2013		2015		2013		2015			
	thous. t	%	thous. t	%	thous. t *	%	thous. t*	%	2013	2015
World	767 158	100.0	802 754	100.0	39 492	100.0	41 282	100.0	5.1	5.1
Belgium	3 529	0.5	4 010	0.5	516	1.3	323	0.8	14.6	8.1
Denmark	5 082	0.7	5 321	0.7	283	0.7	841	2.0	5.6	15.8
France	24 460	3.2	25 845	3.2	2 624	6.6	2 931	7.1	10.7	11.3
Germany	31 324	4.1	32 900	4.1	2 901	7.3	3 363	8.1	9.3	10.2
Ireland	5 601	0.7	6 591	0.8	1 004	2.5	1 237	3.0	17.9	18.8
Italy	11 281	1.5	11 100	1.4	649	1.6	633	1.5	5.8	5.7
Netherlands	12 408	1.6	13 526	1.7	881	2.2	1 435	3.5	7.1	10.6
Portugal	1 848	0.2	2 070	0.3	170	0.4	213	0.5	9.2	10.3
Spain	6 559	0.9	6 902	0.9	234	0.6	277	0.7	3.6	4.0
UK	13 943	1.8	15 460	1.9	957	2.4	988	2.4	6.9	6.4
USA	91 278	11.9	94 635	11.8	5 576	14.1	5 554	13.5	6.1	5.9
Total of countries above	207 313	27.0	218 360	27.2	15 794	40.0	17 794	43.1	7.6	8.1

* Butter production is expressed in thousands of tones milk equivalent.

Source: Own elaboration on basis of: CDIC [2017], Eurostat database, FAO database, UN Comtrade database.

While conducting E-H test described above we decided to use LOFI (1) and LIFO (2) thresholds established at the level of 90% (so-called strong market threshold) as suggested by Elzinga and Hogarty [1973].

As we mentioned before the crucial methodological issue is deciding where to start E-H method procedure. We choose Germany as the starting point. Germany is the largest producer of butter in European Union (this country produces almost 23% of EU butter production and belongs to the world's big 3. The largest producer are United States – 16% of global butter production, the second one is New Zealand (9% of global butter production) and the third position occupies Germany, which covers 8% of butter production in the world. We start with the question: are domestic boundaries of European countries valid delineation of the market in the case of butter? We try to answer basing on the example of the biggest butter producer in Europe, namely Germany. Even though that Germany is not only the big producer but also the big country, we found that the proper answer is "not".

RESULTS AND DISCUSSION

As already mentioned, Germany was taken for the analysis as a starting point in 2013. Because LOFI and LIFO tests were not simultaneously positively verified (Table 2) the area of Germany was enlarged by adding subsequent countries (according to the largest trade exchange) until the required threshold of both tests was met by such enlarged area. The area of Germany failed to meet the LOFI test – as a consequence of significant exports of butter, mainly to the Netherlands (17.4%

of export). Consequently, the first country which was added to Germany, was the Netherlands – the largest recipient of German butter (Fig. 1). The E-H tests for an enlarged area were still not met, despite the increasing value of the LIFO test, the LOFI test fell down. The largest share of butter exports from the joined Germany and Netherlands area goes to France (approx. 64 thousand t), thus France was added to the analysed market. Germany + the Netherlands + France area still failed to meet both LIFO and LOFI tests. The largest

Table 2. Determination of the geographical scope of the butter market with the use of the LOFI/LIFO tests

2013					2015				
Order	Country	LOFI test (%)	LIFO test (%)	90% threshold ("strong market)	Order	Country	LOFI test (%)	LIFO test (%)	90% threshold ("strong market)
1	Germany	71.6	74.6		1	Germany	73.4	72.4	
2	+ Netherlands	67.2	75.8		2	+ Ireland	63.2	83.2	
3	+ France	81.8	78.9		3	+ Netherlands	62.7	81.6	
4	+ Ireland	77.9	86.6		4	+ France	76.9	84.8	no
5	+ UK	82.4	85.9	no	5	+ Belgium	81.0	89.6	
6	+ Belgium	86.1	89.4		6	+UK	86.0	90.9	
7	+ Italy	88.8	90.6		7	+ Italy	88.2	91.3	
8	+ Denmark	89.3	92.3						
9	+ Spain	89.9	93.0		8	+ USA	92.1	94.7	yes
10	+ Portugal	90.1	93.1	yes					

Source: Own elaboration on basis of: CDIC [2017], Eurostat database, FAO database, UN Comtrade database.

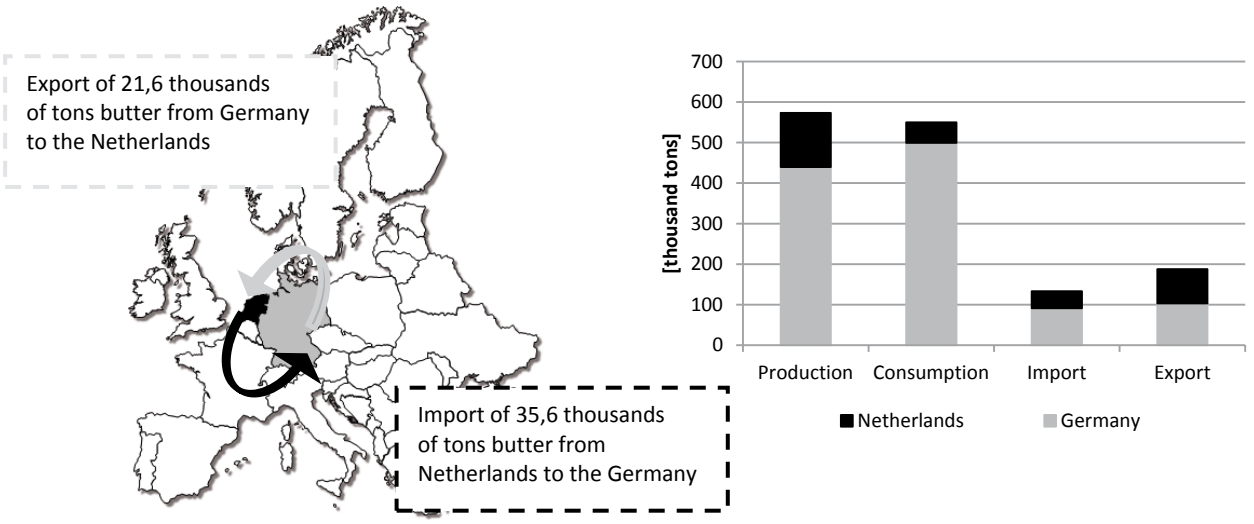

Fig. 1. Butter market in Germany and the Netherlands in 2013

Source: Own elaboration on basis of: CDIC [2017], Eurostat database, FAO database, UN Comtrade database.

trading partner of the combined area of Germany + the Netherlands + France was Ireland, thus Ireland was added to the analysed countries. The adding process continued until Portugal has been added to the group and the required thresholds for both E-H tests were met (Table 2, Fig. 2). The geographical scope of the butter market in 2015 was defined in an analogous way (Table 2, Fig. 3).

The butter market as defined in 2013 covered area of Germany + 9 countries. Market delineated in such way represents production at the level of 1.55 million t (approx. 26% of worlds' production) and consumption at the level of 1.50 million t, with the relatively small amounts of export and imports. So, the geographical scope of the butter market is much broader than the domestic one. Indeed it could be defined as regional (in the broad sense), namely European. Two years later, in 2015 (the first year of milk quota system abolition) the spatial dimension of butter market was broadened by covering not only Germany + six European countries but also one country from other continent, namely United States. This market represents

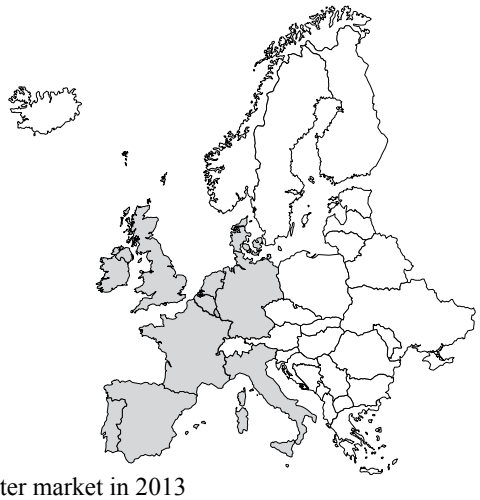

Fig. 2. Geographic scope of the butter market in 2013

Source: Own elaboration on basis of: CDIC [2017], Eurostat database, FAO database, UN Comtrade database.

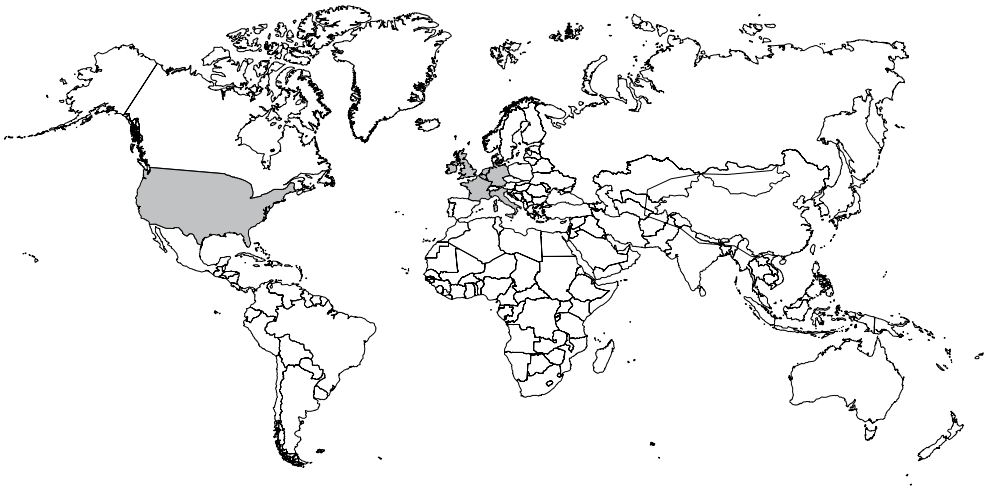

Fig. 3. Geographic scope of the butter market in 2015

Source: Own elaboration on basis of: CDIC [2017], Eurostat database, FAO database, UN Comtrade database.

production at the level of 2.45 million t (approx. 40% of worlds' production) and consumption at the level of 2.09 million t, with the relatively small amounts of export and import. The geographical scope of the butter market seems to evolve into the global one and could be defined as semi-global. Strikingly, this evolution coincides with the liberalization of the CAP in the field of the dairy market regulations, however, it does not prove casualty relations.

There are two limitations of obtained results. Firstly, the assumptions which were taken into account in the study, and secondly, the weakneses of the method adopted. We assumed the broad product definition, treating butter integrally (as a whole, without dividing into sub-products) independently from the type of butter, its origin, and kind of customer. For example, one could claim the need of separation packet from bulky butter as different product markets etc. However, we are convinced that our assumption is justified because of the close substitution between such types of butter. Nevertheless, to overcome this controversy it would be desirable to conduct an assessment of the proximity of different kinds of butter e.g. based on price methods.

The subsequent assumption covers the adoption of the "strong" market threshold (90%). Such approach is suggested by the authors of the Elzinga−Hogarty method and it is also present in its practical applications. However, it should be admitted that the adoption of the "weak" market threshold (75%) would result in a conclusion that the borders of the Germany + the Netherland + France (in 2013) and Germany + Ireland + the Netherlands + France (in 2015) are sufficiently broadly delineated as geographical scope of the butter market (Table 2). Nevertheless, even markets defined in such relatively narrow way are still much broader than domestic.

The second group of arguments limiting obtained results may be drawn from controversies of the E-H method due to:

- level of analysis – it is not specified in the E-H method, at what level one should make calculations (e.g. the regions in the country, the whole country, group of countries, e.g. EU etc.);
- procedure – the choice of the starting point is somewhat subjective (starting from different areas could result in a different geographic scope of the butter market)[3].
- period of analysis – E-H test is a snapshot analysis done in a single moment of time, which does not concern the dynamics of change in relations between countries; however, this could be overcomed by multiplying snapshots as we tried to do.

We do not conjecture that we have proven the semi-global nature of the butter market. But we are convinced that the results of our analysis could be reliable. Such statement needs to be confirmed or rejected by using other methods (i.e. based on prices). Nevertheless, one could doubt about e.g. concerns on oligopoly power in butter market if they are based on the domestic market analysis. One could doubt also about the policy, addressed to the market defined in the narrower manner than it really is. We hope to open discussion about the agricultural markets definitions.

CONCLUSIONS

Due to the spatial character of agricultural markets it is particularly important to properly define their geographical scope. Without valid delineation of the market, analyses could be biased and erroneous conclusions and action could be taken. The use of the Elzinga−Hogarty method, which we tested for delimitation of the butter market, resulted in the quite broad

[3] One should note that in the previous paper one of the authors assumed Poland as the "starting point" in E-H procedure [Roman 2016]. However in this paper, after careful consideration, we decided to start with Germany (the biggest player in Europe). Nevertheless, such assumption is crucial for the results of the research. For example, our present research gives roughly similar results to results obtained by Roman, but not the same. In both research the core of the butter market in 2013 was the same: Germany, France, UK, Italy, Ireland, Netherlands and Belgium. However in previous Roman's study there were also Poland and Czech Republic clustered into this market. In our present study those two countries are not included, but Denmark, Spain and Portugal are added instead. Those results show that Elzinga–Hogarty method is sensitive to the initial assumption embodied in the decision with which country to start the procedure.

definition of the market scope, namely European in 2013 and semi-global in 2015. The broadening of the market scope coincides with the milk quota abolition in UE. When interpreting the obtained results, some limitations should be taken into account. Firstly, the specific research assumptions adopted and secondly, limitations of the Elzinga−Hogarty method used. Given the important controversy which regards the definition of the geographical scope of the market, the authors call for a continuation of research within the geographical delineation. In particular, it would be worthwhile to apply alternative methods. It could be done by using quantitative methods based on prices. Moreover, it could be also done by using qualitative methods drawn from strategic management theory, e.g. by Yip's model [Yip 2002] or by method proposed by Pietrzak [2014]. This complies with the proposition of Sleuwaegen [1999], who postulates to combine different methods of market definition, particularly antitrust methods with those rooted in strategic management.

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PROBLEM DELIMITACJI RYNKÓW ROLNO-SPOŻYWCZYCH NA PRZYKŁADZIE RYNKU MASŁA W UNII EUROPEJSKIEJ

STRESZCZENIE

Rynek jest podstawową kategorią ekonomiczną, tymczasem w wielu badaniach zaniedbuje się konieczność zdefiniowania rynku w wymiarze geograficznym. Wymiar ten ma jednak fundamentalne znaczenie w agrobiznesie, w którym w związku z przestrzennym charakterem konkurencji występuje problem siły rynkowej na różnych etapach łańcucha dostaw. Autorzy w niniejszym artykule postawili przed sobą dwa cele: omówienie problemu delimitacji geograficznej rynków rolnych oraz określenie granic geograficznych rynku masła według metody Elzingi–Hogarty'ego. Korzystając z danych wtórnych, stwierdzono, że rynek masła ma zasięg międzynarodowy, a po zniesieniu kwotowania produkcji mleka zakres ten zmienił się z europejskiego na półglobalny.

Słowa kluczowe: delimitacja rynku, określenie zasięgu geograficznego, rynek rolno-spożywczy, rynek masła, Unia Europejska

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DETERMINANTS OF ENTREPRENEURSHIP DEVELOPMENT IN THE OPINION OF THE AUTHORITIES OF RURAL AND SEMI-URBAN MUNICIPALITIES IN WARMIŃSKO-MAZURSKIE VOIVODESHIP

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ABSTRACT

The paper presents opinions of local government authorities on determinants of local entrepreneurship development. The research conducted in 2017 in rural and urban-rural municipalities of Warmińsko-Mazurskie Voivodship (Poland) shows that among the locational conditions for entrepreneurship development the tourist attractiveness was rated as the highest. Infrastructural conditions were assessed as favourable while such features of the residents as education level, age or qualifications were satisfactory for the respondents. Protected natural areas, popular in the analysed region, were both a barrier and an opportunity for entrepreneurship development. Moreover, self-government activities were evaluated as good on the local level, and satisfactory on the regional level.

Key words: entrepreneurship, conditions of development, local level, Poland

INTRODUCTION

Entrepreneurship has long been seen as an important instrument in stimulating and generating economic growth and local development and the amount of research trying to identify key factors that drive entrepreneurship is considerable [Arin et al. 2015]. Despite considerable interest in the subject of entrepreneurship, there is no unambiguous definition of this phenomenon [Pomianek 2018]. A common feature of some definitions [Say 1855, Kamerschen et al. 1991, Adamczyk 1995, 1996, Kapusta 2001, Kłodziński and Fedyszak-Radziejowska 2002, Tuzimek 2002, Gaweł 2007, Kropsz and Kutkowska 2008] is the combination of entrepreneurship and business. Other definitions refer to psychological features or skills of the entrepreneur and way of acting [Cantillon 1755, Knight 1933, Schumpeter 1960, John Paul II 1991, Drucker 2004, Hébert and Link 2006]. Some economists combine definitions – for example, Casson [1982] developed an original synthesis basing on different approaches, comprising theory of risk-bearing [Cantillon 1755], theory of uncertainty-bearing [Knight 1933], theory of innovation [Schumpeter 1912, 1934], theory of distributed knowledge [Hayek 1945], theory of incentives [Baumol 1968] as well as theory of opportunity-seeking [Kirzner 1973]. Multidimensionality of entrepreneurship emphasizes its importance in economic development, as it occurs in all sectors of the economy. In addition, researches [Sawicka 2013, Bański 2014, Żmija 2017, Godlewska-Majkowska 2018] show that small businesses are the basis for rural development, reducing unemployment,

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providing products to local markets, stimulating the local economy, and providing tax revenues for municipalities – and, at the same time, entrepreneurs depend to a large extent on decisions of local self-government authorities, including investments in technical infrastructure. From this perspective, entrepreneurs play significant role in local and regional development. However, setting up and maintaining own enterprise is not easy [Plawgo 2005, Krasniqi 2008, Garcia-Ruiz and Toninelli 2010, Okwiet and Nowak 2015, Plotnikov and Leontyev 2015, Huggins et al. 2017]. Economics barriers seem to be the most severe while setting up and running the enterprise. Particularly, SMEs face credit discrimination from banks because of their information opacity. Due to the ambiguous nature of the credit rating models and information asymmetry between banks and the SMEs, banks can impose not only higher prices of the loans, but also non-price related restrictions in SME lending, for example, collateral, shorter maturity, and smaller loan size [Rahman et al. 2017]. Lack of transparency of banking regulations and incomplete information are also reflected in the marketing decisions of entrepreneurs [Morris and Lewis 1995, Bajdor 2015] and affect the competitive ability of enterprises [Zvirblis and Buracas 2012, Sipa et al. 2015].

MATERIAL AND METHODS

The paper presents results of the survey conducted from March to September 2017 in 100 municipalities of Warmińsko-Mazurskie Voivodship (including 67 rural and 33 semi-urban ones). The voivodship has been known as one of the biggest and at the same time one of the most problematic regions in Poland. Answers of the municipal mayors were collected from 42% of surveyed self-government units (the same percentage distribution in both groups of municipalities). The presented questions were multiple-choice, so the answers do not sum up to 100%. The resulting structure of respondents (34% in Elbląski sub-region, 26% in Ełcki sub-region and 40% in Olsztyński sub-region) was in line with the structure of the surveyed population, which allows making generalizations of the findings.

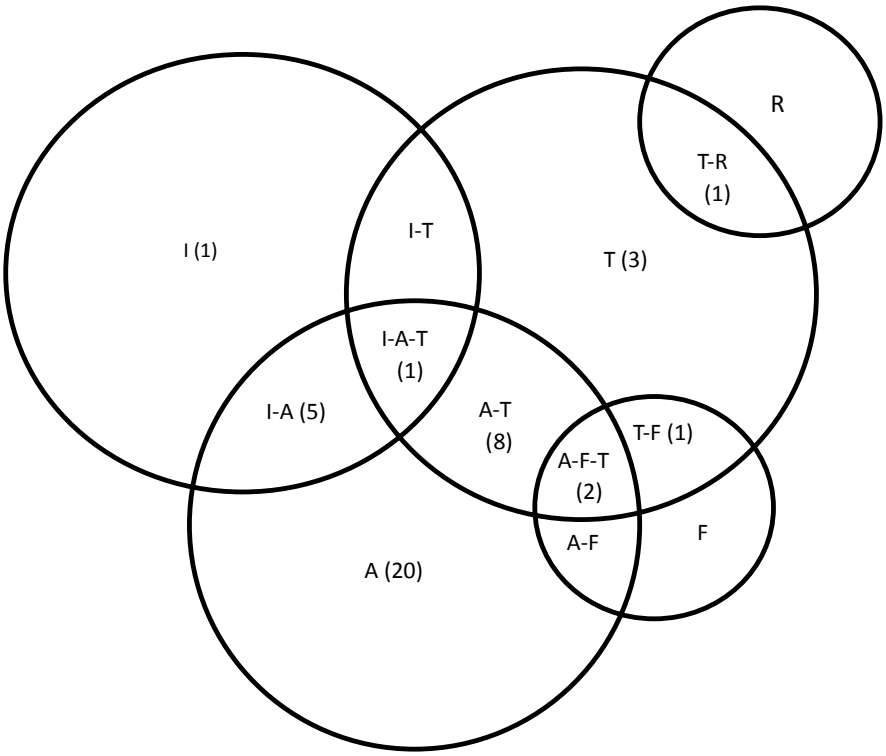
The aim of the paper is to present opinions of the authorities on determinants and conditions of local entrepreneurship development.

RESULTS AND DISCUSSION

Almost half of the respondents stated that an agricultural profile was the leading function of the municipality (50% of rural municipalities and 43% of semi-urban municipalities). The second group in terms of size (19%) included municipalities of agricultural and tourist profiles (29% of semi-urban municipalities and 14% of rural ones). In the group of municipalities of following profiles: agricultural-industrial, tourist as well as agricultural-tourist-forest, only rural municipalities were included (correspondingly: 18, 11 and 7%). On the other hand, only semi-urban municipalities were classified as units of industrial, tourist-forest, tourist--residential as well as agricultural-tourist-residential profiles (7% each). The distribution of responses was illustrated in Figure 1.

Municipal authorities were asked to assess the determinants of entrepreneurship development in the local level. The evaluation criteria were divided into four thematic groups: location, technical infrastructure, features of residents and government activities.

As it was presented in Figure 2, among the locational conditions for the development of entrepreneurship in the municipality, the tourist attractiveness was rated the highest – from 3.9 in rural units to 4.2 in semi-urban ones. In municipalities with a purely tourist profile the authorities rated this factor at 5.0 (maximum assessment scale adopted), whereas in municipalities with mixed functions involving tourist function – 4.5. In municipalities with a dominant agricultural function, the average tourist attractiveness rate amounted to 3.7, while in units of mixed profiles including agricultural function it was a bit higher and amounted to 4.3. The second location factor (relation to major transport routes) was rated the highest in tourist municipalities (4.0). Authorities of the units with mixed functions involving tourist assessed this factor at the level of 3.3, while the average rating of respondents in municipalities with agricultural function ranged from 3.3 (agricultural profile) to 3.7 (mixed profile with agricultural function). As it can be seen from Figure 2, the average score in rural communes was higher than in semi-urban ones and amounted to 3.6 compared to 3.2. The last location factor illustrated accessibility of regional and sub-regional centres. Again, the best



A – agricultural, F – forest, I – industrial, R – residential, T – tourist

Fig. 1. Functions of municipalities in the opinion of local authorities (number of answers)

Source: Author's research.

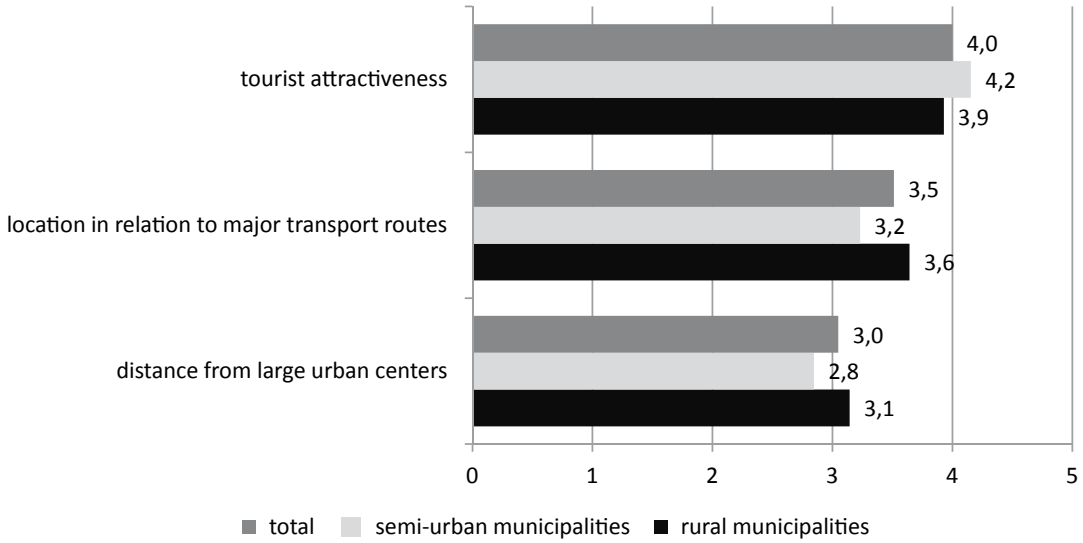


Fig. 2. Assessment of location as a condition for entrepreneurship development in municipalities in the opinion of local authorities (answer scale from 1 to 5, where: 1 = strongly unfavourable, 5 = strongly favourable)

Source: Author's research.

ratings were observed in tourist municipalities (3.7) and in both mixed groups (3.3 in the mixed tourist municipalities and 3.2 in the mixed agricultural municipalities). Distance from large urban centres seemed to be larger in agricultural municipalities as well as semi-urban ones, having their own local urban centres (Fig. 2).

Assessment of technical infrastructure was the next task for the respondents (Fig. 3). Water supply network had better rating in rural municipalities (4.3) – it proves that local authorities of rural units had been proud of the state of water supply and such investments in the municipality. The highest rating characterised tourist municipalities (4.7), whereas in tourist mixed ones it amounted to 3.5, 4.2 in agricultural units or 4.1 in mixed ones with agricultural function. The condition of the telephone network, which currently has been also covering the range of mobile telephony, in most municipalities was assessed at a good level (4.0). The highest average rating was given by the semi-urban authorities (4.2), the lowest – in municipalities with a mixed profile with a tourist function (3.8). Regarding the condition of a road network, the average rating in most analysed groups ranged from 3.1 (mixed tourist) to 3.3 (rural, agricultural, mixed agricultural). In tourist municipalities, the level of satisfaction was higher (3.7).

Gender, age, level of education, experience or income have been important factors of entrepreneurship development in numerous researches [Michalewska-Pawlak 2012, Sawicka 2013, Figueiredo and Brochado 2015, Neneh 2017a, b]. Features of the residents such as education level, age or qualifications received similar ratings in both administrative types of municipalities (Fig. 4). Better average marks were given in semi-urban (3.3) and tourist (3.7) units. On the other hand, in municipalities with a mixed profile with a tourist function, the level of education of local society was rated as the lowest (2.9). In the case of the age category, only the authorities of the tourist municipalities and the mixed profile with the tourist function were not in line with the assessment – respectively providing the rating of 3.7 and 2.9. In other groups of municipalities, 3.1 points were given. Similarly, the lowest rating of qualifications was observed in mixed tourist municipalities, and the highest – in tourist units (3.7). In the remaining municipalities, the assessment ranged from 3.0 to 3.1. And again, authorities of tourist municipalities gave the highest average rate (3.7) for social activity (activeness), followed by respondents from mixed agricultural units with 3.1 and other municipalities in terms of their economic profile (2.8). According to the

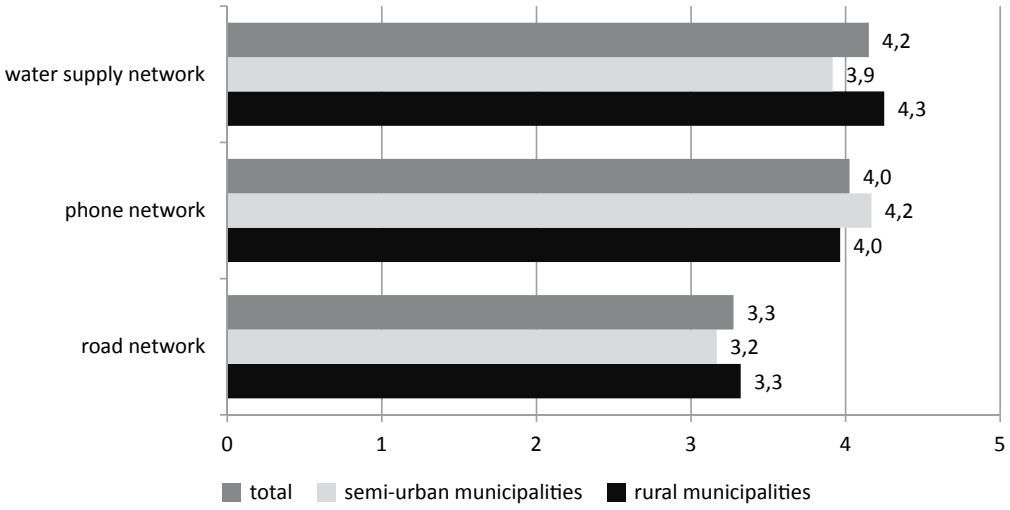


Fig. 3. Assessment of technical infrastructure as a condition for entrepreneurship development in municipalities in the opinion of local authorities (answer scale from 1 to 5, where: 1 = strongly unfavourable, 5 = strongly favourable)

Source: Author's research.

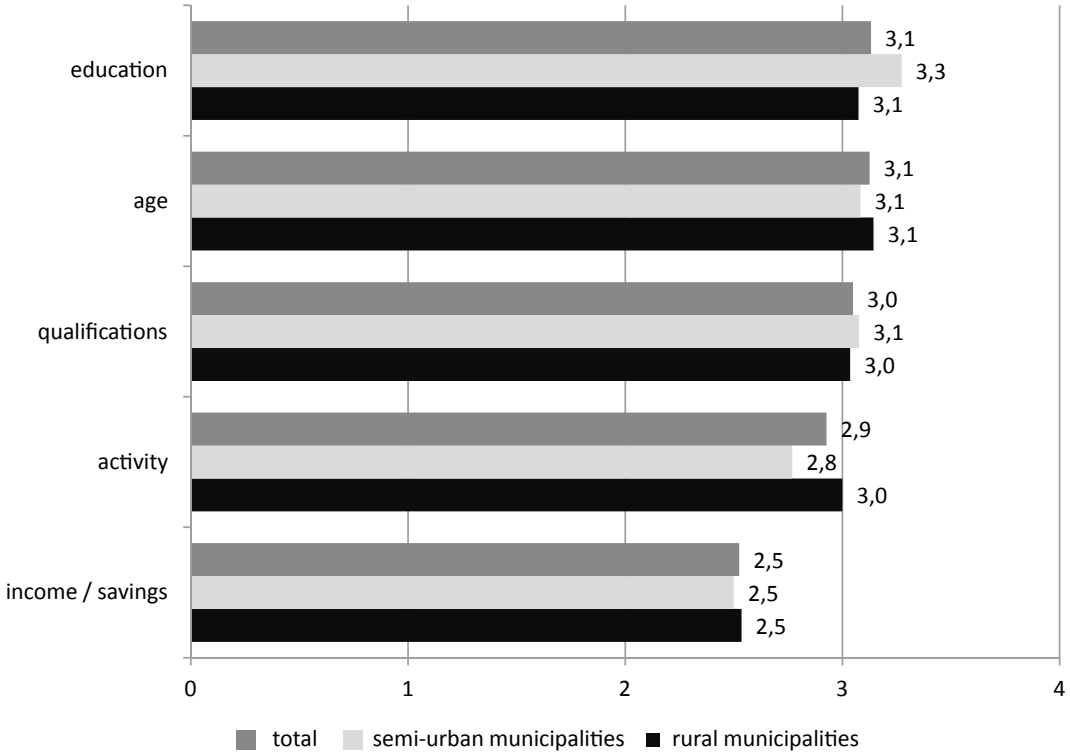


Fig. 4. Assessment of features of local population as a condition for entrepreneurship development in municipalities in the opinion of local authorities (answer scale from 1 to 5, where: 1 = strongly unfavourable, 5 = strongly favourable)

Source: Author's research.

administrative status, in rural municipalities social activity was rated a bit higher (3.0) in comparison to semi-urban ones (2.8). Finally, the last factor of the society – income and savings – gathered the lowest average rates in comparison to other factors in this area, usually not exceeding 2.5. In tourist municipalities, exceptionally, the average rating was 3.3.

The last questioned area concerned self-government activities (Fig. 5). In the opinion of municipal authorities, local government activities was evaluated in inverse proportion taking into account the level of administration. For each level, the highest rating was given by authorities of semi-urban municipalities (from 4.3 for self-evaluation to 3.7 for voivodship's). Respondents from rural municipalities assessed their activity at 3.9, poviat's at 3.5 and voivodship's at 3.4. Self-government in rural municipalities gave similar marks. In municipalities of mixed functions the average rates ranged from 4.2 (mixed tourist) to 4.4 (mixed agricultural) at the municipal level, then 3.3–3.5 at the poviat's level and finally 3.2–3.3 at the regional level (voivodship). The authorities of tourist municipalities assessed themselves as well as the voivodship's activeness at 4.0, whereas the poviat's activeness got a bit lower rank – 3.7.

Due to the presence of protected natural areas in the analysed communes, local authorities assessed impact of these areas on conducting business activity. Protected natural areas were a barrier for 14 self-governments and an opportunity for 17 local authorities. At the same time in 2 municipalities the respondents claimed both answers, and in 7 units the authorities saw neither opportunities nor limits resulting from natural areas (Fig. 6).

Landscape and national parks, reserves and other protected natural areas (e.g. Natura 2000) have a particular impact on economic activities, such as tourism or agriculture, largely dependent on natural condi-

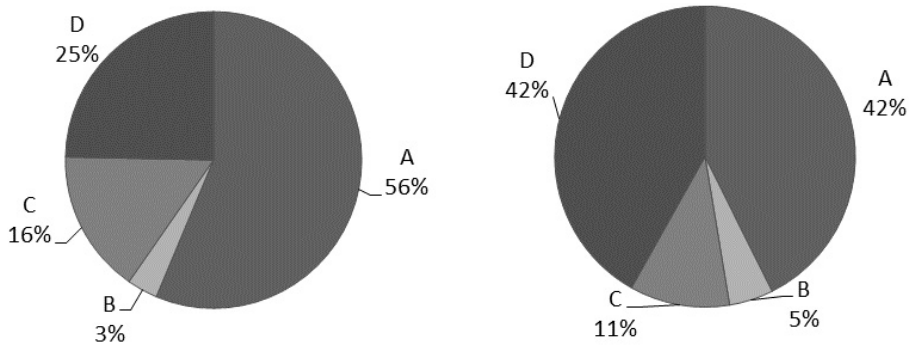


Fig. 5. Assessment of self-government activity at various levels of government as a condition for entrepreneurship development in municipalities in the opinion of local authorities (answer scale from 1 to 5, where: 1 = strongly unfavourable, 5 = strongly favourable)

Source: Author's research.

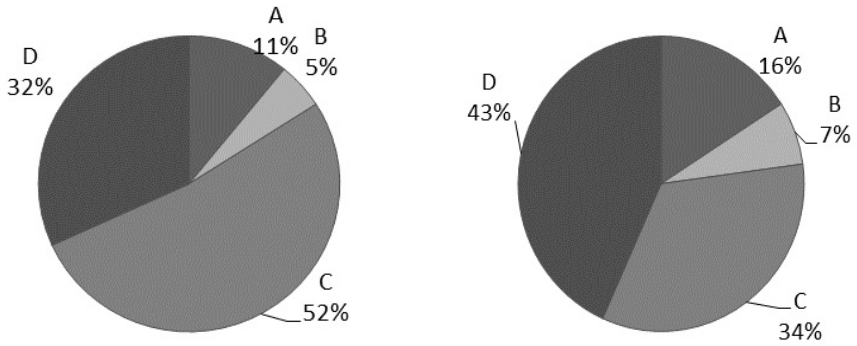


Fig. 6. Assessment of impact of protected natural areas on entrepreneurship development in the opinion of local authorities (number of responses)

Source: Author's research.

tions. Thus, the four analysed types of municipalities require a closer look. Most of agricultural or mixed agricultural self-governments (a total of 15) claimed, that protected natural areas were a barrier for entrepreneurship development in their municipalities. In the contrary, respondents in most of municipalities of a tourist profile or a mixed profile with tourist function perceived natural protected areas as an opportunity for entrepreneurship development.

CONCLUSIONS

Despite considerable interest in the subject of entrepreneurship, there is no unambiguous definition of this phenomenon. The category of rural entrepreneurship is also not adequately recognized, although many scientists conduct research in the field of conditions and instruments and mechanisms for supporting the development of entrepreneurship. Enterprises businesses are important for local and regional development, being at the same time dependent to a large extent on decisions of local self-government authorities, including investments in technical infrastructure or fiscal decisions. Despite a wide range of support instruments at the level of the European Union, local authorities and institutions should strive to create optimal conditions for the creation and development of companies on a local scale.

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UWARUNKOWANIA ROZWOJU PRZEDSIĘBIORCZOŚCI W OPINII WŁADZ GMIN WIEJSKICH I MIEJSKO-WIEJSKICH WOJEWÓDZTWA WARMIŃSKO-MAZURSKIEGO

STRESZCZENIE

Celem artykułu było przedstawienie opinii samorządów gminnych na temat uwarunkowań rozwoju przedsiębiorczości w skali lokalnej. Badania przeprowadzone w 2017 roku w gminach wiejskich i miejsko-wiejskich województwa warmińsko-mazurskiego pokazują, że wśród warunków lokalizacyjnych dla rozwoju przedsiębiorczości najwyżej oceniono atrakcyjność turystyczną badanego obszaru. Warunki infrastrukturalne zostały ocenione jako korzystne, podczas gdy takie cechy mieszkańców jak poziom wykształcenia, wiek czy kwalifikacje były dla respondentów satysfakcjonujące. Obszary przyrodniczo chronione, występujące często w analizowanym regionie, stanowiły zarówno barierę, jak i szansę na rozwój przedsiębiorczości. Ponadto działania samorządowe oceniono jako dobre na poziomie lokalnym i zadowalające na poziomie regionalnym.

Słowa kluczowe: przedsiębiorczość, uwarunkowania rozwoju, poziom lokalny, Polska

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THE USE OF EUROPEAN UNION FUNDS FOR CULTURAL PURPOSES IN MAŁOPOLSKIE VOIVODSHIP FROM 2007 TILL 2015

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ABSTRACT

The paper explores the issue of the use of European Union funds for cultural heritage in Małopolskie Voivodship during the period 2007–2015, taking into consideration spatial categories which include: rural areas comprising rural communes and small towns, towns with health resorts, land counties, urban counties (town with county rights), and Cracow as the capital of the Voivodship. It examines the structure of the total value and of the amount of EU funding for culture-related European projects by the purposes of their implementation which included: revaluation of the objects of culture, creation and development of a new tourism product, renovation of sports and recreation facilities, promotion and other issues. The study was conducted using the statistical database of the National Information System of the Ministry of Infrastructure and Development of the Republic of Poland (KSI SIMIK 07-13) as of 31 December 2015.

Key words: EU funds, cultural assets, Małopolskie Voivodship, rural areas

INTRODUCTION

The centuries-old cultural, social and economic changes in a given region resulted in the landscape which is rich in cultural heritage objects and assets that play an important part in preserving cultural identity of the local community [Vasile et al. 2015, Jenkins 2018]. However, cultural legacy is increasingly viewed as a factor of social and economic development.

Maintenance costs, running repairs and preservation of cultural heritage objects according to the requirements of the conservator of monuments often exceed the financial capacity of local authorities. That is why the aid funds have become a very important source of financing the process of restoration and adaptation of those facilities to their new socio-economic functions (e.g. tourism function) or of the realization of the community own tasks (e.g. education or administration). The renovated cultural heritage objects, being the place of operation of the various types of business, including, for example, museology, hotel-restaurant industry, educational and training sector as well as other activities, stimulate the local labour market and entrepreneurship [Murzyn-Kupisz 2013]. Creation of new tourism products leads to the increase in tourist traffic. In accordance with the rule of the multiplier effect this factor influences the local trade and other types of activities directly or indirectly linked to the market supply of goods that are indispensable to visitors. Thus, the benefits from investments in culture-related objects can be observed both from the perspective of the preservation of cultural heritage and from the point of view of social and economic development. Such activities contribute to the increase in the economic value of cultural heritage assets [Murzyn-Kurpisz 2012, Ilczuk 2014, Clare et al. 2018].

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One of the regions in Poland which has a rich and varied potential of cultural heritage assets is the Małopolskie Voivodship [Hernik 2007]. While Cracow has dominant position influencing the entire cultural potential of the region, cultural heritage resources and assets located in the voivodship, also in small towns and rural areas, are also of great importance.

MATERIAL AND METHODS

The aim of the paper is to present the ways of spending EU funds earmarked for the purposes related to cultural heritage assets in rural areas of the Małopolskie Voivodship against a background of the remaining spatial categories. The study was conducted for the period 2007–2013(15). In order to achieve such main objective the following research tasks were defined: (1) to characterize the total value of the cultural projects carried out in rural areas of the Małopolskie Voivodship in comparison with other spatial categories; (2) to identify the level of EU funding for "cultural" projects in the Małopolskie Voivodship depending on the type of area; (3) to examine the purposes of spending European "cultural" funds in rural areas compared to the remaining spatial categories in the Małopolskie Voivodship.

The study was conducted using the SIMIK database of the Ministry of Infrastructure and Development of the Republic of Poland. The database contained records of more than 100 thousand agreements regarding the funding of projects through EU structural funds carried out in Poland under all operational programmes during the period 2007–2013(15)[1]. However, the European source of financing was used quite rarely for culture in these years: only 1.6% of all agreements related to culture. However, despite a small share of these "cultural" projects in the total amount of EU aid funds they had a significant impact on cultural space of the regions.

European projects thematically related to culture were carried out under four Operational Programmes: Infrastructure and Environment, Human Capital, Innovative Economy, and Technical Assistance. The number of the projects under study also included "cultural" projects implemented during the period 2007–2015 within the framework of regional programmes, including the regional programme for the Małopolskie Voivodship. The analysis conducted in the paper takes into account the following characteristics of the projects: thematic scope, total value and the amount of EU funding, as well as an area in which the project was implemented [Powęska 2017]. Based on the thematic scope of the projects four categories of the objectives of the spending of EU funds were distinguished: revaluation of the objects of cultural heritage, creation of a new tourism product, sports and recreation infrastructure, promotion and other issues. Based on studies of literature [Satoła 2009, 2010, Rakowska 2013] and taking into consideration the specific character of the Małopolskie Voivodship the following spatial categories of the beneficiaries were distinguished: Cracow as the capital of the voivodship, towns with health resorts, towns with county rights (urban counties – town with county righs), counties (land counties), rural communes and small towns, which are grouped together as rural areas. A detailed analysis of the content was conducted taking into account the total value and the amount of EU funding with regard to rural areas against a background of other spatial categories of the Małopolskie Voivodship.

In the present paper cultural heritage assets are understood in the sense contained in the Act of 15 February 1962 concerning the protection of cultural assets. These are the objects, both tangible and intangible, which – being a historical and cultural legacy of the region – due to their specific character and peculiarity also play the role of carriers of aesthetic and artistic values. Other important factors are: landscape setting of cultural heritage objects, their popularity, ways of promotion, spatial accessibility, form of their availability and functions fulfilled by the particular objects.

FINDING OF THE STUDY

The Małopolskie Voivodship ranks fourth after Mazowieckie, Dolnośląskie and Lubelskie Voivodships in terms of the absolute value of European funds spent

[1] Under the N + 2 role UE 2007–2013 funds may be spent by the end of 2015.

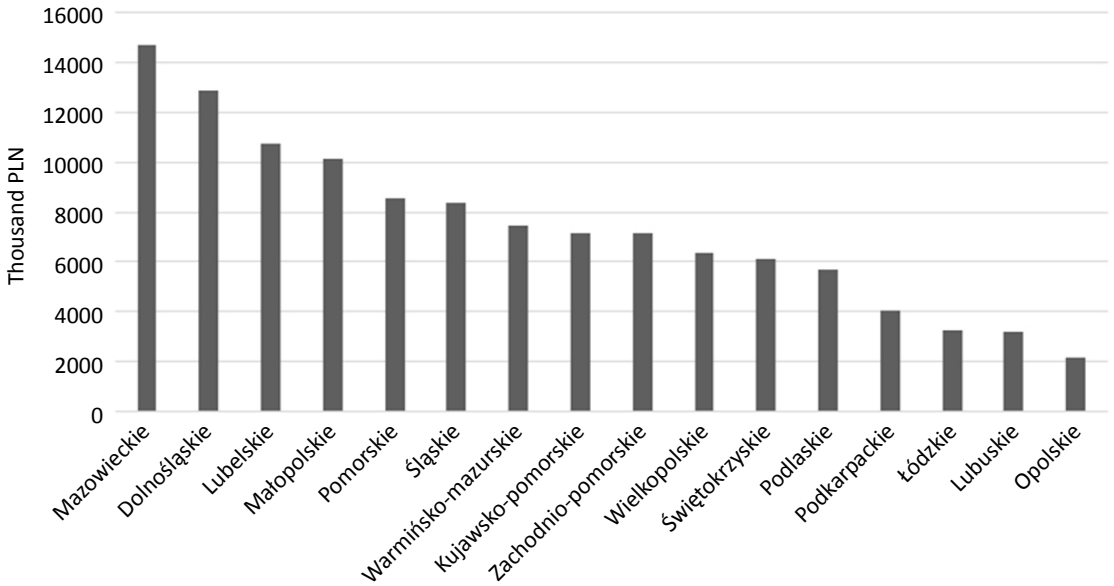


Fig. 1. Total value of projects cofinanced by EU Funds thematically related to cultural assets implemented in Poland by voivodship in 2007–2015

Source: Own elaboration based on KSI SIMIK data of the Ministry of Infrastructure and Development of the Republic of Poland as of 31 December 2015.

on culture (Fig. 1). In the years 2007–2015 the total value of all projects thematically related to culture in the Małopolskie Voivodship amounted to a little more than PLN 1 billion, which in comparison with the absolute value of spending in this regard across Poland (PLN 12.3 billion) constituted 8.1%.

Taking into consideration the cultural potential of the Małopolskie Voivodship, this may seem insufficient. Rural areas of Małopolska Region utilized almost 18% of funds spent in the entire territory, while land counties, which are also functionally linked to rural areas, absorbed a further 15% of the value of the total number of cultural heritage projects co-financed by the EU (the table). This gives a total of more than 33% of all the expenses incurred, which allows us to note that the areas morphologically linked to the countryside, as compared to the remaining spatial categories of the Małopolskie Voivodship, were the type of areas having a significant share in obtaining EU funds intended for culture.

However, the greatest accumulation of the use of funds was recorded in Cracow. More than 54% of the total value of all "cultural" projects implemented in Cracow were concentrated in the capital city of the voivodship. The remaining spatial categories of the voivodship, including towns with health resorts and urban counties (town with county righs), took advantage of the opportunity to reconstruct their cultural heritage assets through the EU funds to a small or to a very small extent.

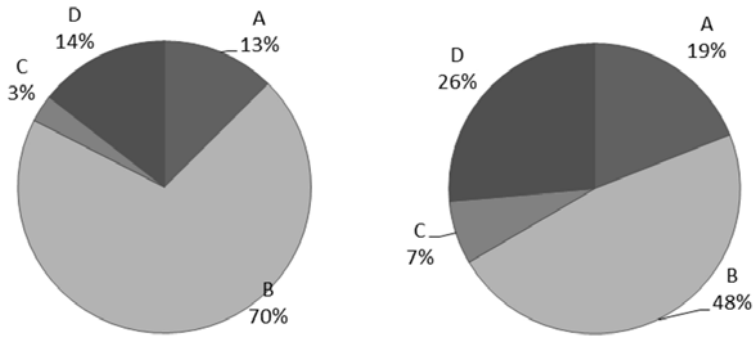
Funding from EU budget for "cultural" projects in the whole Małopolskie Voivodship amounted to 39.4%, and, like the absolute value of the activities which were analysed above, it varied depending on the spatial category. The lowest amount of funding was recorded in the case of Cracow (34.8%), while the highest funding was reported in towns with health resorts (48.9%). In rural areas and in land counties EU grants for cultural projects were at an average level (44.3 and 43.5% respectively), which, in a certain sense, is the result of the ability of local authorities to undertake activities aimed at obtaining external funds but also utilizing their own financial resources for the implementation of objectives at a local level.

Table. The total value and the amount of co-funding from EU funds of "cultural" projects in Małopolskie Voivodship by type of area in 2007–2015

Specification	Total value	Co-funding from EU funds	Share in co-funding from EU funds in relation to total value
	PLN		%
Cracow	571 550 333.78	199 097 907.95	34.83
Towns with health resorts	106 030 922.08	51 805 638.20	48.86
Urban counties (town with county rights)	28 456 174.71	11 808 703.93	41.50
Land counties	151 267 320.35	65 871 906.34	43.55
Rural areas (rural communes and small towns)	184 988 832.45	82 012 516.22	44.33
Total	1 042 293 583.37	410 596 672.64	39.39

Source: Own elaboration based on KSI SIMIK data of the Ministry of Infrastructure and Development of the Republic of Poland as of 31 December 2015.

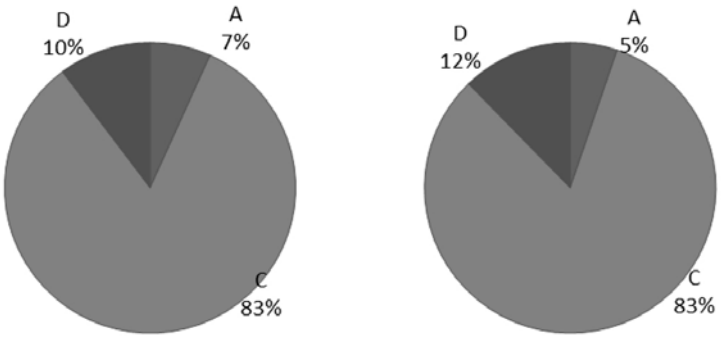
In Cracow (Fig. 2) up to 70% of the total value of the implemented "cultural" projects was earmarked for the institutional support for culture, including the functioning of objects and promotion as well as the management of culture. It is worth noting that a significant portion of this amount came from the city budget, since only 43% of spending for this purpose was financed from EU funds. It is also interesting to note that the share in the EU funding (26%) for the revaluation of cultural heritage objects was much higher than the total value of implemented projects related to this purpose (14%). The objectives associated with the creation of new tourism products and the development of sports and recreation infrastructure in Cracow received less financial support under European Culture Programmes.



A – creation of a new tourism product, B – promotion and other issues, C – sports and recreation infrastructure, D – revaluation of the objects of cultural heritage

Fig. 2. The structure of the total value and the amount of co-funding from the EU Funds of "cultural" projects implemented in Cracow by type of products in 2007–2015

Source: Own elaboration based on KSI SIMIK data of the Ministry of Infrastructure and Development of the Republic of Poland as of 31 December 2015.



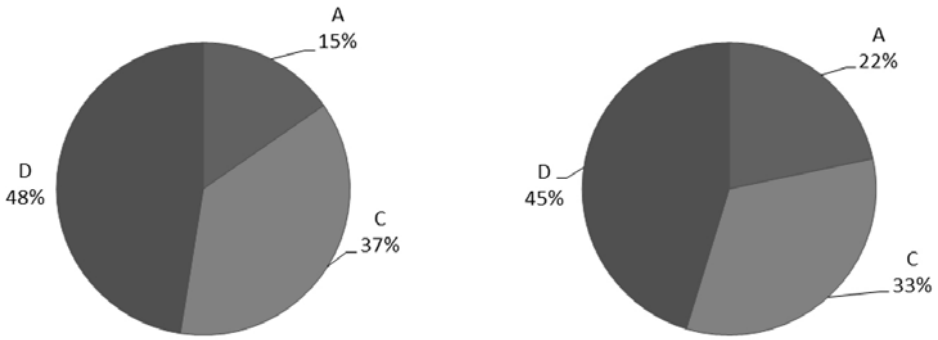
A – creation of a new tourism product, B – promotion and other issues, C – sports and recreation infrastructure, D – revaluation of the objects of cultural heritage

Fig. 3. The structure of the total value and the amount of co-funding from the EU Funds of "cultural" projects implemented in towns with health resorts by type of products in 2007–2015

Source: Own elaboration based on KSI SIMIK data of the Ministry of Infrastructure and Development of the Republic of Poland as of 31 December 2015.

In towns with health resorts (Fig. 3) of the Małopolskie Voivodship, in terms of both the total value of implemented projects and the funding from EU budget, most important purposes included the development of sports and recreation infrastructure, with some 10% share of spending on revaluation of cultural heritage assets and small outlays on development of new tourism products. Such a structure of expenditures for these projects is coherent with the character and with the main social and economic functions of these localities.

In urban counties (town with county righs), both in terms of the total value and of EU funding for projects implemented in the field of culture, expenditures were mainly channelled to revaluation of cultural heritage assets and objects as well as to the development of sports and tourism infrastructure (Fig. 4). The fact that the authorities of these spatial units focus on the reconstruction and preservation of cultural values shows their attempt at increasing cultural potential, which has a great impact from the perspective of competitiveness and territorial marketing



A – creation of a new tourism product, B – promotion and other issues, C – sports and recreation infrastructure, D – revaluation of the objects of cultural heritage

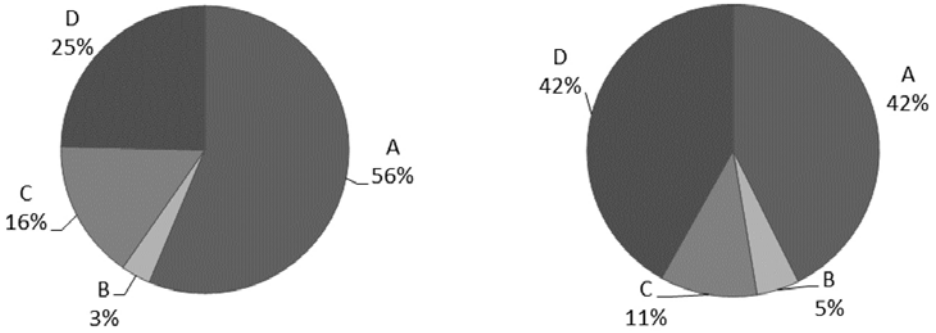
Fig. 4. The structure of the total value and the amount of co-funding from the EU funds of "cultural" projects implemented in urban counties (town with county rights) by type of products in 2007–2015

Source: Own elaboration based on KSI SIMIK data of the Ministry of Infrastructure and Development of the Republic of Poland as of 31 December 2015.

of these localities. Such a structure of expenditures within the framework of cultural projects in urban counties allows one to point to increasing importance of these towns on the tourist map of the region and the country, thus promoting the formation of local and regional tourist attractions.

However, in land counties (Fig. 5) projects aimed at developing a new tourism product in the objects of culture were by far the most significant undertakings. Such a structure of spending points to the activities undertaken to make the widest possible use of these objects to develop tourism function. Also, a continuous improvement of the condition of cultural facilities was co-funded from the EU projects in the field of the restoration of the previous state and character of these cultural assets. One can observe a higher share of own outlays for revaluation in land counties.

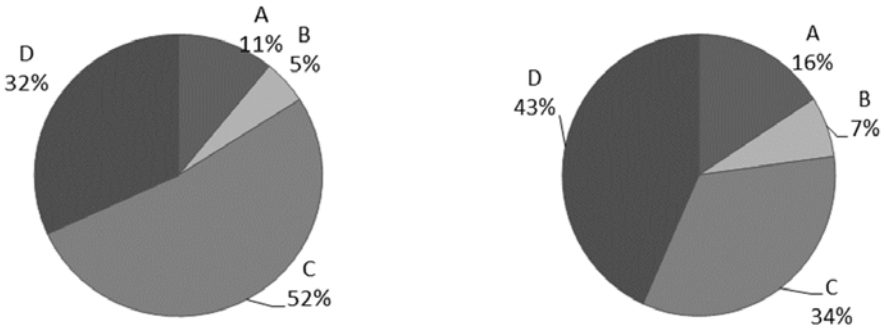
In rural communes as well as in small towns (Fig. 6), in both the structure of total value (52%) and in the amount of EU co-funding (34%) for these projects, data showed the dominance of expenditures for sports and tourism infrastructure which is often neglected at a local level. That is why the implementation of these projects results most often in the improvement



A – creation of a new tourism product, B – promotion and other issues, C – sports and recreation infrastructure, D – revaluation of the objects of cultural heritage

Fig. 5. The structure of the total value and the amount of co-funding from the EU Funds of "cultural" projects implemented in land counties by type of products in 2007–2015

Source: Own elaboration based on KSI SIMICK data of the Ministry of Infrastructure and Development of the Republic of Poland as of 31 December 2015.



A – creation of a new tourism product, B – promotion and other issues, C – sports and recreation infrastructure, D – revaluation of the objects of cultural heritage

Fig. 6. The structure of the total value and the amount of co-funding from EU funds of "cultural" projects implemented in rural areas by type of products in 2007–2015

Source: Own elaboration based on KSI SIMIK data of the Ministry of Infrastructure and Development of the Republic of Poland as of 31 December 2015.

of the facilities, which is very important from the point of view of the standard of living and the quality of life of inhabitants, especially of young generation. It is also worth noting that sports and recreation facilities are extremely important for the development of tourism function, which may be reflected in the development of entrepreneurship and stimulation of the local economy.

The revaluation of cultural heritage assets also has a significant influence on the development of tourism function in rural areas; in 2007–2015, 32% of the total value of cultural heritage assets was allocated for this purpose in these areas of the Małopolskie Voivodship, and the funding from EU resources accounted for up to 43%. When comparing the data relating to the total value and the amount of EU funding for the projects in the field of development of sports and tourist infrastructure as well as the revaluation of cultural heritage assets one must point out that the development of sports and recreation facilities was accompanied by a higher share of the local administrative units' own funds, while the renovation of cultural heritage assets was carried out with greater EU support.

CONCLUSIONS

The analysis conducted in this paper has led to the following conclusions.

In the Małopolskie Voivodship there was a large spatial variability both in terms of the total value and the amount of EU funding for the implemented projects, depending on the spatial areas distinguished in this study. The highest level of spending – about one-half of both the total value and of EU funding for completed projects – was reported in Cracow; however, the share of the areas of dominant rural character (land counties and rural areas) was also significant and it totalled one-third of all the expenditures on the implementation of culture-related projects.

The analysis shows that during the period of 2007–2015 the highest level of EU co-financing for culture-related projects in the Małopolskie Voivodship was observed in towns with health resorts and in rural areas, while the lowest EU grants were allocated to urban counties (town with county righs) and to the capital of the Voivodship.

In rural areas and land counties investment expenditures, including the development of sports and tourist infrastructure as well as creation of a new tourism product, were far more important. The authorities of land counties allocated substantial resources from their own budget to the development of a new tourism product, which shows that they understand that culture-related assets are a potential to be used in their activities. However, in the villages of the communes and in small towns of the Małopolskie Voivodship, in the case of sports and tourist infrastructure, EU co-financing was by far lower than the total value of implemented projects, which indicates that municipal authorities are trying to rebuild and to complete negligence in the field of infrastructure serving their residents. In both land counties and rural areas the allocation of own resources for new tourism products and for sports and tourist infrastructure indicates an increasing use of culture-related assets for socio-economic development by local governments.

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WYKORZYSTANIE FUNDUSZY UNII EUROPEJSKIEJ NA CELE KULTUROWE W OKRESIE 2007–2015 W WOJEWÓDZTWIE MAŁOPOLSKIM

STRESZCZENIE

W artykule przedstawiono zagadnienie wykorzystania funduszy unijnych na rzecz dziedzictwa kulturowego w województwie małopolskim w latach 2007–2015 z uwzględnieniem kategorii przestrzennych, wśród których wyróżniono: obszary wiejskie, do których zaliczono gminy wiejskie oraz małe miasta, miejscowości uzdrowiskowe, powiaty ziemskie, powiaty grodzkie oraz Kraków jako stolicę województwa. Przeanalizowano strukturę wartości ogółem oraz dofinansowania z Unii Europejskiej do kulturowych projektów europejskich według celów ich realizacji, wśród których wyodrębniono: rewaloryzację obiektów kultury, powstanie nowego produktu turystycznego, renowację infrastruktury sportowo-rekreacyjnej, promocję i inne. W badaniu wykorzystano dane statystyczne Krajowego Systemu Informatycznego Ministerstwa Infrastruktury i Rozwoju Rzeczpospolitej Polskiej (KSI SIMIK 07-13) według stanu na 31 grudnia 2015 roku.

Słowa kluczowe: fundusze UE, dobra kultury, województwo małopolskie, obszary wiejskie

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THEORETICAL APPROACHES TO LOCAL DEVELOPMENT IN THE CONTEXT OF RURAL AREAS

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ABSTRACT

The aim of the work is to make a synthetic review of definitions of regional and local development in economic terms in relation to rural development. Rural development is a topic often taken up in scientific research by sociologists, geographers and economists, but it is not defined in a specific way, and is usually understood as development in relation to rural areas. Therefore, the paper presents an overview of various approaches to local development and regional development, using the method of literature studies. The work has reviewed many approaches, features and definitions of socio-economic development as well as regional and local development, which also refer to rural areas and finally proposed a place for rural development in regional and local development.

Key words: rural development, local development, regional development, definitions

INTRODUCTION

Rural development is a topic frequently undertaken in interdisciplinary research, in which, in addition to economists, work carried out by sociologists, geographers and representatives of other scientific fields is of great importance. However, the issue of rural development does not constitute a separate research area, and is usually understood as regional or local development in relation to rural areas. There is a lack of a universally recognized definition of rural areas, although they cover approximately 93% of the total area of Poland. On the other hand, to the rural areas refer strategic documents as Strategy for the sustainable development of the countryside, agriculture and fisheries or Rural Development Program. In the literature on the subject socio-economic issues are exposed, which was also reflected in this work in which the review of theoretical and definitional approaches on socio-economic development, including regional and local development, was presented, emphasizing the economic approach.

MATERIAL, AIMS AND METHODS

The aim of the work is to make a synthetic review of the definition of regional and local development in economic terms in relation to rural development. Selected definitions and theoretical aspects are shown, while the work deliberately omits issues of development factors, indicators and methods of measuring development, which can be a material for a separate, comprehensive scientific article. A wide overview of regional and local development theories can be found among others in papers by Capello and Nijkamp [2009], Capello [2011] or Rakowska [2016].

The method of literature studies was used, based on which an overview of various approaches to local development and regional development was presented. Fragments of the literature review made by the author

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in his doctoral dissertation were also used [Stawicki 2011].

DEVELOPMENT AND GROWTH AS ECONOMIC CATEGORIES

In economic sciences, both concepts of growth and development are used, but they can not be used interchangeably. Regional economics deals with the regularities of socio-economic and spatial development and its shaping in regional and supra-regional terms [Secomski 1982]. Economic growth is one of the objects of interest in macroeconomics. The economy of development deals with the study of development processes in low-income countries [Bartkowiak 2010], in particular the causes of poverty and the possibilities of stimulating economic development. The following are the basic differences between the two concepts, hereinafter the definitions of socio-economic development are presented.

Growth is a process of intensification, increase and intensification of existing features of observed phenomena and limitations, as a result of which phenomena increase their possessed parameters [Kupiec 2008]. Economic growth should be understood as increasing the potential gross domestic product of a country or a gross national product [Samuelson and Nordhaus 2004]. The most important growth factors are: human resources, natural resources, capital accumulation, technology.

On the other hand, development is, according to the Polish language dictionary, "a process of change leading to improvement of something, to increase something, to achieve a higher level in some respect" [Dunaj 2001]. It is also defined as "a process of changes taking place in every field, and at the same time creating a process of transformations consisting of increasing and intensifying and improving existing features, as well as the emergence and further development of new phenomena", which results in positive qualitative changes and structural, spatial and functional transformations [Kupiec 2008]. A variety of definitions of economic development were presented by Siudek et al. [2014].

Thus, development is the result of positive changes in quantitative growth and qualitative progress in economic, social and natural systems [Markowski 2008]. These changes take place both in terms of time and space. Gorzelak [1989], having reviewed the definitions of the term development in the literature, notes that:

- development is a concept of many dimensions which combines many mutually dependent phenomena;
- development, apart from the growth (the quantitative category), means also structural changes;
- development is dynamic and spatially diversified.

In summary, development can be defined as a transition from worse to better, a process of positive change involving qualitative and quantitative growth.

Socio-economic development

According to the definition proposed by Chojnicki and Czyż [2006], "socio-economic development can be defined as a set of targeted changes that take place in various spheres of social reality: economic, political, institutional, cultural, biological, ecological and environmental protection". It consists of two main elements, which are economic development and social development.

Economic development is a long-term process of change taking place in the economy, which includes both quantitative changes related to production growth, employment, investment, capital, income, consumption and other economic variables characterizing the economy from the quantitative aspect (economic growth), as well as accompanying changes with qualitative character. Among them one can include technical and technological progress, improvement of the system of economic connections within the country and links with the global economy, increase in the level of qualifications of the workforce, changes in the structure of the economy aimed at its modernization, increase in efficiency on the micro and macroeconomic scale, the emergence of new products and improvement of quality of the already produced. While it is possible to grow without development, it is not possible to develop without growth [Encyklopedia PWN 2016].

Social development is defined as the development of social units and social systems and the process of change leading, among others, to enrich and diversify

the organizational and cultural structures of a given community [Encyklopedia PWN 2016]. On a local scale, it relies on better and better meeting the social needs of the population and business entities in a given area.

Rural development as an element of regional and local development

Rural development is not a separate category within the framework of development economics, which addresses these issues within the scope of development of agriculture or selected development problems (such as poverty, marginalization, exclusion, migration) [Zawalińska 2009]. Specific aspects of development of rural areas were presented i.a. by Bański [2017]. Rural development should be understood primarily as local development in relation to rural areas, regional development concerns entire regions (e.g. voivodships), thus units covering both rural and metropolitan areas. This approach is confirmed by the fact that rural development is defined as a process of improving the quality of life and economic well-being of people living in peripheral and sparsely populated areas [Moseley 2003]. Ellis and Biggs [2001] presented the evolving ideas in rural development in the 20th century. In the following, the basic definitions are presented: in a narrower scope of regional development, and more broadly of local development, which also apply to non-urbanized areas.

Local development can be understood as a complex of positive qualitative transformations in the area of living standards of people living in a given area [Wojtasiewicz 1997]. Another concept is local economic development defined as a process in which the following sectors cooperate with each other to create better conditions for economic growth and new jobs: the public sector, the business sector and the non-governmental sector. The goal of local development is to improve the quality of life for everyone [Bank Światowy 2003, Wojewódzka-Wiewiórska 2010].

Blakely and Leigh [2002] believe that local development is a process of supporting or at least maintaining employment in industries that bring specific benefits for a given local community. In Polish literature there are many different definitions of local development. According to Pietrzyk [1997], this concept "belongs to very imprecise, ambiguous and has an ideological tone". Another definition is given by Brol [1999], for whom it is "a process of changes taking place in a city, rural or urban-rural commune or otherwise delimited subregion, ie a local socio-territorial system identified by special features of space, economy and culture, as well as local preferences needs and hierarchy of values".

Canzanelli [2001] defines local development as a participatory process that facilitates partnership between local stakeholders, enabling joint design and implementation of strategies, mainly based on the competitive use of local resources to create decent jobs and sustainable business. Markowski [2008] defines local development as a result of positive changes in quantitative growth and qualitative progress in economic, social and natural systems. At the same time, he points out that the natural system is perceived as an integral component in the contemporary paradigm of local development.

In general, local development is related to the local scale of socio-economic activity and takes place in the local environment of a given community using local development resources and through the involvement of local communities, local self-government structures and other organizations and institutions, especially non-commercial ones. Therefore according to Parysek [2001], local development is based on endogenous development factors (local people, local organizations and economic entities, local resources, local needs, etc.) and complements regional development taking place on the basis of exogenous factors. This concept seems to omit the importance of endogenous potential, which stimulates regional development as well.

According to Adamowicz [2003], local development may be defined as a process of economic, social, political and cultural changes leading to raising the general level of well-being of the inhabitants. The development components can be:

- economic growth;
- reducing unemployment;
- increase in the well-being and quality of life of the population (e.g. housing equipment);
- increased investment attractiveness (land preparation, entrepreneurship support);

- technological development and implementation of innovations;
- restructuring and diversification of economic activity;
- development of services and technical infrastructure;
- increase in occupational and social mobility of people (training, counseling, development of new qualifications;
- development of institutional infrastructure and non-governmental organizations;
- improvement of the quality of the natural environment;
- strengthening local or regional identity, social integration.

In turn, Pietrzyk [2000] believes that local development is not only "development on a local scale" but also stresses the bottom-up nature of this process. According to Kowalska [2003], despite various approaches to the definition of local development, the authors mostly note the following common features of this phenomenon:

- the subject of development on a local scale are residents of a given area;
- the key drivers of development are primarily endogenous factors;
- local development is a broader concept than economic development;
- the criterion of development is the satisfaction of residents and the improvement of living conditions;
- local development is not a state but a process.

In a broad sense, local development is based on three levels [Pająk 2003]:

- the social sphere – it causes an increase in the level of education, awareness and culture of the inhabitants;
- the ecological and spatial sphere, meaning shaping the spatial order, respecting the values of the natural environment;
- the economic sphere in which it manifests itself in the development of entrepreneurship.

Local development is therefore also a social process, which consists in activating local communities, externalizing local pro-development attitudes and participation of social institutions [Parysek 2001]. It should be remembered that local development is influenced by processes taking place in the environment, both closer (in the region) and further (in the country and abroad) and the territorial local system should be considered as an element of a larger whole. On the one hand, the local unit imports goods and services, is supplied from outside (e.g. with energy, raw materials), and on the other hand, it exports the effects of its own economic activity [Kot 2001].

Local development is understood as a continuous transformation of territories, both in time and space and is conditioned by the relations between various local actors [Conti and Giaccaria 2001]. Local development is closely related to the concept of regional development. According to some researchers, local development is identical to the regional one, and the only difference is the size of the territorial unit, the development of which concerns (local – small units, e.g. municipalities, regional – large enough voivodships) [Kosiedowski 2005].

Locality is on the one hand a factor, a component of the development of the region, on the other hand, the development of regions is based on local potential [Siemiński 1994]. As the quoted author points out, there is confusion and incompatibility in terms of terminology and the relationship between local and regional development. Therefore, the basic definitions of regional development are presented below.

According to Szlachta [1996], regional development is "systematic improvement of competitiveness of economic entities and the standard of living of inhabitants, as well as the increase of economic potential of regions contributing to the socio-economic development of the country". Regional development is also understood as a process of improving conditions in underdeveloped regions or undergoing structural changes [Bingham and Mier 1993]. Regional development can also be treated as the country's development in the decomposition into regions [Gorzelak 1989].

All the above mentioned concepts are similar and complement each other. According to the author's idea, regional development is therefore somewhat broader than local development, not only due to the larger territory, but also a wider scope including impact on development and economic competitiveness at the national level. Regional development refers also to larger territorial units, in Poland – voivodships (or

regions at NUTS-2 level) and statistical macroregions (NUTS-1 level), while local development means the development of municipalities (communes) and counties (poviats). In this way, local development can be taken into consideration as an element of regional development processes. The development of rural areas refers to local development in rural areas, so it can be treated as a part of local development containing improvement of living conditions. Consequently therefore it is an element of regional development as regions cover both rural and metropolitan areas. The idea showing the relations between the discussed development processes are presented in the figure.

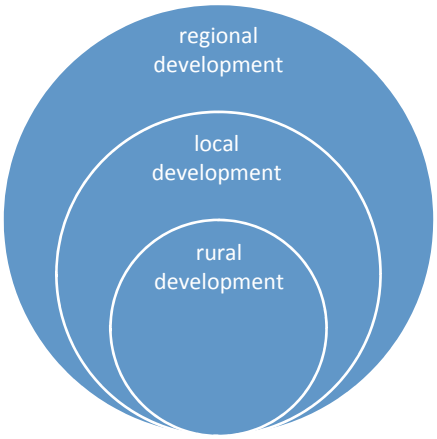

Fig. Relations between rural, local and regional development

Source: Own elaboration.

CONCLUSIONS

As can be seen from the above considerations and analyzes of other authors, the concept of development, including local development, is considered to be ambiguous. In the literature one can find various research approaches, different interpretations and, consequently, various definitions of development [Wojewódzka 2009].

Development processes in rural areas are one of the elements that make up the development of regions. Regional development refers to the social and economic development of countries and regions. The development of rural areas, as an element of regional development, should be defined as the local socio-economic development and improvement of living conditions in relation to rural areas.

Summing up, it can be stated that the development of rural areas as local development is a process of changes in the economic, social, political and cultural sphere, which results in an increase in the well-being of the population. This is a particularly important process in poorer regions, which are characterized by a lower initial level of development. These regions include areas distant from larger urban centers with a large share of agriculture and forestry sector in economy and employment, and above all, rural areas. This is one of the reasons of the growing interest in scientific research on the issue of rural development in economic sciences. Further studies can be aiming at identification of successful rural development mechanisms and creating new concepts of development in the 21st century globalized economy.

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TEORETYCZNE UJĘCIA ROZWOJU LOKALNEGO W KONTEKŚCIE OBSZARÓW WIEJSKICH

STRESZCZENIE

Celem pracy jest dokonanie syntetycznego przeglądu definicji rozwoju regionalnego i lokalnego pod względem ekonomicznym w odniesieniu do ewolucji obszarów wiejskich. Rozwój obszarów wiejskich jest tematyką często podejmowaną w badaniach naukowych zarówno przez ekonomistów, jak i socjologów czy geografów, przy czym nie jest definiowany w sposób szczególny – zwykle jest rozumiany jako rozwój w odniesieniu do obszarów wiejskich. W pracy zastosowano metodę studiów literaturowych i dokonano przeglądu wielu ujęć, cech i definicji rozwoju społeczno-gospodarczego oraz rozwoju regionalnego i lokalnego, które odnoszą się także do obszarów wiejskich. Dodatkowo określono miejsce przemian obszarów wiejskich w rozwoju regionalnym i lokalnym.

Słowa kluczowe: rozwój obszarów wiejskich, rozwój lokalny, rozwój regionalny, definicje

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SOCIO-ECONOMIC IMPACTS OF EPIDEMIC DISEASES OF FARM ANIMALS

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ABSTRACT

Based on desk research and literature review, the paper identifies the effects of farm animal disease outbreaks from the economic perspective. It provides a brief overview of broad impacts of trans-boundary animal diseases such as Bovine Spongiform Encephalopathy (BSE) and Foot and Mouth Disease (FMD) on the economy and society. It also presents a synthetic summary of the results of several studies dealing with the assessment and estimation of the costs of BSE and FMD epidemics in selected countries. The two epidemics were costly, both in monetary and non-monetary terms. Assessed direct and indirect economic losses were equivalent to several billion US dollars or euro in the countries under consideration. The economies depending on the export of live animals and meat products (e.g. the UK and Canada) were particularly affected. The economic welfare losses from hypothetical FMD outbreak in the USA could exceed a hundred billion US dollars. From the political perspective, government-run policies aimed at controlling and eradicating dangerous animal diseases seem to find the justification primarily in economic rationality or international competitiveness arguments.

Key words: animal health economics, animal disease, FMD, BSE, economic welfare

INTRODUCTION

In today's globalised world, farm animal diseases can spread dramatically as a result of the rapid growth in movements of goods and people, and trade liberalisation. Animal diseases of significant economic, trade and/or food security importance for a considerable number of countries which can easily spread to other countries irrespective of national borders and reach epidemic proportions, and where control or management requires cooperation between several countries are called trans-boundary animal diseases (TADs) [FAO 2016]. Zoonotic diseases among them include Bovine Spongiform Encephalopathy (BSE), West Nile Virus and Bovine Tuberculosis. Other important TADs are Foot-and-Mouth Disease (FMD) and African Swine Fever. They cause considerable economic, social, environmental and even political implications, and can pose a risk not only to animal health but also to human wellbeing. Countries which are heavily leveraged toward exports of animals and animal products can be particularly affected by livestock disease crises since it would take several years to recover their position on international market lost due to closing their borders for trade. There is a wide consensus that indirect or longer term impacts (such as loss of market shares, disruption of trade flows, effects on tourism, and the loss of consumer confidence in food safety) are far greater than the direct or shorter term impacts for livestock keepers (such as herd destruction).

For year 2018, the list of the World Organization for Animal Health (Office International des Épizooties

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– OIE) covers 117 animal diseases, infections and infestations [OIE 2018]. The official disease status on freedom from any of the specified six priority diseases (along with BSE and FMD) being granted to OIE member states is of great importance for international trade. For FMD only, countries or zones can be given a free status with or without vaccination. A country may either lose or improve its commercial attractiveness amongst existing or potential trading partners, depending on official recognition of its status.

Our study focuses on BSE and FMD diseases that have occurred in and outside Europe, and have aroused widespread concerns amongst producers, consumers and general public about disease-related socio-economic and ecological costs as well as government accountability. The European Union (EU) had its crisis of BSE ("mad cow disease") that originated in the United Kingdom (UK) in the late 20th century and shook world food security and safety, and public trust. During the past decades, large events related to FMD (economically the most destructive farm disease) have taken place in different parts of the world, including Europe. Over 100 states are still not considered as free from FMD and its potential outbreak is widely regarded as a major threat to many other countries. Re-emergence of the both diseases in Europe may have implications going far beyond severe disturbances in animal production and trade.

The economic and social effects of high-impact animal diseases (transmissible to humans – such as BSE, and not directly affecting human health – such as FMD) have not attracted much attention from economists, and this topic only occasionally appears in the economic journals. Paradoxically, veterinary literature seems to be richer in studies on the economic implications of animal disease epidemics. Generally, however, scientific publications on the subject are scattered across the literature, concentrated on particular countries with different epidemic size or pattern and types of impact within specific time periods. This makes the comparison and synthesis of findings achieved by different researchers particularly difficult.

The purpose of this paper is to describe and classify costs (losses) stemming from animal disease outbreaks, and provide a synthetic summary of the empirical studies quantifying real and potential effects of BSE and FMD on the agriculture sector and whole economy. The study would help understand the full scope of economic and social impacts from the observed and potential occurrence of animal epidemics.

MATERIAL AND METHODS

The basis for the article was desk research (identification of relevant literature/data) and literature review (content analysis of available literature/data). The literature search covered scientific journal articles and official reports. It was performed using online (Google and Google Scholar) search for papers with key words "animal diseases", "animal epidemics", "FMD", "BSE", "economic impact", "social effects", "welfare loss", "direct costs" and so on. The references of interest in identified articles were also reviewed. The literature was considered from the perspective of an economist. Additionally, statistics of the World Organization for Animal Health (OIE) was used. The BSE and FMD were chosen for an analysis because they are unique in the extent of their socio-economic implications. Therefore, they have been studied by economists more extensively than any other animal diseases. Both diseases are at the forefront of disruptions in livestock industry and meat trade in the EU and on the global scale. In addition, they affect a number of seemingly unrelated economic sectors such as tourism for example.

RESULTS AND DISCUSSION

This section first provides characteristics of the two diseases (BSE and FMD) under investigation. Then, it briefly overviews the spectrum of impacts generated by animal diseases by applying the economic analysis framework. Afterwards, it presents the empirical results on BSE and FMD costs/losses in certain countries already and potentially affected by them.

Although the detailed characteristics of both diseases and their epidemic developments goes beyond the scope of this study, their short description would allow readers a better understanding of effects they cause.

The BSE – a novel progressive and degenerative neurologic disease in cattle [Wells et al. 1987] was first diagnosed (recognized) in the UK thirty years ago (the case reported in November 1987) but the disease may

have started two years before its official confirmation [Meikle 2012]. An initial incident resulted in a common source epidemic that peaked in the UK in 1992–1993. According to veterinary scientists, the spread of BSE among cattle was caused by feeding rendered material (meat and bone meal) from infected cattle or sheep back to other cattle [*BSE*... 2011]. At the EU level, a ruminant feed ban had been introduced in 1994, followed by a total ban on the feeding of meat and bone meal to all farm animals in 2001. The "mad cow disease" has occurred not only in Europe but also in Asia, North America and the Middle East. Its subsequent international spread had been facilitated by British exports of BSE-contaminated feed and infected cows. Outside the UK, the first BSE events were reported in the following years: Ireland – 1989; France –1991; Germany – 2000; Japan – 2001; the Czech Republic – 2001; Poland – 2002; Canada and the United States – 2003; France – 2005 [OIE 2018, Zawojska and Horbowiec-Janucik 2018]. According to the OIE [2018], 97% of all BSE cases reported throughout the world from 1987 to 2007 were those in the UK (184,105 cases). The number of BSE cases reported each year in the UK has dropped drastically from 37,300 in 1992 to only 2 in 2015. The present epidemiological situation is characterised by noticeable decrease of the BSE annual incidences also in the world. Nevertheless, millions of animals had been destroyed (euthanized or slaughtered) in an effort to control the BSE spreading. From the public health impact perspective, the BSE-connected brain disease in humans – variant Creutzfeldt-Jakob disease or "the British disease"[1] has caused deaths of 177 Britons and nearly 50 others around the world [Meikle 2012, Greener 2015].

The FMD is considered to be a highly contagious viral epizootic disease of cloven-footed animals, firstly discovered by Loeffler and Frosch in 1898 [Loeffler and Frosch 1898, Chakraborty et al. 2014]. The disease is of relatively low mortality among animals but of very high morbidity which in a susceptible population approaches 100%. Its global impact is enormous due to the huge numbers of animals affected. FMD virus is readily transmitted in live animals and products of animal origin. FMD was once found worldwide. Since the nineties of the last century a number of outbreaks have occurred in previously FMD-free states. In Europe, the largest and very devastating epidemic appeared in the UK in the early 2001, and was followed by outbreaks in neighbouring states (France, the Netherlands). The disease has been eradicated by many countries (e.g. EU, USA, Japan) but still remains endemic in most of the world. To avoid the trade consequences of being categorized as "FMD free with vaccination" as opposed to "FMD free without vaccination", the governments are ready to adopt the policy of culling or slaughtering vaccinated animals along with infected and exposed animals. Countries that are FMD-free will likely not accept livestock and fresh meat products from FMD infected areas. Opposite to BSE, FMD is not a public health risk.

Considering theoretical methodological basis for assessing economic effects (impacts) of particular animal disease, its related costs or losses are often split into direct and indirect ones. The concepts of direct and indirect effects are, however, diverse. According to Knight-Jones and Rushton [2013], direct impacts (losses) are attributable to on-farm production and changes in herd structure while indirect ones are connected with the disease control, poor access to markets and limited use of improved production technologies. In another conceptual framework, proposed by McInerney et al. [1992], direct economic costs due to livestock disease are explained in terms of two distinct components:

1. L – disease losses (i.e. reduction in output value) following disease occurrence or outbreak (for example: animal deaths, impaired fertility of stock, declined rates of liveweight gain, depressed yields, reduction in product quality).
2. E – disease expenditures made to treat disease or prevent its occurrence (extra resources as a result of disease such as: veterinary services, drugs, medication, vaccination, prevention measures etc.).

The total direct economic costs (C) can be then expressed as the sum of the two components ($C = L + E$). In this case, the trade-off between losses and expenditures offers a powerful basic model for economic analysis. *Ceteris paribus*, higher (lower) control expenditures are associated with lower (higher) disease losses.

[1] Transmission of BSE prions from cattle to man probably occurred via consumption of BSE tainted meat and meat products.

The economic benefits (B) from the disease controlling can be measured by considering the reduction in economic losses from the disease corresponding to different levels of expenditure on its control [McInerney 1991].

Therefore, based on the above approach, indirect effects associated with animal disease can include: human health costs (e.g. due to BSE transmission to humans in the form of variant Creutzfeldt–Jakob disease – vCJD or psychological damage to animal owners and veterinarians involved in the culling activities), negative animal welfare impacts (animal suffering, stress prior to slaughter), trade restrictions due to disease and its control, ecological damage, and others. The problems of animal epidemics arise not only from the disease itself but also from disease-related activities of public authorities and institutions. The country's disease-free status, public health, food safety and security, protection of environment and rural livelihoods (poverty alleviation) and national security are regarded as public goods [Czyżewski and Brelik 2013, Zalewski and Skawińska 2016]. This provides a basis for the government intervention (through controlling, limiting and stopping animal epidemics) as well as for public policy to alleviate negative effects of the diseases. Such interferences require increased public expenditure, usually at the expense of taxpayers. The proposed classification of costs arising from outbreak of animal diseases (such as BSE and FMD) is shown in Table 1.

In an alternative approach, animal disease-related effects can be divided into:

- on-farm effects;
- market supply effects (reduced animal production/ /increased production costs → reduced volume of domestic supply → increased prices → farm incomes);
- market demand effects (ban or tightened controls by importing states → reduced exports → drop in domestic prices → forgone farm incomes);

Table 1. Outbreak costs classified by their types

Direct production costs/losses		Indirect costs	
Direct losses	number of animals lost (died from the disease or culled)	Ripple effects	denied access to domestic and foreign markets
	average market value per head of animal (pre-outbreak)		fall in domestic animal prices
	culling and disposal costs per head of animal		fall in domestic sales
	control costs per animal		fall in world animal prices
	loss of production per animal		loss of exports
	replacement costs (purchasing or raising extra heifers)		costs on upstream/downstream or affiliated industries
			lost employment
			duration of the above impacts
Consequential on-farm losses	forgone farm income from activity (receipts/ /income per animal)	Spillover effects	loss in tourism income value
	costs due to the restriction on livestock movements		loss in other services' income
	duration of farm business disruption (number of days)		duration of the above impact
	lost employment	Wider society	loss in GDP and economic welfare
			consumer fear, food insecurity
			health concerns
			environmental pollution (e.g. due to animal burning and burial)
			loss in tax revenue due to reduced
			output; government expenditure

Source: Authors' own compilation.

- externalities (e.g. environmental degradation, food insecurity);
- financial consequences (private extra financial costs/expenditures, reduced income of farm businesses, farm solvency and liquidity, government outlays, increased taxes);
- hidden transaction costs incurred in the supply chain (e.g. greater need for monitoring, control measures and product traceability, information collection).

It is obvious that animal-keepers must suffer large losses since their production is curtailed as animals die or are preventively slaughtered (stamped out). Loss of production and productivity is likely to influence the domestic market price of sensitive animal products (limited supply can result in increase in their market price). On the other side of market relationships, public health concern associated with certain disease may also decrease the demand. In the case of epidemic diseases, output market prices will depend primarily on whether or not foreign trade restrictions are used. Without export bans, the market prices may temporarily raise dependent on the outbreak spread and duration. If exports are restricted, however, prices in countries with large export markets will drop substantially due to an oversupply of the domestic market.

Much of the economic impact of BSE and FMD constitutes a direct or indirect effect of trade restrictions. Trade isolation represents one of the ripple effects (spreading result of the disease). Notably FMD affects exporters of a wide range of livestock products [FAO 2016].

From the economic perspective, the analysis of social effects (i.e. costs and benefits born by the whole community as a result of a particular event or activity) should take into account (and traditionally does) both private and external costs and benefits. They can be market and nonmarket values. Consequently, economic efficiency analysis (economics core) considers both overall economic efficiency and social welfare. In the case of animal disease management, the goal of economic efficiency implies minimising: a reduction in revenues from sales to domestic market, losses to animal-related industries, export loss, disease control costs to the government, etc.). In turn, the social welfare goal requires paying attention to minimization of human harm from animal disease and its surveillance and control (such as disruptions to the communities caused by closed or limited public access to affected areas, emotional or psychological damage to people, limited freedom of animal keepers, burden of zoonoses, etc.). Government-run policies to control, eradicate and prevent spreading of animal diseases seem to find the justification principally in arguments of economic efficiency. An example is the policy of preventive veterinary vaccination. The prohibition of its use (e.g. the EU has banned FMD vaccines in 1990 and 2001) is of crucial importance for international trade in live animals and their products. Evidently, potential loss of economic benefits gained from country's status of being "free of FMD and infection without vaccination" is taken into consideration when strategy of animal culling/destruction (instead of vaccination-to-life) is chosen to fight highly infectious animal diseases.

To sum up, contagious animal diseases (like BSE and FMD):

- have implications on domestic trade (e.g. due to restriction on animal movement as a part of disease control) and on international trade (countries which are free from diseases tend to protect their agriculture and markets by prohibiting the import of live animals, animal products or by-products);
- disrupt both local and national economies (e.g. illegal imports of animal products, losses in tourism and supporting industries);
- threaten human health (e.g. zoonotic diseases – infective to humans);
- can lead to political and social unrest in people;
- threaten food security, proper livelihood of livestock owners and workers;
- have negative impact on consumer confidence;
- harm the environment (lost wildlife, BSE prions dispersed in the aquatic environment);
- absorb massive expenditures by the public sector (disease management, compensation or indemnity payments to producers, subsidizing disease surveillance testing, etc.);
- may generate positive effects such as prompted changes in regulatory disease control as well as increased consumer sensitivity to food safety and health issues.

Economists usually ask awkward questions about the economic burden or level of costs associated with

particular illness or disease. Thus, our question is: how much animal epidemic diseases do really cost the economy? The answers are revealed by the number of previous studies that investigated costs (losses) of BSE and FMD in the countries affected by these diseases. Their selected results are summarized in Table 2.

Both diseases are costly, either in monetary terms or in the number of livestock destroyed. The economic losses were equivalent to several billion US dollars or euro in the particular countries under consideration. The numbers presented in Table 2 should be treated with some caution because of – among others – the possible discrepancies in data used in the reported studies. For instance, in accordance with the official announcement by the UK government, 4.07 million animals were culled in the period between the first and

Table 2. Costs/losses of FMD and BSE for the affected countries

Country	Outbreak year(s)	Non-monetary impacts	Costs/losses expressed in money terms
Foot-and-mouth disease (FMD)			
USA, California	1929	5 herds; 3,590 infected animals	USD 0.11 million
Canada	1951–1952	42 premises; 5,000 animals	USD 5.0 billion
Bhutan	1990–1994	111 outbreaks	USD 0.15 million per year
Taiwan	1997	6,147 premises 4 million pigs slaughtered	EUR 4.96 billion (government plus private costs – agriculture & related industries)
United Kingdom	2001	2,030 infected animals; 6.5–7.0 million slaughtered animals (5 million sheep, 0.8 million cattle, 0.4 million pigs)	GBP 3.1 billion (EUR 3.5 billion) for agriculture and food sector; GBP 3 billion – tourism; EUR 8 billion – rural economy; USD 10 billion – in total
Ireland	2001	57,000 animals culled (52,570 sheep, 1,330 cattle)	Total costs (agriculture, tourism and other sectors, government) estimated at EUR 10 million (approx. 0.2% of GDP)
South Korea	2010/2011	3.5 million cattle and pigs depopulated	USD 1.9 billon
South Korea	2000, 2002, 2010 2010/2011	from 15 outbreak farms in 2000 to 3,748 in 2010/2011	Total costs from ca. USD 23.6 million to max. USD 1.9 billion; per outbreak cost from USD 4.5 million (2010/2011) to USD 16.5 million (2000)
Turkey (mainly Anatolia)	2006–2010	1,557 outbreaks in 2006 and 1,715 in 2010; 11 million cattle (< 2 years old) infected	Average cost of each case USD 150–300 depending on production type; 3-year project for disease control – EUR 65.4 million
Bovine Spongiform Encephalopathy (BSE)			
UK	1990–2001	170,000 cases reported	over EUR 3 billion
UK	1996–2010	over 1 million cattle may have been infected; 4.4 million animals destroyed	EUR 8.5 billion
Germany	2000–2010	413 cases confirmed; 17,313 heads of cattle culled and destructed	EUR 2 billion
Canada	2003–2005	4 cases discovered in cattle	USD 4.1 billion in losses to beef sector USD 7 billion in BSE-related losses USD 11 million a day due to trade bans

Source: Authors' own compilation based on: Le Roy et al. [2006], Askaroglu [2011], DAFRD [2002], European Commission [2012], Kim et al. [2013], Knight-Jones and Rushton [2013], Probst et al. [2013], European Court of Auditors [2016], Fiebre [2017], Zawojska and Horbowiec-Janucik [2017].

last case of diagnosed FMD (20 February – 30 September 2001) but according to the British Meat and Livestock Commission, above 6 million beasts had not been included in the official slaughter toll. It means that 10 million animals could have been stamped out in foot and mouth cull, more than twice as high as official government figures [Uhlig 2002].

The results provided in Table 2 confirm that more severe impacts of animal diseases are felt in more export-dependent economies, such as the UK and Canada. Canada, having relatively small number of recorded BSE cases, experienced large economic losses in the beef industry due to import embargoes of ruminant and ruminant products originating from this country that were placed by the governments of more than 30 states, including the USA, in 2003. Some exporting countries (Ireland, for example) gained agriculture-related benefits from the FMD. Irish benefits, estimated at around EUR 107 million, resulted from FMD-related reduction in British output and this gap-filling by Irish exporters [DAFRD 2002].

Although continental Western Europe, Australia, New Zealand and Indonesia as well as Central and North America are currently (2018) free of FMD (the disease has not been found in numerous countries since many decades ago), several economic analyses have been undertaken to estimate economic impacts of its hypothetical outbreaks. Table 3 gives the simulation results for welfare effect of FMD in the USA (since 1929 there have been no FMD events on the US mainland).

Table 3. Simulated economic welfare losses from a hypothetical FMD outbreak in the USA

Source	Welfare losses in monetary terms	Notes/Conclusions
Ekboir [1999]	California: annual mean welfare losses USD 1.5 billion; the total costs USD 2.5– 9.3 billion depending on scenario	The loss to the US exports: USD 1.3 billion each year (optimistic scenario)
Schoenbaum and Disney [2003]	Net welfare change (producer surplus, consumer surplus and government cost): from USD 213 million to 3,443 million depending on scenario	Alternative slaughter and vaccination strategies incorporated. Increases in vaccination and slaughter infrastructure decrease costs of simulated outbreaks
Hayes et al. [2011]	Total welfare losses: USD 128.23 billion; annual welfare losses: USD 12.8 billion	National trade bans incorporated
DHS [2012]	Total losses in economic welfare range from USD 16 billion to 140 billion	Sum of producer and consumer welfare dominates the economic impacts arising from government costs and regional non-agricultural impacts. For large outbreaks, both consumers and producers welfare is large and negative
Hagerman et al. [2012]	Mean losses: Texas USD 11.2–13.5 billion; California USD 2.7–21.9 billion	Mean national economic welfare losses in Texas increase under vaccination
Lee et al. [2011]	Total economic losses range from USD 23 billion to 34 billion	Reduction in domestic and international demand is overwhelming source of the losses
Pendell et al. [2015]	Total losses for the hypothetical release of FMD virus from laboratory range from about USD 16 billion to 140 billion in damages	Producer effects (negative due to reduced output and prices) share the largest burden in losses; Consumer effects negative or positive (mainly contingent upon the outbreak size, export losses, demand shocks)
Schroeder et al. [2015]	In Midwest (8 states), producer and consumer losses would likely approach USD 188 billion; government costs would exceed USD 11 billion (without vaccination)	Vaccination program with a large vaccination zone would reduce median losses to USD 56 billion and government costs to USD 1 billion

Source: Authors' own elaboration.

Economic welfare effect is generally understood as net change in the benefit to society resulted from a change in the economy. It is usually measured as the aggregate change in consumer's surplus, producer's surplus and public expenditures.

The estimated results for potential outbreaks vary depending on: analytical framework (models employed), production conditions, epidemiological input (the epidemic duration, spread rate, number of quarantined and depopulated herds, depopulated species), trade ban duration, export loss and recovery, and consumer response. The studies are not without limitations; the welfare effects could be under- or overestimated.

CONCLUSIONS

Transmission and spread of animal diseases (including zoonotic TADs) are driven by globalization that has increased both international trade and human mobility. The economic and social costs (expressed in monetary and non-monetary terms) associated with occurrence of BSE and FMD can be significant. Unfortunately, it is difficult to give an accurate answer to the question about their size. Even in the case of the economies affected by BSE or FMD in the near past (the UK, for instance), the reported costs or losses they faced due to these diseases very differ depending on the source of information. Looking at official statements, it seems that governments tend to underestimate the negative effects of the crisis events (such as BSE and FMD) in hope of avoiding the social unrest and the erosion of public trust.

The experience of countries not so formerly affected by FMD or BSE helps to understand how a potential outbreak situation (including that which could be caused by use of animal disease as a tool of attack on national security) may impact any country. The historical evidence shows that these diseases cause major economic and financial losses through animal (and human) mortality, reduced animal productivity, condemned products, restricted access to international markets, consumer market response, and spill-over effects on agriculture-related and other sectors (e.g. tourism). Their impacts have implications in terms of economic welfare, animal welfare, public health, food security, environment protection, poverty alleviation, social stability and national security.

Neoliberal policies of farm animal disease management driven by pure economic rather than wider societal considerations (e.g. mass destruction not only infected but also potentially healthy herds, the prohibition of animal vaccination due to its export implications, restricting the people movement within rural areas) and lack of awareness of such policy complex consequences could lead to the crisis of the entire rural economy (decline in employment, tourism collapse due to decline in overseas visitors and change in domestic tourism patterns, etc.). In view of still existing risk of a new incursion of FMD and BSE in the EU, the economists (following the veterinarians' footsteps) should study more-in-depth the potential social and economic effects associated with these diseases.

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SPOŁECZNO-EKONOMICZNE SKUTKI EPIDEMII CHORÓB ZWIERZĄT HODOWLANYCH

STRESZCZENIE

Bazując na przeglądzie literatury, dokonano identyfikacji skutków wywoływanych przez wybuch epidemii chorób zwierząt gospodarskich, postrzeganych z perspektywy ekonomicznej. Na przykładzie gąbczastej encefalopatii bydła (BSE) i pryszczycy (FMD) ukazano wielopłaszczyznowe oddziaływanie trans-granicznych chorób zwierząt na gospodarkę i społeczeństwo. Zawarto syntetyczne podsumowanie wyników badań empirycznych dotyczących oceny i oszacowań kosztów epidemii BSE i FMD w wybranych krajach. Epidemie obu chorób pociągnęły za sobą wysokie koszty, zarówno w wymiarze finansowym, jak i niepieniężnym. Bezpośrednie i pośrednie straty ekonomiczne sięgały kilku miliardów dolarów lub euro w poszczególnych krajach. Szczególnie dotknięte nimi zostały gospodarki zależne od eksportu żywych zwierząt i produktów mięsnych (np. Wielka Brytania i Kanada). Straty w dobrobycie ekonomicznym spowodowane przez hipotetyczną epidemię FMD w USA mogą przekroczyć sto miliardów dolarów. Oceniając z perspektywy politycznej, prowadzone przez rządy polityki mające na celu kontrolowanie i zwalczanie groźnych chorób zwierzęcych wydają się mieć uzasadnienie głównie w argumentach natury ekonomicznej.

Słowa kluczowe: ekonomika zdrowia zwierząt, choroba zwierząt, FMD, BSE, dobrobyt ekonomiczny

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EVALUATION OF THE RESULTS OF THE EQUITY FUNDS IN THE YEARS 2004–2015 USING VaR AND CVaR MEASURES

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ABSTRACT

The paper presents analysis of the risk and effectiveness of investments in equity funds using value at risk (VaR) and conditional value at risk measures, i.e. reward to value at risk (RVaR) and conditional Sharpe ratio (CS). The study was conducted for 2004–2015, divided into shorter sub-periods (two-, three-, four- and five-year). The stability of the rankings of funds was examined and its significance was verified using the Spearman rank correlation coefficient between subsequent sub-periods. The highest values of measures were observed for 2004–2005. Even then, they were not satisfactory, and the lack of stability of the results does not guarantee that they will be repeated in the future.

Key words: investment efficiency, value at risk (VaR), conditional value at risk (CVaR), reward to value at risk ratio, conditional Sharpe ratio (CS)

INTRODUCTION

By entrusting their financial surpluses to collective investment institutions, the investor expects such management of his assets to achieve the greatest profits. However, one must remember about the risks associated with this type of investment. Investor's fear of a potential loss is often greater than the prospect of profit. Therefore, it is important to relate the investment results of the funds to a possible loss, which should be easy to determine. Such tools provide the value at risk measure. Originally, it used to assess credit risk, and now is the basis for evaluating the effectiveness of the investment. Value at risk was widespread by J.P. Morgan/Reuters [1996]. Technical documents prepared by J.P. Morgan/Reuters can be found in Zangari [1994], Longerstaey and Spencer [1996] or Mina and Yi Xiao [2001].

The aim of the study is to evaluate mutual funds in terms of their investment effectiveness. The investment efficiency measures based on value at risk (VaR) and conditional value at risk (CVaR) are used. The risk assessment and investment efficiency will be analyzed taking into account the length of the investment.

The issue of investment efficiency is a frequent topic discussed in the literature, both foreign and Polish. The basic measure of investment effectiveness assessment is the rate of return. However, it does not take into account the risk associated with the investment. Therefore, indicators that combine both the rate of return and the risk are more appropriate. The following ratios can be mentioned here: Sharpe, Treynor and Jensen, which are one of the most commonly used measures. To study the effectiveness of investment funds, among others, in the papers of Grau-Carles and Sainz [2009] or Kumar and Devi [2011].

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Grau-Carles's and Sainz's research for 239 UK investment funds over 11 years indicates a correlation between Sharpe's and Treynor's ratios. Kumar and Devi [2011] analyzed various types of Indian funds using the Sharpe, Treynor and Jensen indicators, and compared the results with the benchmark to indicate better-performing funds than the market.

Sharpe, Treynor and Jensen ratios are counted among classical measures due to the normality requirements of the return rate breakdown. An alternative to them are non-classical measures in which the risk is perceived from the point of view of loss for the investor. Classical and non-classical measurements compared, among others, Elling and Schuhmacher [2007] or Bacon [2009]. They pointed to the strong correlation of most indicators.

On the Polish market, investment funds were researched by: Kompa and Witkowska [2010], Mentel [2011], Perez [2011, 2012], Kopiński [2013, 2014], Zamojska [2015] or Rutkowska-Ziarko and Sobieska [2016], Karpio and Żebrowska-Suchodolska [2017]. Perez focused primarily on hedge funds using both classic and non-classical measures for research. Kompa and Witkowska [2010] or Kopiński [2013, 2014] used taxonomic measures, Karpio and Żebrowska-Suchodolska – non-classical investment performance indicators, and Zamojska [2015] – wavelet analysis. In Polish literature, the valuation of VaR value on the Polish capital market were dealt with, among others, Mentel [2011], or Rutkowska-Ziarko and Sobieska [2016], who studied the risk of equity funds.

MATERIAL AND METHODS

The work is a continuation of the research presented in [Żebrowska-Suchodolska 2018]. The investment risk of equity funds using VaR and CVaR was examined there. Value at risk is understood as the value of a potential loss that will be achieved or not exceeded with a certain probability of alpha in a given time horizon of t [Jajuga 2007]. If the loss value exceeds VaR level, CVaR is used, which is a coherent measure.

Because in most cases the distribution of rates of return is a normal distribution, VaR and CVaR can be estimated from the formulas [Jorion 2006][1]:

$$VaR = -(r_p + z\delta) \tag{1}$$

$$CVaR = r_p - \frac{\varphi_z}{\alpha}\delta \tag{2}$$

where:

r_p – average rate of return;

z – negative value of the quantile of standard normal distribution;

δ – standard deviation of return rates;

φ_z – density of standardized normal distribution.

On the basis of VaR and CVaR, measures were developed to assess the effectiveness of risk-based investments as VaR. The following measures may be mentioned reward to value at risk (RVaR) or conditional Sharpe ratio (CS).

The reward to value at risk ratio was proposed by Dowd [2000]. It is a Sharpe indicator, except that the standard deviation is replaced by VaR. The reward to value at risk ratio has the following form:

$$RVaR = \frac{r_p - r_f}{VaR} \tag{3}$$

The conditional Sharpe ratio in which CVaR is used is represented by the pattern [Argawal and Naik 2004]:

$$CS = \frac{r_p - r_f}{CVaR} \tag{4}$$

The Spearman correlation coefficient was calculated between the sub-periods examined and its significance was examined by hypotheses:

- H_0: the correlation coefficient is not statistically significant;
- H_1: the correlation coefficient is statistically significant.

[1] Estimating VaR is possible using several methods. One of them is the variance-covariance method. The Monte Carlo simulation gives lower results than the parametric method [Mina and Yi Xiao 2001]. The use of the parametric approach seems justified here due to the large variability of results associated with the occurrence of large falls.

The test statistic expressed by the formula:

$$t = \frac{r_s}{\sqrt{1 - r_s^2}}\sqrt{n-2} \quad (5)$$

has a Student *t*-distribution with $v = n - 2$ degrees of freedom. In all tests the level of significance equal to 0.05 [Luszniewicz and Słaby 2003].

RESULTS

The research focuses on 16 equity funds that existed on the Polish market since 2004. These were: Arka BZWBK Akcji, BPH Akcji, BPH Akcji Dynamicznych Spółek, CU Akcji Polskich, DWS Akcji, DWS Akcji Plus, DWS Top 25, ING Akcji, Legg Mason Akcji, Millennium Akcji, Pioneer Akcji Polskich, PKO/CS Akcji, PZU Akcji Krakowiak, SEB 3, Skarbiec Akcja, UniKorona Akcje. The initial nomenclature of the fund was adopted. The research was completed in 2015 due to the fact that at the end of 2015 Pekao CS Akcji was merged with the PKO Akcji Plus and long-term research should be done without this fund.

The period 2004–2015 was divided into sub-periods: two years (2004–2005, 2006–2007, 2008–2009, 2010–2011, 2012–2013), three years (2004–2006, 2007–2009, 2010–2012), four years (2004–2007, 2008–2011) and five years (2004–2008, 2009–2013). The monthly return rates for units provided the basis for VaR measure.

Calculations started with the determination of the average rate of return and standard deviation, which allowed estimating VaR value at significance level of 0.05. The results of VaR and CVaR were presented in more detail in Żebrowska-Suchodolska [2018]. The results of VaR for two-year periods are presented in Table 1.

Table 1. Values VaR of for equity funds in two-year periods

Equity fund	2004–2005	2006–2007	2008–2009	2010–2011	2012–2013	2014–2015
Arka BZWBK Akcji	0.038	0.071	0.158	0.092	0.059	0.048
BPH Akcji	0.037	0.077	0.135	0.089	0.059	0.056
BPH Akcji Dynamicznych Spółek	0.058	0.107	0.162	0.089	0.049	0.053
CU Akcji Polskich	0.036	0.082	0.154	0.089	0.042	0.050
DWS Akcji	0.043	0.073	0.148	0.088	0.056	0.047
DWS AkcjiPlus	0.037	0.075	0.144	0.094	0.051	0.052
DWS Top 25	0.043	0.087	0.169	0.100	0.045	0.060
ING Akcji	0.047	0.078	0.136	0.095	0.060	0.046
Legg Mason Akcji	0.044	0.074	0.135	0.071	0.055	0.058
Millennium Akcji	0.050	0.077	0.130	0.086	0.053	0.052
Pioneer Akcji Polskich	0.048	0.084	0.182	0.128	0.063	0.059
PKO/CS Akcji	0.036	0.068	0.161	0.077	0.048	0.032
PZU Akcji Krakowiak	0.043	0.069	0.141	0.086	0.067	0.067
SEB 3	0.044	0.072	0.155	0.079	0.071	0.080
Skarbiec Akcja	0.045	0.062	0.128	0.088	0.063	0.062
UniKorona Akcje	0.043	0.071	0.129	0.086	0.061	0.046

Source: Own study.

The highest VaR values were observed in the years 2008–2009, in the period of financial crisis. They were often four times higher than the years 2004–2005, where VaR turned out to be the lowest. The exception was the BPH Akcji Dynamicznych Spółek, for which VaR values for the periods 2012–2013 and 2014–2015 were lower than in the years 2004–2005. In terms of the three-year sub-periods, the highest VaR occurred in the 2007–2009 sub-period and the lowest in the 2004–2006 and 2013–2015 periods. Among the four-year sub-periods, the greatest loss of value occurred in 2008–2011, and in the five-year sub-periods: 2004–2008.

Table 2 shows CVaR values obtained for two-year periods. The order of the sub-periods, both in terms of biennial and three-, four- and five-year periods, was similar to that of VaR. However, all CVaR values were higher than VaR, which is justified by the definition of this measure.

The next step was to measure investment efficiency based on VaR and CVaR risk measures, i.e. RVaR and CS. The values of these measures for two-year periods are shown in Table 3. The highest values of RVaR and the CS were recorded for the years 2004––2005. This resulted in both the highest average return over the benchmark and the lowest risk weighted VaR and CVaR. The exception were BPH Akcji Dynamicznych Spółek, DWS Top 25 and Legg Mason Akcji, for which values of ratios were higher in other periods. The worst results were observed in 2008–2009 and 2010–2011 when the values of the indicators turned out to be negative. The result was a negative return and a high VaR and CVaR risk.

Under the three-year sub-periods, the highest values for RVAR and CS were in the years 2004–2006, with the exception of the BPH Akcji Dynamicznych Spółek, and the lowest in 2007–2009, which was important influenced by the 2008–2009 results. Results from the years 2004–2005 continued to influence the results of the 2004–2007 period.

Table 2. Values of CVaR in the two-year sub-periods

Equity fund	2004–2005	2006–2007	2008–2009	2010–2011	2012–2013	2014–2015
Arka BZWBK Akcji	0.055	0.094	0.198	0.113	0.075	0.059
BPH Akcji	0.052	0.101	0.168	0.110	0.076	0.069
BPH Akcji Dynamicznych Spółek	0.071	0.140	0.200	0.109	0.065	0.066
CU Akcji Polskich	0.050	0.109	0.192	0.111	0.055	0.061
DWS Akcji	0.058	0.094	0.184	0.11	0.072	0.058
DWS AkcjiPlus	0.051	0.099	0.177	0.116	0.068	0.066
DWS Top 25	0.056	0.116	0.206	0.123	0.062	0.073
ING Akcji	0.064	0.102	0.169	0.118	0.077	0.057
Legg Mason Akcji	0.059	0.100	0.168	0.089	0.072	0.071
Millennium Akcji	0.066	0.100	0.161	0.107	0.069	0.064
Pioneer Akcji Polskich	0.065	0.110	0.225	0.156	0.081	0.071
PKO/CS Akcji	0.049	0.089	0.197	0.096	0.062	0.041
PZU Akcji Krakowiak	0.057	0.092	0.174	0.107	0.086	0.081
SEB 3	0.060	0.094	0.193	0.098	0.089	0.097
Skarbiec Akcja	0.061	0.082	0.159	0.109	0.081	0.077
UniKorona Akcje	0.059	0.093	0.162	0.108	0.079	0.058

Source: Own study.

Table 3. Ratios of RVaR and CS for biennial periods

Equity fund	2004–2005	2006–2007	2008–2009	2010–2011	2012–2013	2014–2015
	RVaR					
Arka BZWBK Akcji	0.576	0.248	–0.047	–0.155	0.054	–0.119
BPH Akcji	0.446	0.182	–0.074	–0.114	0.069	–0.099
BPH Akcji Dynamicznych Spółek	–0.214	0.164	–0.106	–0.141	0.197	–0.016
CU Akcji Polskich	0.375	0.223	–0.055	–0.053	0.220	–0.111
DWS Akcji	0.280	0.114	–0.069	–0.063	0.059	–0.120
DWS AkcjiPlus	0.431	0.190	–0.118	–0.120	0.224	0.022
DWS Top 25	0.099	0.308	–0.178	–0.121	0.399	–0.131
ING Akcji	0.254	0.161	–0.088	–0.083	0.116	–0.051
Legg Mason Akcji	0.297	0.321	–0.060	–0.058	0.124	–0.162
Millennium Akcji	0.192	0.149	–0.083	–0.090	0.112	–0.111
Pioneer Akcji Polskich	0.250	0.135	–0.077	–0.172	0.044	–0.185
PKO/CS Akcji	0.380	0.179	–0.145	–0.079	0.134	0.094
PZU Akcji Krakowiak	0.238	0.219	–0.085	–0.103	0.084	–0.169
SEB 3	0.277	0.169	–0.057	–0.089	–0.037	–0.149
Skarbiec Akcja	0.330	0.231	–0.054	–0.114	0.105	–0.121
UniKorona Akcje	0.380	0.195	–0.036	–0.034	0.075	–0.089
	CS					
Arka BZWBK Akcji	0.399	0.188	–0.038	–0.126	0.043	–0.097
BPH Akcji	0.318	0.139	–0.059	–0.092	0.054	–0.080
BPH Akcji Dynamicznych Spółek	–0.174	0.125	–0.086	–0.115	0.149	–0.013
CU Akcji Polskich	0.272	0.168	–0.044	–0.043	0.168	–0.091
DWS Akcji	0.209	0.089	–0.055	–0.050	0.046	–0.097
DWS AkcjiPlus	0.311	0.144	–0.096	–0.097	0.168	0.018
DWS Top 25	0.076	0.231	–0.146	–0.098	0.289	–0.107
ING Akcji	0.187	0.123	–0.071	–0.067	0.090	–0.041
Legg Mason Akcji	0.222	0.238	–0.048	–0.046	0.095	–0.132
Millennium Akcji	0.145	0.115	–0.067	–0.072	0.086	–0.090
Pioneer Akcji Polskich	0.185	0.103	–0.062	–0.141	0.034	–0.154
PKO/CS Akcji	0.279	0.137	–0.119	–0.063	0.104	0.073
PZU Akcji Krakowiak	0.180	0.164	–0.069	–0.083	0.066	–0.140
SEB 3	0.203	0.130	–0.046	–0.072	–0.029	–0.123
Skarbiec Akcja	0.243	0.175	–0.044	–0.092	0.082	–0.097
UniKorona Akcje	0.277	0.149	–0.029	–0.027	0.058	–0.071

Source: Own study.

The lowest values were in the years 2008–2011. Extending the time horizon to the five-year sub-periods completely reversed the order of the sub-periods. Better performance indicators were found in 2009––2013 than in 2004–2008 years. The 2008 results were so significant for the period 2004–2008 that even average returns above the benchmark and small losses in 2004–2005 were not decisive.

ANALYSIS OF RANKINGS BASED ON RATIOS OF THE RVAR AND THE CS

When calculating VaR and CVaR value, the fund rankings were also determined. They are included in Tables 4, 5 and 6. CS rankings differed only in two cases in the two-year sub-periods (2014–2015). Therefore, it focused on the analysis of ranking positions based on RVaR.

The division of the whole period of research into two-year sub-periods shows a large variability of ranking positions in particular sub-periods, often changing market conditions. Funds occupy the top positions in the ranking in one period, in the next period are already at the distant positions in the ranking. Exceptions are only two funds: CU Akcji Polskich and Pioneer Akcji Polskich. The first one in all two-year sub-seasons occupies positions in the first half of the ranking, while the second one in the second half.

Breaking down into three-year sub-periods, the situation is very similar to the shorter time horizon. The exception is only two funds: CU Akcji Polskich and Pioneer Akcji Polskich. In addition to the mentioned funds, it can also add the UniKorona Akcje, which can be listed among the better ones.

Table 4. Rankings derived from RVaR for two-year periods

Equity fund	2004–2005	2006–2007	2008–2009	2010–2011	2012–2013	2014–2015
Arka BZWBK Akcji	1	3	2	15	14	9
BPH Akcji	2	9	8	11	12	6
BPH Akcji Dynamicznych Spółek	16	12	13	14	4	3
CU Akcji Polskich	6	5	4	2	3	8
DWS Akcji	9	16	7	4	13	10
DWS AkcjiPlus	3	8	14	12	2	2
DWS Top 25	15	2	16	13	1	12
ING Akcji	11	13	12	6	7	4
Legg Mason Akcji	8	1	6	3	6	14
Millennium Akcji	14	14	10	8	8	7
Pioneer Akcji Polskich	12	15	9	16	15	16
PKO/CS Akcji	4	10	15	5	5	1
PZU Akcji Krakowiak	13	6	11	9	10	15
SEB 3	10	11	5	7	16	13
Skarbiec Akcja	7	4	3	10	9	11
UniKorona Akcje	5	7	1	1	11	5

Source: Own study.

Table 5. Rankings derived from RVaR for three-year periods

Equity fund	2004–2006	2007–2009	2010–2012	2013–2015
Arka BZWBK Akcji	1	4	15	13
BPH Akcji	5	7	10	9
BPH Akcji Dynamicznych Spółek	16	11	14	4
CU Akcji Polskich	7	5	2	6
DWS Akcji	15	8	6	12
DWS AkcjiPlus	2	14	12	1
DWS Top 25	6	16	11	3
ING Akcji	12	13	4	5
Legg Mason Akcji	4	1	3	10
Millennium Akcji	13	10	7	8
Pioneer Akcji Polskich	14	9	16	15
PKO/CS Akcji	11	15	5	2
PZU Akcji Krakowiak	9	12	9	14
SEB 3	10	6	13	16
Skarbiec Akcja	8	3	8	11
UniKorona Akcje	3	2	1	7

Source: Own study.

Table 6. Rankings derived from RVaR for four- and five-year periods

Equity fund	2004–2007	2008–2011	2012–2015	2004–2008	2009–2013
Arka BZWBK Akcji	1	7	13	2	13
BPH Akcji	6	10	10	5	14
BPH Akcji Dynamicznych Spółek	16	13	4	16	5
CU Akcji Polskich	7	2	6	6	1
DWS Akcji	13	4	12	12	9
DWS AkcjiPlus	5	14	1	7	6
DWS Top 25	9	16	3	13	3
ING Akcji	12	9	5	10	10
Legg Mason Akcji	2	3	11	1	2
Millennium Akcji	15	8	7	11	8
Pioneer Akcji Polskich	14	12	15	15	16
PKO/CS Akcji	8	15	2	14	7
PZU Akcji Krakowiak	10	11	14	8	12
SEB 3	11	5	16	9	15
Skarbiec Akcja	3	6	9	3	11
UniKorona Akcje	4	1	8	4	4

Source: Own study.

Extending the time horizon slightly increases the number of better and worse funds. In the four-year periods, the better are: CU Akcji Polskich, UniKorona Akcje, and worse: Pioneer Akcji Polskich, PZU Akcji Krakowiak. Increasing the time horizon slightly increases the number of better and worse funds. Such a small number of better and worse funds have confirmed the lack of relevance of Spearman's correlation coefficients between successive sub-periods.

SUMMARY

Indicators based on risk measures such as VaR and CVaR are one of the categories of non-classical measures used to assess the effectiveness of an investment. The probability of CVaR losses estimated for equity funds exceeds VaR risk.

Investment efficiency measures, based on VaR and CVaR, have yielded different values, but the effect – the same rankings with one exception. Thus failure to meet the corresponding VaR values does not translate into the results obtained. The results obtained are not satisfactory (and in many sub-periods the average rate of return does not exceed the benchmark) or stable which does not guarantee the investor to repeat the results over time. The highest value of the indicator was 0.58 (for the period 2004–2005). Such results do not allow to compensate for the potential loss of profit. This is not an optimistic conclusion for potential future investors.

Previous studies conducted using the Pain and Martin index testify to the poor results of equity funds in the period 2004–2014. Only in two sub-periods, the values of ratios calculated for funds exceeded the values obtained for the benchmark. So it cannot talk about investing in funds effectively. As the time horizon increased, the stability of the funds also deteriorated [Żebrowska-Suchodolska 2017].

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OCENA WYNIKÓW FUNDUSZY AKCYJNYCH W LATACH 2004–2015 Z WYKORZYSTANIEM METOD VaR I CVaR

STRESZCZENIE

Praca analizuje ryzyko i efektywność inwestycji w fundusze akcyjne z użyciem miar, których podstawą są wartość zagrożona (VaR) i warunkowa wartość zagrożona (CVaR), tj. wskaźnik RVaR i wskaźnik conditional Sharpe (CS). Badania przeprowadzono dla okresu 2004–2015, który podzielono na krótsze podokresy (dwu-, trzy-, cztero- i pięcioletnie). Zbadano także stabilność rankingów funduszy z użyciem współczynnika korelacji rang Spearmana wyznaczonego dla kolejnych podokresów, jednocześnie weryfikując istotność tego współczynnika. Największe wartości mierników zaobserwowano w okresie 2004–2005. Nawet wtedy nie były to wartości zadowalające, a brak stabilności wyników nie daje gwarancji powtórzenia się ich w przyszłości.

Słowa kluczowe: efektywność inwestycyjna, wartość zagrożona (VaR), warunkowa wartość zagrożona (CVaR), wskaźnik RVaR, wskaźnik conditional Sharpe (CS)

CONTENTS
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Patkowska, E., Konopiński, M. (2008a). Pathogenicity of selected soil-borne microorganisms for scorzonera seedlings (*Scorzonera hispanica* L.). Folia Horticul., 20(1), 31–42.

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