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PRICE VOLATILITY IN MACROECONOMIC STRUCTURE OF PRODUCTION IN POLAND

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ABSTRACT

In this article an empirical analysis of price volatility was conducted, on the basis of Polish macroeconomic data from 2010–2016 and theoretical framework proposed by Austrian School of Economics. The research was carried out using a number of statistical methods used on price indices representing different stages of production. The analysis allowed to establish conclusions about differing degree of price movements throughout Polish economy and its sectors, where prices of goods produced at the beginning of the structure were characterised by higher volatility than those produced in other branches. No statistically significant difference in price volatility was noted between consumer goods and intermediate goods stage.

Key words: structure of production, price volatility, Austrian School, statistical mathematics, macroeconomics

INTRODUCTION

Price changes in the economy are inherently linked to the market relations between the individuals within society. Indeed, it is the market economy which allows entrepreneurial activity that manifests itself in demand and supply market forces allowing for price determination. In centrally planned economy one cannot speak of prices as a result of voluntarily conducted transactions. The concept of prices in such conditions is nothing less than misleading; such "prices" (imposed by central planning) would lack what is perhaps one of the most important feature of price formation in the economy namely transmission of information [Huerta de Soto 2011]. Price theory presented in this paper is based on tradition of Austrian School of Economic Thought. In general the most distinguishing difference between neoclassical economics and Austrian approach is the lack of distinction between micro- and macroeconomics [Huerta de Soto 2008]. Austrians[1] view economic activity as an uniform process encompassing individuals, markets and whole economies alike, human action axiom being the common thread. Austrians prove that this axiom is sufficient for creating complex economic theories, as the one examined in this article.

Having stated that, it might be confusing why it was decided to use the term "macroeconomic" in the title of this paper. Firstly, as much as Austrian methodology leads to some of the most original and accurate conclu-

[1] This term is nowadays used in relation to all representatives of Austrian School who not necessarily come from Austria. Moreover, most of contemporary Austrian economists come from United States and are concentrated around Mises Institute operating in Auburn, Alabama.

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sions, many of its representatives, especially in the past century, relied almost exclusively on theoretical tools without conducting empirical research. The author of this paper believes that while praxeology[2] is absolutely sufficient when considering less complex economic phenomena and theories, more complicated matters (such as the theory of the structure of production) require additional empirical considerations, especially in spite of availability of proper data. Secondly, the structure of production concept can be viewed as a direct attempt at countering neoclassical and Keynesian models [Butos 2001]. Thirdly, the title of this paper points out to the use of macroeconomic data, on which this research was based.

MACROECONOMIC STRUCTURE OF PRODUCTION

While considering macroeconomic structure of production one can speak of transmission of information via prices in the economy. Based on the theory of capital firstly introduced by Bohm-Bawerk [1930], macroeconomic structure of production concept is the result of the work of later generations of Austrian economists, as well as contemporary adherents of the theory. As Garrison [2002] mentions, general idea behind the concept is to "allow the time to enter the theory [of macroeconomics – note of the author] in a fundamental yet concrete way". Therefore, one can depict production side of the economy as an intertemporal capital structure which outlines how raw resources are being transformed into consumable output in time.

On Figure 1 an exemplary depiction of macroeconomic structure of production is examined, representing disaggregated neoclassical model of circular flow of income. It has to be mentioned, that there is no canonical way of depicting macroeconomic structure of production. Throughout the years, many authors used different methods; dating back to Bohm-Bawerk's "concentric circles" [Bohm-Bawerk 1930] through "Hayek's triangles" [Hayek 2008] and modern depictions as seen in Huerta de Soto [2006]. These were however mostly used as a basis of theoretical framework and were meant to ease the comprehension of the concept. For the purpose of this research an authorial structures[3] was used which is not only consistent with the discussed theory but can also be used as foundation for empirical research.

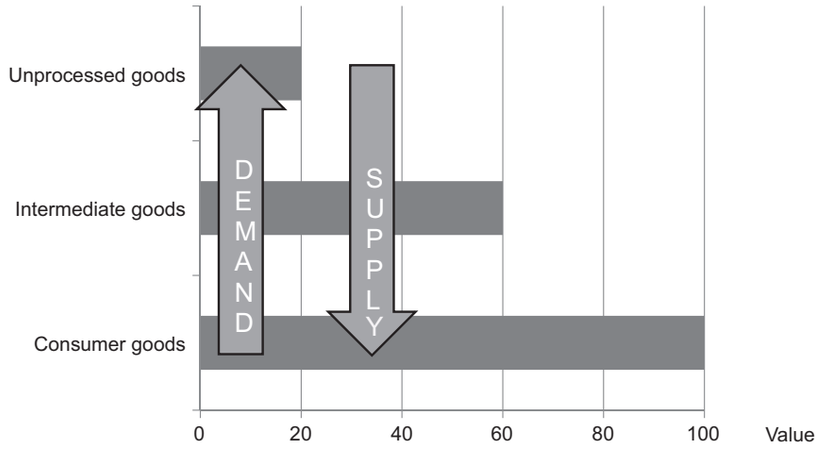

Fig. 1. Exemplary structure of production

Source: Own elaboration.

[2] Term introduced by Mises in 1949 describing the methodology of modern Austrian School.

[3] It has to be mentioned, that proposed macroeconomic structure of production was mostly inspired by Skousen's "Aggregate Production Structure" [2011], which was designed with empirical research in mind.

Contrary to the neoclassical model, macroeconomic structure of production views the production side of the economy as a series of stages of production on which entrepreneurs produce goods differing in maturity. While neoclassical model depicts production side of the economy as a *horizontal*, single-dimensional entity in which goods and services are being produced (and through which money flows in and out), Austrians propose a structure in which some of the goods are "further away" from the final demand represented by consumers and some are "closer" to completion, while money is being paid for goods and services exchanged between the stages. This results in different price levels on each stage [Cochran 2011].

According to Austrians, production side of the economy should be depicted *vertically* [Skousen 2011]. Money flows into the structure at the bottom of Figure 1 where consumers pay for final goods and services in the economy. This remarks one of the key elements of the model – the ultimate goal of all entrepreneurial activity in the structure is the production of consumer goods. However, as Hayek [2008] mentions production takes time. Before the final output reaches the consumer, intermediate goods and raw materials need to be produced and exchanged between stages. The demand of consumers induces an intermediate demand which causes entrepreneurial activity of producers which are "further away" from consumer goods stage, eventually allowing money to reach stages of production at the bottom of the structure[4].

Though the final demand results in all activity within the structure, the production itself starts with raw materials stage ("unprocessed goods" in Figure 1). From this point on, a supply chain between stages is established allowing the flow of goods differing in maturity, while value is added at each stage before they reach consumer goods stage. One should notice, that goods at the bottom of the structure do not represent much of a value. They will mature in time as they are being transformed into consumer goods [Menger 2007].

One can examine a more practical example, namely a production process of a car. Cars are made, at least partially, out of steel. Before steel can be used to produce parts of the car, an ore has to be extracted and produced. Only then producers of particular car parts are able to start their production. In the end all the parts are brought together by the producer who outputs the car itself[5].

In this particular structure of production there are three stages, which is mostly due to availability of empirical data that could have been assigned to a particular stage. In the literature however, one can find examples of structures consisting of even ten stages, where the analysis focuses mainly on theoretical framework [Lachamnn 1978]. What becomes clear however, is the difference in level of aggregation between neoclassical and Austrian macroeconomic model. While neoclassical approach favours pure aggregation of all production in the economy, Austrian model resembles microeconomics, where particular goods produced are placed within a framework of supply chain[6].

The application of microeconomic disaggregation within macroeconomic theory proves to be more efficient in explaining events happening in the economy as a whole [Skousen 2011]. The most important theoretical tenets used as a basis of this research were the ones concerning prices. On each production stage not only are different prices being determined (which is truism – concerning the addition of value and different goods traded), but the movement and volatility of prices differs as well [Jędruchniewicz 2013]. This is why one cannot simply aggregate all the producing activity and speak about "general price level" in the economy. Austrians argue that, especially throughout economic cycles, prices do not change uniformly. Higher volatility of prices should be ob-

[4] Which rests at the top of Figure 1.

[5] Skousen's [2011] "Aggregate Production Structure" consists of four stages. Skousen's structure also includes "wholesale" stage. Due to unavailability of the data it was not possible to include it in the analysis and so the author decided to propose his own idea of the structure.

[6] One can notice an explicable simillarity of the proposed model to some of the microeconomic "supply chain" models. Indeed, as explained by Skousen [2015] structure of production is an adaptation of microeconomic methods on the field of macroeconomics.

served on "further" production stages, compared to consumer goods stage. The main objective of this paper was to investigate this dependency on the basis of Polish economy in 2010–2016 period. In this article author does not go into detail on why such occurrence takes place. Extensive explanations can be found in Rothbard [2008], Mises [1953] and other positions mentioned above, especially in Huerta de Soto [2006].

DATA AND RESEARCH METHODS

For the purpose of this research author proposed an exemplary structure of production fitting the available empirical data. As a basis of measuring price volatility, price indices corresponding to the particular stage of production were used. The indices, as measured by Central Statistical Office of Poland, represent a change in price level of particular production stage compared to the corresponding period of a previous year. The data comes from 2010–2016 period and was measured on a monthly basis. 84 observations were noted per each stage of production giving 252 observations in total. Data used to represent particular stages of production was as follows:

- Unprocessed goods – *Capital goods price indices*;
- Intermediate goods – *Intermediate goods price indices*;
- Consumer goods – *Consumer goods and services indices of prices* (CPIs)[7].

It has to be mentioned that no empirically based structure of production will ever truly represent complexity of entrepreneurial activity throughout the economy. Such task would require an enormous effort of data gathering, which would not only be difficult and expensive, but might not bear much fruit either. Author realises that compromises made in this paper might be controversial. Nonetheless, one has to remember that this is one of the first attempts at proving the discussed theory using given methods.

In this research a number of statistical tests was carried out. Most of them revolve around analyses of variance of the samples described above. All of the computations were done in *R* statistical computing software. Throughout the research 0.05 statistical significance was adopted. Figure 2 represents density plots for examined data.

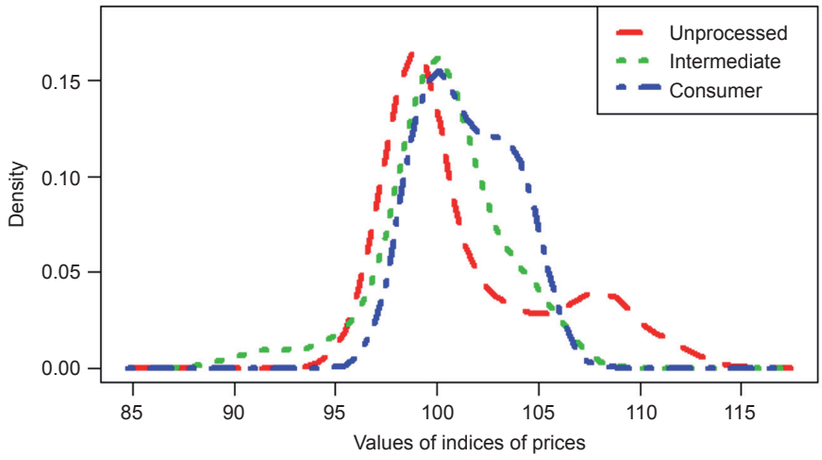

Fig. 2. Density plots for examined data

Source: Own elaboration based on Central Statistical Office of Poland.

[7] For more detailed information about branches and sectors aggregated in particular stages see: Commission Regulation (EC) No 656/2007 of 14 June 2007 amending Regulation (EC) No 586/2001 on implementing Council Regulation (EC) No 1165/98 concerning short-term statistics as regards the definition of main industrial groupings (MIGS).

Firstly, it had to be determined whether data samples follow normal distribution. This was crucial to the research, as the methods available for measuring data dispersion sometimes largely depend on the normality of distribution assumption. For that purpose Shapiro-Wilk normality test was used because of its good power properties [Razali and Wah 2011]. Shapiro-Wilk statistic is given as:

$$W = \frac{\left(\sum_{i=1}^{n} a_i y_i\right)^2}{\sum_{i=1}^{n}\left(y_i - \bar{y}\right)^2} \tag{1}$$

where: y_i – the i^{th} order statistic;
$\bar{y}$ – the sample mean.

$$a_i = \left(a_1, \ldots, a_n\right) = \frac{m^T V^{-1}}{\left(m^T V^{-1} V^{-1} m\right)^{1/2}} \tag{2}$$

and $m = (m_1, \ldots, m_n)^T$ are the expected values of the order statistics of independent and identically distributed random variables sampled from the standard normal distribution. Where V is the covariance matrix of those order statistics and the *P-value* below statistical significance points out to rejection of normality assumption in particular sample. It has to be mentioned, that in this research a modified algorithm (AS R94) for the test was used as provided by Royston [1995] which makes the test usable for samples of up to 5,000 observations.

Results of Shapiro-Wilk test led to rejection of normality assumption in all of three samples. Therefore, proper non-parametric statistical tests had to be considered for measurement of volatility. The volatility differences were measured using Brown-Forsythe test of homogeneity of variances, which proves very efficient while considering large, multiple samples of non-normally distributed data [Denekowska et al. 2009]. The statistic is given as:

$$F = \frac{(N - g)}{(g - 1)} \frac{\sum_{i=1}^{g} n_i \left(Z_i - \bar{Z}\right)^2}{\left[\sum_{i=1}^{g}\sum_{j=1}^{n_i}\left(Z_{ij} - \bar{Z}_i\right)^2\right]}$$

where: $Z_{ij} = \left|Y_{ij} - \tilde{Y}_i\right|$; (4)

$$\bar{Z}_i = \frac{1}{n_i}\sum_{j=1}^{n_i} Z_{ij}; \tag{5}$$

$$\bar{Z} = \frac{1}{N}\sum_{i=1}^{g}\sum_{j=1}^{n_i} Z_{ij}; \tag{6}$$

$$\tilde{Y}_i = median\left(Y_{i1}, Y_{i2}, Y_{i3}, \ldots, Y_{in_i}\right). \tag{7}$$

Hypotheses tested are given as:

$$H_0: \sigma_1^2 = \sigma_2^2 = \sigma_3^2 = \ldots = \sigma_g^2 \tag{8}$$

$$H_1: \sigma_1^2 \neq \sigma_2^2 \neq \sigma_3^2 \neq \ldots = \sigma_g^2 \tag{9}$$

Brown-Forsythe test is in fact a slight modification of statistic proposed by Leven [Brown and Forsythe 1974]. Originally, the test used mean instead of median, which made it appropriate for testing normally distributed data-samples. The reason behind modification was to make the test more robust to non-normal distributions. In this research, *p-value* below given statistical significance pointed out to non-homogeneity of at least one population's variance compared to others, indicating differences in dispersion between data samples, which also proves the assumption of non-uniform price movements within the economy (in between stages of production).

Lastly, it needed to be tested if the volatility was higher the "further" a given stage of production was situated compared to consumer goods stage. In this part of the research, Ansari-Bradley's test was used which is a rank sum type of test used for measuring differences in dispersion [Ansari and Bradley 1960]. In general, the test is used to investigate whether the difference in scale of two cumulative distribution functions is different than 1. For that purpose Ansari and Bradley introduce a scale parameter (θ) given as:

$$G(\theta u) \equiv F(u) \tag{10}$$

where $G(u)$ and $F(u)$ are cumulative distribution functions derived from independent samples. In that case H_0 assumes the value of θ to be no different than 1. An alternative hypothesis stating that scale parameter is less than 1 was used for the purpose of this research. H_1 indicated higher dispersion of $G(\theta u)$ distribution[8].

To carry out Ansari-Bradley's procedure, both of the tested samples are ranked in a combined array represented by:

$$Z_1, \ldots, Z_{m+n} \tag{11}$$

where ranks are being assigned from both ends, starting with 1 and working towards the center (middle ranks are given as $(m + n)/2$ in this case[9]). Then Ansari-Bradley's statistic is given as:

$$W = \sum_X R(Z) \tag{12}$$

P-value for the test was calculated by the software. If below statistical significance, alternative hypothesis was adopted. One can notice, that the test was designed to be used for two samples. Therefore, the test had to be run twice for two pairs of indices samples; once for *unprocessed goods* and *intermediate goods* and once for *intermediate goods* and *consumer goods*, which allowed the author to check if dispersions in price changes were higher at the bottom of the structure of production.

Before moving on to Ansari-Bradley's test however, its assumptions needed to be considered. Firstly, observations in tested samples had to be independent – this condition was certainly met all across the data. Secondly, both of the tested samples had to come from the same type of distribution function differing only in scale. To test this assumption, another rank type test was used, namely Wilcoxon rank sum test [Fahoome 2002]. This let the author check whether H_0 stating that two independent samples used in particular Ansari-Bradley's procedure were selected from the same distributions without statistically significant differences in location parameters.

[8] One can also use "greater than 1" or two-sided hypotheses.

[9] Formula is slightly different when odd number of overall observations is considered.

Wilcoxon procedure involves combining samples in ordered manner, keeping track of sample membership. The ranks of the sample with the smaller sum are added, giving the S_n statistic, formally represented as:

$$S_n = \sum_{j=1}^{n} R_j \tag{13}$$

where R_j are the ranks of sample n expected to have the smaller sum. *P-value* below the statistical significance led to rejection of H_0, thus making the use of Ansari-Bradley's test inadequate for the given pair of samples.

RESULTS

The first step of the research was to find out if analysed samples follow normal distribution. Table 1 represents *p-values* of Shapiro-Wilk's normality test for each sample.

Table 1. Results of Shapiro-Wilk's test

Stage of production	Unprocessed goods	Intermediate goods	Consumer goods
P-value for S-W's test	0.00000002	0.001308	0.00002

Source: Own elaboration.

As mentioned before, based on the results and adopted statistical significance, it had to be concluded that none of the samples follows normal distribution. This assumption necessitated the usage of robust tests in further proceedings.

The next test was Brown-Forsythe's test. This test had to be run only once, as it measured if homogeneity of variances was present between all of the samples. Result for this test was *p-value* at the level of 0.005031. Based on adopted statistical significance, given H_0 does not apply anymore and it had to be concluded that price movements between stages of production were not uniform.

For the last stage of the research (Ansari-Bradley's test) it needed to be determined whether the data came from the same type of distribution. For that purpose, Wilcoxon's rank sum test was run for two pairs of the samples for which Ansari-Bradley's test was to be run as well. Table 2 represents *p-values* as measured for both tests. Based on the results of Wilcoxon's test and adopted statistical significance, it can be noticed that when it comes to measuring differences in spread of indices between *unprocessed goods* stage and *intermediate goods* stage H_0, stating that both of the samples come from the same distribution type with statistically negligible location differences could be adopted. However, when it comes to *intermediate goods* and *consumer goods* pair of samples, the results were not so favourable. In this case H_0 for Wilcoxon's test could be adopted only if statistical significance is to be lowered (to 0.001 for example).

Table 2. Results of Wilcoxon's and Ansari-Bradley's test

Pair of indices of prices	*Unprocessed goods* and *intermediate goods*	*Intermediate goods* and *consumer goods*
P-values for Wilcoxon's test	0.938	0.007266
P-values for A-B's test	0.01872	0.2616

Source: Own elaboration.

Results of Ansari-Bradley's test could be examined only while taking Wilcoxon's test results into consideration. When it comes to *unprocessed goods* stage and *intermediate goods* stage, based on the tests' *p-values* and adopted statistical significance, it had to be concluded that *unprocessed goods* indices of prices distribution scale parameter is less than 1. This result indicates higher dispersion of price indices on *unprocessed goods* stage. Ansari-Bradley's test's function coded in *R* estimated θ parameter at the level of 0.9093484, indicating that price volatility is expected to be around 9.9689% higher on *unprocessed goods* stage, compared to *intermediate goods* stage.

When it comes to *intermediate goods* and *consumer goods* however, it was already indicated that Wilcoxon's test H_0 can be adopted only for much lower statistical significance. That would also apply for the Ansari-Bradley's test run for this set of data. Based on this test's *p-value*, it had to be concluded that the difference in scale parameter of both distributions was not statistically significant. Therefore, one cannot conclude if the price volatility was higher on *intermediate goods* stage, compared to *consumer goods* stage.

Moreover, Brown-Forsythe's test run for *intermediate goods* and *consumer goods* set of data scored *p-value* of 0.2834 indicating no statistical difference in populations' variances, thus pointing out to no difference in price volatility between those stages.

CONCLUSIONS

The theory discussed in the beginning section of this paper was partially proven. While *unprocessed goods* in Polish economy are characterised by higher price volatility than *intermediate goods* one cannot say if the same follows for *intermediate goods* as compared to *consumer goods*. Furthermore, it cannot be concluded if there was any difference in price volatility between those stages at all. Nonetheless, price volatility on *unprocessed goods* stage differs from the rest of the stages and it is enough to conclude that prices in Polish economy did not change uniformly. Therefore, aggregating whole economic activity and speaking of an uniform price level in the economy can be misleading.

As for the limited provability of the theory, a few factors might have had an impact on the research. Firstly, the discussed theory is mostly applicable for *developed* market economies, while Poland is still considered a *developing* country. Secondly, as the Austrian School deals only with pure market phenomena (of which regulations and state activity are not a part) the validity of the theory largely depends on the level of economic freedom. Polish economy, according to Heritage Foundation report is only moderately free[10]. Various state interventions and regulation could impact entrepreneurial activity in examined sectors and branches, distorting the results. Thirdly, one of the limitations of Austrian model is the lack of foreign trade impact examination. Structure of production theory is in fact limited only to 'supply chain' of national economy, mostly lacking any serious consideration of globalisation phenomena, which could influence the findings. Fourthly, the problem may lay in the data and its examination itself. Possible limitations of the model were already mentioned and it might very well be that proposed level of disaggregation and number of stages of production were not sufficient or that the statistical data was somewhat flawed. Nonetheless, one has to keep in mind that methods used in this article are merely a proposition, as the theory did not see many empirical verifications as of yet, and there is still much place for improvement.

[10]See The Heritage Foundation [2016]. Index of Economic Freedom: Promoting Economic Opportunity and Prosperity report, were Poland scores 39th place out of 186 economies examined.

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ZMIENNOŚĆ CEN W MAKROEKONOMICZNEJ STRUKTURZE PRODUKCJI W POLSCE

STRESZCZENIE

W artykule zawarto wyniki badań empirycznych w ramach teorii struktury produkcji szkoły austriackiej w ekonomii, dotyczące zmienności cenowej w polskiej gospodarce w latach 2010–2016. W badaniach wykorzystano dane o indeksach cenowych dla różnych etapów struktury, które zostały poddane obróbce statystycznej. Badania częściowo potwierdziły założenia teoretyczne w zakresie różnic w zmienności cenowej w gospodarce, w której największą zmienność odnotowano w zakresie dóbr nieprzetworzonych. Nie stwierdzono istotnych statystycznie różnic w zakresie zmienności cenowej między etapem dóbr pośrednich i konsumpcyjnych.

Słowa kluczowe: struktura produkcji, zmienność cenowa, szkoła austriacka, statystyka matematyczna, makroekonomia

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CHANGES IN AGRICULTURAL ADVISORY SERVICES IN POLAND AFTER ACCESION TO THE EU

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ABSTRACT

The main objective of this article is to analyze and evaluate the state and development of agricultural advisory services in Poland after accession to the European Union. The most important change, based on the Act from 22 October 2004, was to obtain legal personality by the Agricultural Advisory Center in Brwinów (CDR) and 16 provincial agricultural advisory centers (ODRs), and the possibility of charging fees for selected services. This Act was changed three times during the research period. The changes concerned mainly the subordination of ODRs; from the Governors to the provincial self-governments (2009), then to the Boards of provinces (2012), and most recently to the Minister of Agriculture and Rural Development (2016), and how they are financed. At present, two main public organizational units exist within the agricultural advisory structure; there are the CDR responsible for training of advisers and the 16 ODRs responsible for farm advisory services and rural development.

Key words: FAS in Poland, Farm Advisory System, agricultural advisory services, CDR, ODRs

INTRODUCTION

Public sector of agricultural advisory services (agricultural extension) means that advisory is provided and funded by governmental organizations [Swanson et al. 1990, Rivera 1991]. Institutions of this type played a key role in the modernization of the agricultural sector and in changes of the rural environment in the countries of Western Europe and the USA. The experience of those countries provides firm arguments that agricultural advisory was the primary instrument for the implementation of the broadly understood agricultural policy and the driving force carried transformations in agriculture [Kania and Drygas 1995]. It is thus impossible to imagine adaptation processes related to sustainable development of the rural areas and agriculture in Poland without the participation of state-owned (public) agricultural advisory. From the middle of the 1980s public sector of agricultural advisory has been criticized for irrelevance for the needs of farmers, the results and effectiveness of advisory work as well as the costs and the manner of financing [Koutsouris 1997, Chapman and Tripp 2003]. Responding to these changes, some countries, including Poland, undertook restructuring, commercialization and privatization actions, as well as actions using non-governmental organizations to support public sector advisory, especially regarding educational functions [Blum 1995, Nagel 1997, Hoffmann et al. 2000, Kania 2007].

The accession of Poland to the European Union put new challenges for agricultural advisory system in Poland. They relate to, among others, the implementation of new production methods in agricultural farms,

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especially integrated and ecological production, the principles of good agricultural practices and animal welfare, food safety, public health of people, animal health and plant health. It is also about undertaking various actions related to agricultural and non-agricultural entrepreneurship requiring extensive economic and marketing knowledge in the conditions of market economy as well as acquiring skills regarding the preparation of applications for EU assistance resources as part of instruments of the Common Agricultural Policy, as well as the ability to prepare drafts of projects taking into account analyses as well as marketing and financial projections.

MATERIAL AND METHODS

The main objective of this article is to analyze and evaluate the changes in agricultural advisory services in Poland, after accession to the European Union[1]. Research questions which I would like to address are: What are the statutory solutions in agricultural advisory services; What changes were caused by the decentralization and commercialization of public advisory services and when; When and how did the government resolve the problem of statutory state agricultural advisory units; How many households does a an advisor help.

The study used a descriptive and tabular method. The basic data was obtained from author's research carried out within the PRO AKIS project [AKIS in the EU… 2014]. The source of the presented indicators concerning the number of farms and advisers as well as the average farm of utilized agricultural area was the statistical data and data obtained from managers of the CDR and 16 ODRs. The remaining indicators concerning the work of advisers were calculated on the basis of the data originating from a questionnaire survey carried out among 5% randomly selected field advisers employed in all the 16 ODRs. 103 surveys completed were obtained, i.e. 4.5% of the respondents.

Agricultural Advisory Services after Poland's integration with the European Union (from 1 May 2004)

As of 1 January 2005, the CDR and the ODRs obtained a legal status[2], the possibility of charging for some services and have been subordinated respectively to the Minister of Agriculture and to province governors who are representatives of the government. Budget cuts in and charging for advisory services meant that the state advisory system was transformed from state-owned into a semi-state owned system. As of 1 August 2009[3], the ODRs were subordinated to the provincial self-governments and together with this reform, the agricultural advisory system in Poland became a semi-autonomous system. It should be noted, however, that the term 'public advisory' is still used in statutory nomenclature. Since 31 December 2012[4], the second change of the Act introduced the subordination of ODRs to the boards of provinces. New rules have allowed the boards to the additional small financing the annual operational programs of ODRs. Since 20 August 2016, under the new Act of 22 June 2016[5] amending the Act on agricultural advisory units from 22 October 2004, ODRs became again are semi-state organizational units with legal personality, partially funded by the Minister of Agriculture and rural development, and they are subject to him.

[1] The history of agricultural advisory services in Poland was presented in another article [Kania 2017].

[2] Act on Agricultural Advisory Bodies of 22 October 2004 (Journal of Laws 2004 no 251, item 2507).

[3] Act from 16 June 2009 amending the Act from October 2004 (Journal of Laws 2004 no 92, item 753), and Act from 23 January 2009 amending selected acts due to changes in organization and competences of public administration (Journal of Laws from 2009 no 31, item 206).

[4] Act from 16 November 2012 amending the Act of Agricultural Advisory Services with later changes (Journal of Laws from 2012, item 1414).

[5] Journal of Laws from 2016, item 1176.

The organization framework of agricultural advisory in Poland is depicted in Figure 1. The Agricultural Advisory Center[6] (Polish – Centrum Doradztwa Rolniczego, CDR) in Brwinów is a governmental institution responsible for the professional development of agricultural advisors. The improvement in advisors' knowledge and skills is achieved through seminars, trainings, courses, practical trainings, workshops, shows, demonstrations, national and foreign study visits, as well as postgraduate courses in cooperation with universities. The CDR has operated in its present organizational form since 1 January 2005 and is supervised by the Ministry of Agriculture and Rural Development. The CDR has three branches or divisions in Krakow, Poznan and Radom.

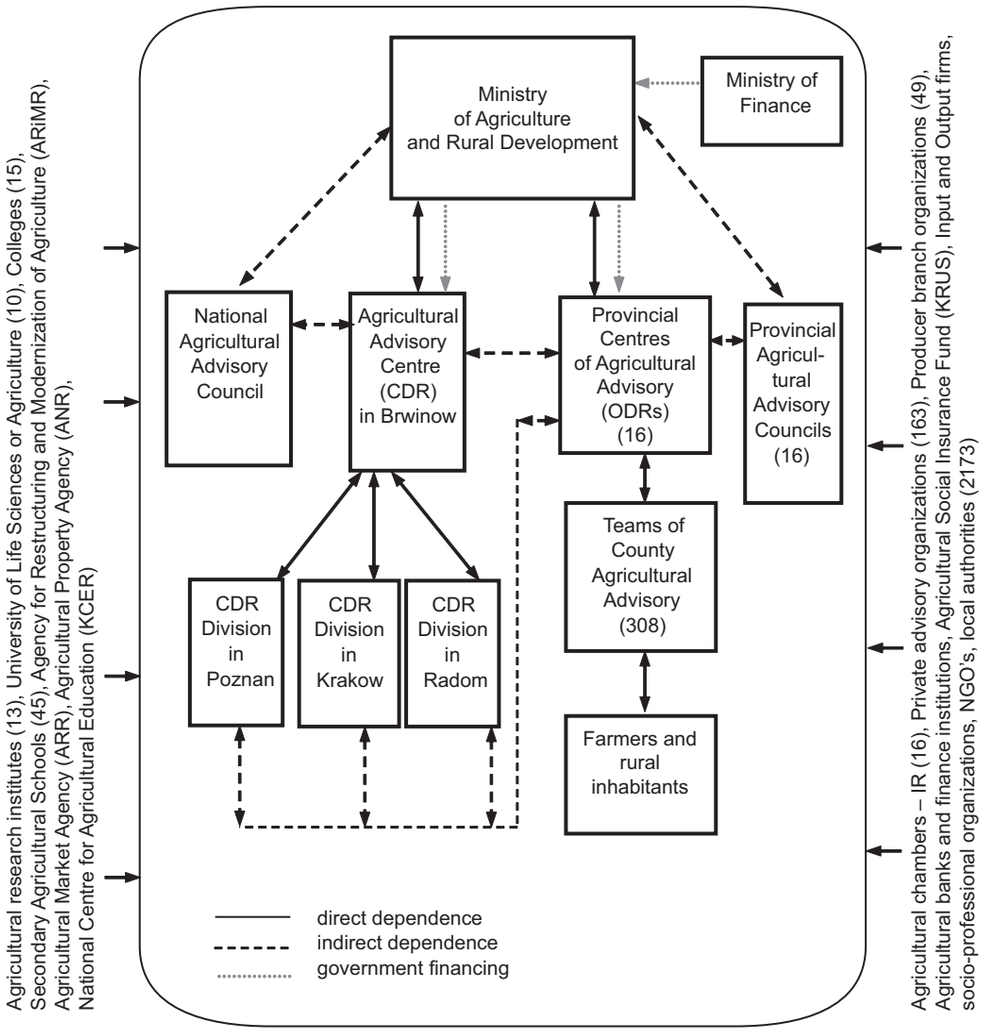

Fig. 1. Organization of Agricultural Advisory Services in Poland and other stakeholders of AKIS (state since 20 August 2016)

Source: Authors' work.

[6] The center's name is confusing for foreigners and is not adequate to its role. In my opinion this is only a training center for agricultural advisers which are not subordinated ODRs.

It is a governmental unit and reports directly to the Minister and its scope covers the entire country. The CDR is managed by a director, appointed by the Minister. The tasks of the CDR are specified by the Act on Agricultural Advisory Bodies of 22 October 2004 [Kania 2011].

The so-called Social Council for Agricultural Advisory, an outcome of the Polish and American Extension Program, is appointed by the Minister of Agriculture and Rural Development [Kania 2016]. This Council since 2016, has 11 members, and they include: 2 representatives of the Minister, 2 representatives of the National Board of Agricultural Chambers, 4 representatives of farmers' trade unions and 1 representative for each of the following institutions: universities, R&D units and the Convent of Marshals.

The CDR cooperates closely with the provincial ODRs, as well as with agricultural research institutes, government and local government administration bodies, farmers' organizations, universities of agriculture and life-sciences, regional and local agencies, as well as agricultural chambers. Occasionally, it also establishes cooperation with the unions of farmers, farmer associations and organizations and other universities. The main source of funding for the operation of the CDR are subsidies from the state budget (about 50% of the total budget). The provincial agricultural advisory Centers (ODRs) were self-governed organizational legal entities operated on the basis of the Act on Agricultural Advisory Bodies of 22 October 2004. This Act went into effect on 1 January 2005, resulting in charges for selected services provided by the agricultural advisory centers. According to the Competence Act prepared by the Ministry of Internal Affairs and Administration approved by the Parliament of the Republic of Poland, 16 provincial ODRs reporting to the province governor were transferred to the Provincial Parliaments on 1 August 2009. The Act specifies the goals and tasks of the centers, their structure, as well as their method of administrative and financial management. There is one provincial ODR in each of the 16 provinces in Poland. Its name contains the name of the province e.g., Mazowiecki ODR or Małopolski ODR. Provincial ODRs are part of the public sector. Pursuant to the Act from 2009, they receive purpose subsidies from the state budget to carry out non-commercial tasks specified in Article 4 item 2 of the Act from 2004, on Agricultural Advisory Bodies and specific subsidies for the remuneration of employees and maintenance of the centers (approx. 50% of the budget). This new management structure of agricultural advisory services which was introducing in 2009, with mentioned earlier small change in 2012, was criticized. The provincial advisory centers, in practice 16 independent organizations, they were under supervision and control of provincial self-governments first and then the boards, but they were funded by the Ministry of Agriculture, not by the self-governments. Easy to see the weakness of the management structure because someone else has supervised the ODR, and someone else has financed statutory activities. Another disadvantage of the advisory organization in Poland in that time, was the lack of a coordinating body for the sixteen independent advisory organizations. The Agricultural Advisory Center in Brwinów does not perform this function, as its main task is only professional improvement of ODR advisors, partially implemented against remuneration. Moreover, the Center reports directly to the Minister of Agriculture, and the activity of the 16 advisory centers was supervised by provincial boards. Additional weakness of advisory structure is that since 2004, Poland has implemented the Rural Development Plans in agriculture (RDPs 2004–2006, 2007–2013 and 2014–2020) which are centrally managed and implemented (both centrally and at the level of provinces) by Paying Agency (Polish – ARiMR), supervised by the Minister of Agriculture and supported by strong financial resources under the EU's Common Agricultural Policy. It was very difficult in that case of efficient management of the national agricultural policy and RDP.

In my opinion, the decentralized ODRs needed consolidation of top management and financing which took place under the new Act of 22 June 2016. Since 20 August 2016, the Minister gives, by means of an order, the statue of the ODRs. The authority of ODR is the director appointed and dismissed by the Minister of Agriculture. Minister monitors and evaluates the activities of ODRs and the work of its directors and Social Councils. The agricultural advisory units act on the basis of annual program of operations, annual financial plans and price-list of services. Each ODR is associated with its own Social Council for Agricultural Advisory, which is a consultative-advisory body to the director of the ODR and is made up of 12 people. It

includes the representatives of: the Minister of Agriculture, the Marshal Office, Provincial Self-Government, the Agricultural Chamber (2), members of farmers' trade unions (4), universities and research units (2), and vocational agricultural schools.

They focus on the execution of objectives that can be classified into four types [Wiatrak 2006, Kujawiński 2009, Kania et al. 2014]: extension tasks, which consist in helping farmers in decision-making, information tasks, i.e., delivering information on new technologies and innovations to agricultural manufacturers without their assessment, educational tasks consisting in conveying knowledge and teaching adults (farmers and members of their families), popularizing tasks consisting in the dissemination of new technical and technological solutions in rural areas.

The priority for the ODRs is to assist farmers and their families in making decisions that will help them achieve their goals. This is achieved by: engaging in actions aimed at improving the level of qualifications of farmers and rural inhabitants, implementing the instruments of the European Union's Common Agricultural Policy, promoting the multifunctional development of rural areas, promoting environmentally-friendly management methods and environmental protection, providing assistance in implementing new requirements relating to agricultural production, the so-called mutual conformity principle (cross-compliance), implementing new production technologies, protecting and cultivating cultural heritage at the village level and providing assistance in the creation of production groups.

Based on European Council Regulation No 1782 of 29 September 2003, the Farm Advisory System (FAS) was introduced in 2009. The FAS system in Poland consists of: provincial agricultural advisory centers – 16, provincial agricultural chambers – 16, private providers of services for farmers accredited by Ministry of Agriculture – 185, and public and private providers for forest holders – 271 (Fig. 1). Institutions supporting FAS in Poland are: Ministry of Agriculture and Rural Development (as the institution for the FAS implementation), the Agricultural Advisory Center (as the coordinator), the Agency of Restructuring and Modernization of Agriculture (as the payment agency and controlling farms on good agricultural and environmental conditions, food safety and plant health), and veterinary inspection (controlling animal welfare and animal health). Farmers can benefit from the advice on a voluntary basis and receive support to adapt their farms to the cross-compliance requirements.

Selected characteristics of agricultural advisory services in Poland

The most important factor for the advisory system to be efficient is the advisory staff – competent professionals, with extensive and in-depth professional knowledge and good communication skills, familiar with farmers' needs, being market-orientated and capable of working with all stakeholders. In the period from 2006–2015 the number of advisory staff at provincial ODRs was successively decreased (Table 1).

Table 1. Employment of Agricultural Extension Advisors in ODRs in 2006 and 2015

Year (on 1 January)	Years 2006 and 2015					
	total	of which			administrative and technical assistance	total
	advisors	management staff	subject matter specialists	field advisors		
2006	4 212	500.0	1 045.0	2 667.0	1 135.0	5 347.0
2015	3 549	565.0	753.0	2 231.0	653.0	4 202.0
%	100.0	15.9	21.2	62.9	–	–

Source: Own research based on data received from 16 ODRs.

At present, the number of advisors employed in the ODRs is 3,549, of which 31.9% are women. Since 2006, the number of full-time positions in provincial ODRs has declined (reduction by 15.8%). The reason for the declining number of advisors can be due to a very tight budget, year by year limited by the government, but also due to the fact that many advisors decided to open their own advisory practices.

The largest number of advisors are employed in Mazowieckie (455) and Wielkopolska (372), Lubelskie (293) and Podkarpackie (255) provinces. The smallest number was in Lubuskie (87), Opolskie (91), Śląskie (144) and Zachodnio-pomorskie (150) provinces. Each county's agricultural advisory team averages from 7 to 17 advisors by province. Since 2006, the number of full-time positions in provincial ODRs has declined (reduction by 18%). The reason of the declining number of advisors can be due to a very tight budget, year by year limited by the government, but also due to the fact that many advisors decided to open their own advisory practices. The advisory service as a profession is recognized by farmers and other stakeholders as a very important, trustworthy, and responsible one.

Statistically, the number of farms (over 1 ha) per advisor is generally very high in Poland (approx. 393), and there is a certain variation between provincial ODRs in the number of advisors per farm (from 189 in Zachodnio-pomorskie up to 605 in Lubelskie) – Figure 2.

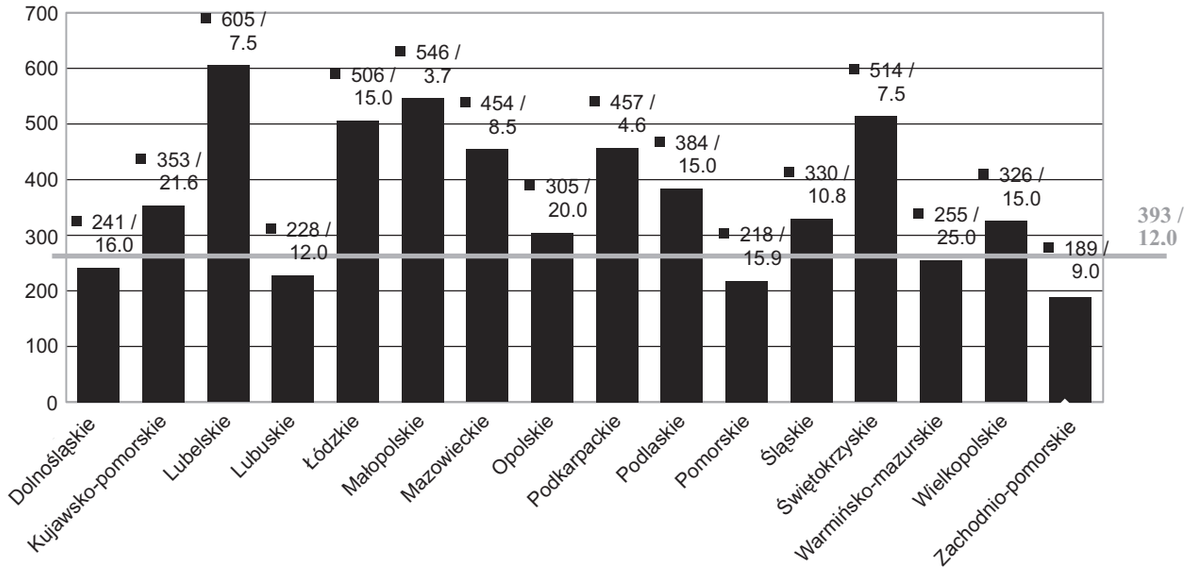

Fig. 2. Number of agricultural holdings with area (UAA) over 1 ha per adviser and its average size (ha) in 2012 by provincial ODR

Source: Kania et al. [2014].

These holdings are also quite diverse in terms of average size of area e.g. 3.7 ha in Malopolskie or 4.6 ha in Podkarpackie and 25.0 ha in Warmińsko-mazurskie, 21.6 ha in Kujawsko-pomorskie and 20.0 ha in Opolskie wherein the average size for Poland is 12.0 ha.

From the responses of 103 advisors representing all the provinces, it follows that they work at an average of 201 holdings a year, which means that only one third of the farms use different types of advisory support [Kania et al. 2014a]. The number of clients differs widely between provinces from 60 holdings in the Podlaskie

province and 80 holdings in the Opolskie province, and up to 400 in the Świętokrzyskie or 280 in the Lubelskie provinces.

The most important group of customers for Polish advisors are small and medium farms. This is related to specific characteristics of Polish agriculture (fragmentation of farms, agrarian overpopulation, weak soil, poor use of production means). Nonetheless, advisors still ranked "helping large market oriented farms" fourth, before assistance to the so-called young farmers, i.e., persons below the age of 40, and rural women.

Looking at the main topics of advisory services, we can notice that there is no big difference between the groups of clients. The main topics of advisory for medium commercial farms are: plant production, animal production, accounting, taxes, cross-compliance and environment protection. Similar topics for small commercial farms, excluding environment protection, but including rural development, are covered. The four first topics and renewable energy hold true for young farmers.

The main methods used in advisory services are individual (56.2%). These relate to the preparation of business plans and the application forms for subsidies coming from different instruments of CAP under the Rural Development Plan 2007–2013. Group methods are used in advisory work in 26.0% and mass communication in 17.8%.

Most of the advisors (86.1%) have a university degree. Advisors with only a secondary education are older employees with very good experience and many certificates. The largest percentage of advisors specialize in plant production (cereals, root crops, high protein and oil plants), as well as in ecological agriculture. More than 10% of the advisors deal with the issues of agricultural farm management (farm economics and organization, marketing of agricultural products) and issues related to the implementation of instruments of the European Union's Common Agricultural Policy and policy-related principles (cross-compliance, financial support from the EU).

Additionally, more than 40% of the agricultural advisors filled applications for direct payments for farmers. Applications for other funds within the Rural Development Plan are prepared by nearly 24% of the employed advisors.

As shown in Figure 3, individual extension is the most common form applied (this form occupies 59.3% of agricultural extension advisors' working time).

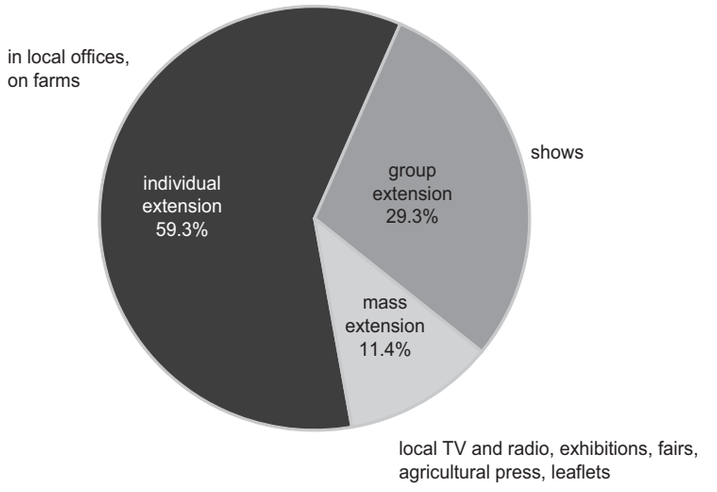

Fig. 3. The use of forms and methods of extension by field advisors

Source: Kania et al. [2014].

Most often, this form is implemented by direct contact with the agricultural producer, i.e., by meetings with farmers in advisory centers (district or county office) or on the farm.

Group extension services, most often implemented in form of shows, seminars, demonstrations, workshops, etc. constitutes one third of the working time (29.3%).

With respect to mass extension services (11.4%), the most commonly applied extension method is mass media, i.e., TV and radio.

CONCLUSIONS

As of 1 January 2005, it is a common trend to charge fees for most advisory services, and the financial burden is transferred to the producers. In Poland, we can observe, year after year, less financial support for agricultural advisory services from the state budget and the necessity to look for other sources of funds (i.e., commercial services with marketing approach, EU funds). It is expected that farmers in our country will pay for most services received from advisory staff. The problem is that owners of small farms, which dominate in Poland, might not be able to afford such services.

In the analyzed period, the basic Act on Agricultural Advisory Bodies of 22 October 2004 was changed three times, mainly in terms of organizational subordination and the method of financing advisory bodies, both for legal reasons and political.

At present, two main public organizational units exist within the agricultural advisory structure. There are the CDR responsible for training of advisers and the 16 ODRs responsible for farm advisory services. These organizations are supervised and partially funded (ca. 50%) from a state budget by the Ministry of Agriculture.

In the longer term, ODRs should be incorporated into structure of the CDR and perform a uniform structure of public (semi-public) agricultural advisory services in Poland or moved to agricultural chambers together with the budget and become a semi-autonomous organization (farmer based organization – FBO) supervised by farmers.

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ZMIANY W DORADZTWIE ROLNICZYM W POLSCE PO AKCESJI DO UNII EUROPEJSKIEJ

STRESZCZENIE

Głównym celem artykułu jest analiza i ocena zmian w doradztwie rolniczym w Polsce, po akcesji do Unii Europejskiej. Najważniejszą zmianą, spowodowaną ustawą o jednostkach doradztwa rolniczego z dnia 22.10.2004 r. było uzyskanie osobowości prawnej przez Centrum Doradztwa Rolniczego w Brwinowie (CDR) i 16 wojewódzkich ośrodków doradztwa rolniczego (ODR) oraz możliwość pobierania opłat przez doradców za wybrane usługi doradcze. Ta ustawa była zmieniana w badanym okresie trzykrotnie. Zmiany dotyczyły głównie podporządkowania ODR, najpierw od wojewodów do sejmików województw, potem do zarządów województw, a ostatnio do Ministra Rolnictwa i Rozwoju Wsi oraz sposobu finansowania ODR. Obecnie w strukturze doradztwa rolniczego w Polsce istnieją dwie główne jednostki organizacyjne, tj. CDR odpowiedzialny za szkolenie doradców i 16 ODR odpowiedzialnych za doradztwo na rzecz gospodarstw rolnych i rozwoju obszarów wiejskich.

Słowa kluczowe: FAS w Polsce, system doradztwa rolniczego, rolnicze usługi doradcze, CDR, ODR

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ANALYSIS AND CONTROL OF GOVERNMENT SUBSIDIES FOR INVESTMENTS IN AGRICULTURE OF THE RUSSIAN FEDERATION

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ABSTRACT

Subsidies are an important part of development of agriculture in Russia. The vast majority of agricultural holdings have negative profit margin without government support. Comparing an amount of government support in Poland and in Russia, it was equal to 76.21 m PLN for 1,000 km^2 of agricultural land in Poland versus 6.35 m PLN in Russia in 2014. Such situation leads to low productiveness of agriculture in Russia. As Russian agriculture is extensive, the Government has made a decision to assign about 40% of the support amount to recover rate of investment loans intended for development of material and technical facilities of agriculture. This program is not popular and it involves 3.55% of the total number of agricultural holdings only. In order to estimate efficiency of utilization of subsidies a cluster analysis was made by means of *K*-mean method. It revealed 3 clusters depending on efficiency of subsidies utilization. Some control procedures are suggested to manage efficiency of utilization of government support.

Key words: Russian agriculture, government support, efficiency of support for agriculture, cluster analysis

INTRODUCTION

Well-developed agriculture is a foundation of prosperity of the country and good health condition of its population. Russia is situated in 4 climate zones (arctic, subarctic, moderate and tropical) and the biggest part of its lands is in risk agriculture area. Under such area conditions agricultural production is quite complicated task without government support.

Having specific activity, agriculture is not able to function steadily and continuously without government's interference [Kolosova 2016]. Being quite complicated, government's regulation of the agricultural sector simultaneously influences profit of agricultural manufacturers, social structure of rural area, market and environment support [Borniakov 2011]. The review of regulation methods is presented on Figure 1.

The government increases profit of agricultural manufacturer without impact on prices of products that is direct support.

Indirect support provides regulation of internal prices of products, loans at preferential rates, share of imported products in import and export and customs duties.

Government support of investments (according to the report of Ministry of Agriculture) is performed by subsidizing of interest rates of loans in such priority areas as vegetable growing, flour-milling and baking industry, vine growing etc. Investment support helps renew production facilities and establish new ones. Consequently, it may be concluded that government support of agricultural holdings is highly important for the whole population of the country.

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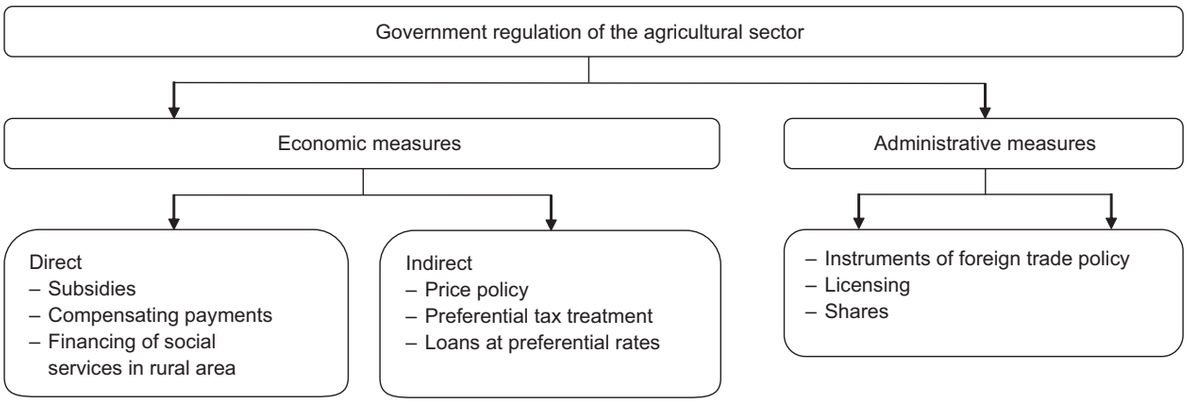

Fig. 1. Measures of government regulation of the agricultural sector
Source: Own elaboration.

However, the investigation [Webb and Block 2010] provides reverse point of view. Developed countries such as the USA, Canada and Germany have excellent support of agriculture but in order to get high profit, agriculture is focused on production of cheap products such as corn syrup instead of fruits etc. It influences health of final customer negatively.

The aim of the research: to estimate the current status of government support by investment subsidies in agriculture and estimate efficiency of these subsidies in different regions of the Russian Federation.

The objectives of the research are:

1. Analysis of the current condition of government support of agriculture.
2. Making cluster analysis by grouping all regions of the Russian Federation depending on efficiency of government support investments.
3. Analysis of control procedures for government support.

MATERIAL AND METHODS

The number of investigated regions of the Russian Federation is 85 (79 regions of them are chosen). Initial data was taken from the website Statistics of Russia and the website of Ministry of Agriculture of the Russian Federation. The data set outlines were deleted in order to obtain reliable result during analysis of statistical data. Calculations were done by means of software STATA 13. During cluster analysis all regions of the Russian Federation were divided into 3 clusters depending on efficiency of subsidies utilization. The method, used for clustering, was *K*-means.

K-means cluster analysis and its variant, *k*-medians cluster analysis, are discussed in most cluster analysis books [Makles 2012]. *K*-means and *k*-medians clustering are iterative procedures that partition the data into *k* groups or clusters. The procedure begins with *k* initial group centers. Observations are assigned to the group with the closest center. The mean or median of the observations assigned to each of the groups is computed, and the process is repeated. These steps continue until all observations remain in the same group from the previous iteration.

Lance and Williams [1967] developed a recurrence formula that defines, as special cases, most of the well-known hierarchical clustering methods. From the notation of Everitt et al. [2011], the Lance and Williams recurrence formula is as follows:

$$d_{k(i,j)} = \alpha_i d_{ki} + \alpha_j d_{ki} + \beta d_{ij} + \gamma \left| d_{ki} - d_{ki} \right|$$

where: d_{ij} – the distance (or dissimilarity) between cluster i and cluster j;

$d_{k(ij)}$ – the distance (or dissimilarity) between cluster k and the new cluster formed by joining clusters i and j;

α_i, α_j and β and γ – parameters that are set based on the particular hierarchical cluster-analysis method.

Government support conditions

To estimate conditions of government support of agriculture it is necessary to compare Russia with other countries by means of a comparison analysis providing clear vision on this matter.

Table 1 presents comparison of key factors identifying current condition of agriculture in Poland and in the Russian Federation. Percentage of agricultural land in total country square in Poland is 69.75% from the total area of the country. In Russia, it is only 11.17%. Cow population in Russia is 3.3 times more than in Poland. Grain crop is 5.13 times more in Russia, too. Nevertheless, intensity of agriculture in Poland is much higher than in Russia, for instance, crop capacity of grain is twice higher.

This high level result in Poland is expected because of big value of subsidies equal to 76.21 m PLN for 1,000 km^2 of agricultural land versus 6.35 m PLN in Russia. For the reason of low amount of subsidies, agriculture in Russia implements traditional extensive approach demanding less money and providing worse result.

Table 1. Estimation of current condition of agriculture Poland and the Russian Federation in 2014

Definitions	Poland	Russia
Total country square (thous. km^2)	312.68	17 125.19
Square of agricultural land (thous. km^2)	186.83	1 912.86
Agricultural land in total country square (%)	59.75	11.17
Cattle (thous. head)	5 920	19 564
Milk whole fresh cow (thous. t)	12 933	30 791
Cow milk yield (kg)	5 298	4 841
Wheat (thous. t)	11 629	59 711
Wheat yield [dt·ha^{-1}]	49.721	24.976
Total amount of subsidies in the agricultural sector (bn PLN)	14.24	12.15

Source: Own elaboration based on the data from Faostat, Rosstat (www.minrol.gov.pl).

There is the only one program of government support of agriculture in the Russian Federation, i.e. "Government program of agriculture development and regulation of markets of agricultural products, raw materials and food".

The amounts of money appropriated to agriculture per year since 2008 is on Figure 2. It should be taken into account that exchange value of ruble fell down that resulted in inflation growth and partly depreciated provided money.

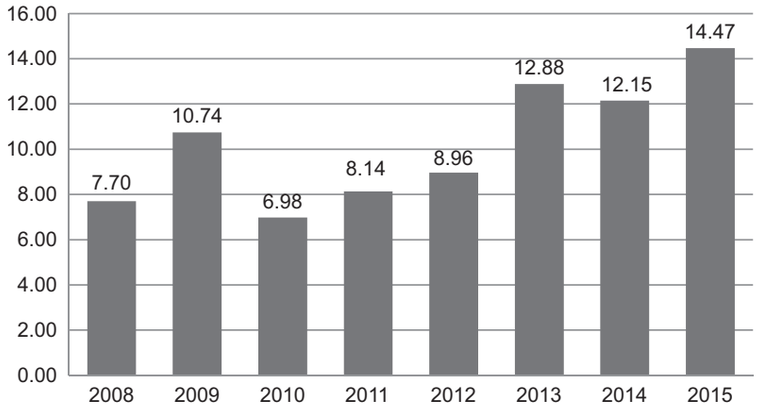

Fig. 2. Subsidy assistance dynamics in agriculture of the Russian Federation in 2008–2015 (1,000 m PLN)

Source: Own elaboration based on Report of Russian Federation Ministry of Agriculture (http://www.mcx.ru/).

As Russian agriculture is extensive, the Government has made a decision to assign about 40% of the support amount to recover rate of investment loans intended for development of material and technical facilities of agriculture. Content of agriculture development program is presented in Table 2. The highest priority for investments obviously belongs to animal breeding.

Table 2. Content of agriculture development program in 2014

Definitions	Total amount of subsidies		Investment interest rate of subsidies	
	(m PLN)	(%)	(m PLN)	(%)
Total	12 147.03	100	4 544.24	100
Plant cultivation development	3 734.64	30.75	1 334.56	29.37
Cattle breeding development	4 654.85	38.32	3 209.45	70.63
Steady development of rural area	1 609.98	13.25	–	–
Land improvement	662.5	5.45	–	–
Technical and technological modernization	526.87	4.34	–	–
Minor business forms support	353.13	2.91	–	–
Regulation of agricultural products and food and raw material markets	102.21	0.84	–	–

Source: Own elaboration based on Report of Russian Federation Ministry of Agriculture (http://www.mcx.ru/).

According to the statements of program of government subsidies for investments any agricultural holding or a private farm is able to take part in the program at one time and get recovery of interest rate of loan intended for development of material and technical facilities. However, number of holdings involved in this program is quite small. According to the Report of Russian Federation Ministry of Agriculture, estimation of investment projects utilization in agriculture is the following: number of agricultural entities 248 569 pcs,

number of existing loan investment projects 8,827 pcs. In this case only 3.55% of entities were involved in the program in 2014.

Low popularity of this program is caused by a complex reason involving filling heaps of documents, low awareness of agricultural holdings managers of opportunity of getting government support, high interest rate on loans provided by banks, high inflation and fluctuation of holdings about future government policy.

Table 3 aggregates banks supporting investment loan program for agricultural holdings in Russia. Banks provide loans to agricultural holdings unwillingly especially investment loans for the reason of high risks, seasonal production and low liquidity of underlying assets.

According the data, common proportion of both Rosselkhozbank (43%) and Sberbank (26%) is about 70% of the total amount of provided subsidies.

Table 3. Investment projects in agriculture in banks in 2014

Name of bank	Number of loan agreements (pcs)	Value of loan agreements (m PLN)
Total	8 827	26 922
Rosselkhozbank	5 223	11 498
Sberbank Rossii	2 595	6 898
Alpha-Bank	77	3 194
Gasprombank	19	404
Vnesheconombank	4	622
Others	909	4 306

Source: Own elaboration based on Report of Russian Federation Ministry of Agriculture (http://www.mcx.ru/).

Investment loans in Rosselkhozbank are provided under the following conditions: projects with interest rate subsidies are considered with higher priority. It is Ministry of Agriculture of the Russian Federation which takes decision to provide subsidies. Loan period is up to 15 years. Investment loan interest rate is 15–19%. The following areas are of high priority: construction, restoration, modernization, perennial plantings and vine land establishment, projects on import-substituting products, projects on agricultural areas' development.

CLUSTER ANALYSIS OF INVESTMENT SUBSIDIES

Estimation of efficiency of subsidies utilization is important part of support of agriculture by means of investment subsidies.

A cluster analysis was used for estimation of efficiency. An effect of provided subsidies was estimated by seven indexes. Regions with different climate and economic conditions and different amount of support were involved into analysis. Total subsidies per 1 ha of agricultural land is the key index for unification as some regions, especially situated to the North, have big actual area but small agricultural land.

The investigation involved 79 regions in 2014. They were divided into 3 clusters by means of the cluster analysis *k*-means and software STATA. The results are aggregated in Table 4.

Table 4. Variables for clusters analysis

Definitions	1 cluster	2 cluster	3 cluster
Total subsidies (PLN·ha^{-1} agricultural land)	30.84	76.04	251.7
Amount of investment subsidies in the total amount of subsidies (%)	51.95	89.46	33.24
Ratio of investment subsidies to agricultural gross value product (%)	1.35	1.88	1.99
Agricultural gross value product (thous. PLN·ha^{-1})	1.09	2.72	3.77
Gross regional product per inhabitant (thous. PLN)	15.06	16.07	30.25
Share of arable lands in total amount of agricultural lands (%)	56.08	65.04	59.07
Rural population share in the total population (%)	32.65	34.95	22.39

Source: Own study.

Table 5. Additional variables of regions divided into clusters

Definitions	1 cluster	2 cluster	3 cluster
Wheat yield (dt·ha^{-1} of harvested acreage)	19.6	27.38	25.78
Milk yield (kg·cattle unit^{-1})	3 962.73	4 555.24	5 042.05
Mineral fertilizer amount (equivalent to 100% of plant-food basis) (kg·ha^{-1} crop of agricultural plants)	25.7	54.09	43.87
Organic manuring (t·ha^{-1} of agricultural plants)	0.79	1.61	3.31
Profit margin of plant cultivation products (with subsidies from state budget) (%)	9.72	12.35	1.73
Profit margin of cattle breeding products (with subsidies from state budget) (%)	10.29	14.05	4.4
Feeds consumption (dt feed units·cattle unit^{-1})	28.38	31.86	26.85
Monthly salary (PLN)	1 585.08	1 650.01	2 347.67
Profit margin of agricultural organizations without subsidies from state budget (%)	0.4	–6.45	–1.94
Profit margin of agricultural organizations with subsidies from state budget (%)	13.89	8.3	15.89
Ratio of arable land in total square region (%)	27.07	26.4	14.2

Source: Own study.

The regions were additionally estimated by some factors indicating intensity of agriculture that is wheat crop, milk yield, mineral fertilizer amount per 1 ha etc. and some financial factors (Profit margin with and without subsidies, monthly salary). The results are aggregated in Table 5.

The regions are divided into groups by amount of investments and intensity of its output. The cluster 1 is characterized by the smallest subsidies per 1 ha of agricultural land equal to 30.84 PLN and ratio of investment subsidies to agricultural gross value product equal to 1.35 %. The cluster 2 has 76.04 PLN of subsidies and ratio of investment 1.88%. The cluster 3 has 251.70 PLN of subsidies and ratio of investment 1.99%.

Ratio of investment subsidies to agricultural gross value product (%) indicates value of output (manufacturing of agricultural products) from investment support in monetary equivalent.

Additional indexes show the lowest amount of government support in the regions from the cluster 1 but at the same time only these regions have positive profit margin 0.4% without subsidies and 18.89% including subsidies. The cluster 3 having the biggest amount of government support has the highest profit margin 18.89%. However, estimations of physical indexes (wheat crop and mineral fertilizer amount) and earning power of holdings in terms of particular areas such as plant breeding and animal breeding point out that holdings from the cluster 2 are obviously leaders. It might be result of investments in particularly plant breeding and animal breeding as the amount of subsidies is the biggest one in this cluster.

Fig. 3. Localization of clusters in Russian Federation

Source: Own elaboration.

Clustering of regions is presented on the map of the Russian Federation (Fig. 3). Location of the regions on the map does not provide sufficient evidences to define the reasons of assignment of subsidies and efficient/inefficient utilization of investments. It is suggested that the assignment of subsidies has not only economic character but political as well.

CONTROL OF SUBSIDIES

Both distribution of government support and efficiency of its intended use should be controlled.

Methods and techniques of control are as following [Kontsevaya 2016]:

1. Preliminary control provides reasonable and legal presentation of facts belonging to operational activity of a holding.
2. Current control provides complete and valid presentation of operations. Current control is intended to avoid illegal operations in the holding's activity.
3. Follow-up control proves validity of presented facts. This control may be fulfilled by both internal departments of the holding and audit services of Ministry of Agriculture.

The methods and techniques such as check of documents, control of reasonable, legal and complete order of getting financial facilities, control of intended utilization of financial facilities, monitoring of financial and

business operations, check of reasonable and intended fulfillment of these operations, recalculation for checking mathematical accuracy, monitoring and inspection of business operations may be used to carry out preliminary, current and follow-up control. These control procedures may be fulfilled by both government services and internal departments of agricultural holdings.

CONCLUSIONS

1. Government support of agriculture in the Russian Federation is carried out in accordance with the document "Government program of agriculture development and regulation of markets of agricultural products, raw materials and food for 2013–2020". It defines the total amount of financial government support of agriculture. According to this program an annual amount of financial support is 14 bn PLN. This program has the following objectives: steady development of farm lands (drinking water and gas supply, provision of housing), soil fertility support, development of high priority segments of industry, and cattle breeding first of all, extension of cultivated area occupied with basic seeds, increasing of financial stability of agricultural organizations providing loans and recovering part of production costs, decreasing of risks by increasing insured cultivated areas, smoothing variance of prices and implementation of customs tariff regulation for imported products.
2. Interest rate recovery in case of investment loans is 40% of total amount of government support. Rosselkhozbank and Sberbank are the main lending entities. In 2014, only 3.55% business entities was involved into investment loan program. Investment loan interest rate was 15–19%.
3. According to results of cluster analysis, all Regions of the Russian Federation have been divided into 3 groups depending on government support amount and the results of its implementation. The first group involves regions with the smallest subsidies of 30 PLN per 1 ha of agricultural lands. These regions have also the smallest gross product of 1.09 thous. PLN per 1 ha. The amount of subsidies of the second group of regions is 76 PLN per 1 ha and gross product is 2.72 thous. PLN per 1 ha. The third group of regions has subsidies of 251 PLN per 1 ha of agricultural lands and gross product in this group is 3.72 thous. PLN per 1 ha. Crop capacity of wheat, milk yield and average monthly salary is also proportionally distributed. No matter of subsidies, profitability of companies is the smallest in the second group. Subsidies obviously increase profitability of companies that is proved by the third group of regions. Here subsidies increased the profit margin result from –1.94 to 15.89%.
4. The biggest output of investment subsidies is observed in the holdings belonging to the cluster 2.
5. Audit commissions and monitoring institutions of Ministry of Agriculture should control planned use of subsidies. Method of control is expected to include the following: preliminary control to provide soundness of a loan and legal validity of getting government support, current control to provide completeness of facilities and their proposed use; final control to check efficiency of facilities' utilization.

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ANALIZA I KONTROLA RZĄDOWYCH SUBWENCJI INWESTYCJNYCH W ROLNICTWIE W FEDERACJI ROSYJSKIEJ

STRESZCZENIE

Dotacje są ważną częścią rozwoju rolnictwa w Rosji. Zdecydowana większość gospodarstw rolnych ma ujemną marżę zysku bez wsparcia rządu. Porównując kwotę wsparcia rządowego w Polsce i Rosji, wynosiła ona 76,21 mln PLN na 1000 km^2 gruntów rolnych w Polsce wobec 6,35 mln PLN w Rosji w 2014 r. Taka sytuacja prowadzi do niskiej produktywności rolnictwa w Rosji. W związku z tym, że rosyjskie rolnictwo jest ekstensywne, rząd podjął decyzję, aby przyznać około 40% kwoty wsparcia na pokrycie kredytu inwestycyjnego przeznaczonego na rozwój materialnych i technicznych urządzeń rolniczych. Program ten nie jest popularny i obejmuje 3,55% ogółu gospodarstw rolnych. W celu oszacowania efektywności wykorzystania subsydiów przeprowadzono analizę skupień metodą *k*-średnich. Wyodrębniono trzy skupienia, w zależności od efektywności wykorzystania dotacji. Zalecane są procedury kontrolne w celu efektywnego wykorzystania wsparcia rządowego.

Słowa kluczowe: rolnictwo rosyjskie, wsparcie rządowe, efektywność wsparcia rolnictwa, analiza klastrów

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ORIGINAL PAPER

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THE IMPACT OF OFFSHORING ON THE EUROPEAN LABOUR MARKET

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ABSTRACT

This study shows the differences in wages of workers from the EU countries according to various levels of education. It also shows the level of offshoring in the analysed countries and its impact on the salaries. It was found that the largest wage gap between the high-skilled and the low-skilled workers exists both in the countries of Central and Eastern Europe and in the countries such as Germany and Portugal. Results of the analysis show that offshoring contributes to a decrease in wages of workers in the countries of the European Union. Nonetheless, the highest decrease in wages is visible among workers with the lowest skills, and the lowest decrease can be seen among workers with the highest skills.

Key words: offshoring, labour market, labour productivity

INTRODUCTION

Progressive globalisation of the economy enforces more and more intense competition. Many companies, particularly transnational corporations, improve their efficiency, among other things, by moving their production processes and services abroad, that is, *offshoring*. These operations undoubtedly are very beneficial for the business. They help in reducing costs (especially the cost of workforce), resource acquisition, market penetration, enhancing innovation and, as a result, a faster development. Also, the countries, to which transnational corporations move their production processes and services become beneficiaries of the *offshoring* process. Nonetheless, there is a belief that the countries, from where production processes and services are moved, incur losses. Of course, it is not as obvious as it appears. The *offshoring* may be a threat for these countries, but it can also bring positive effects. It allows the companies from these countries to reduce costs and improve product quality, increasing their competitiveness, which has a positive effect on the entire economy of the investing country. It helps the investing countries in the transition to economic activities offering higher productivity and higher value added. A significant threat to these countries may be the negative impact of *offshoring* on their labour market. Moving some production processes and services abroad may result in a reduction in the number of jobs and a reduced workers' compensation. Upon carrying out an analysis of the phenomenon of *offshoring* in the perspective of value-added chain, we can see that the nodes linked with the concept and concept implementation, which are most profitable and remunerative, remain in the country of origin. The production processes, which are much less profitable, are moved abroad and the product brand, whereas most sales activities and services, from which the companies draw most profits, remain in the country of origin. We can see the changes in the labour market in the countries, from where the companies move some nodes of their value-added chain abroad, from this point of view.

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The aim of this study is to show the impact of *offshoring* on the labour market of the selected countries of the European Union and, in particular, on wages of different groups of workers.

OFFSHORING IN THE SELECTED ECONOMIC THEORIES

The latest trend in the process of international expansion of companies operating on the international markets, and, above all, the TNCs, is moving the production processes and services abroad, the so-called *offshoring* [Kraciuk 2014]. The growing popularity of *offshoring* in the modern economy is driven by technological and economic transformations mainly related to the processes of globalisation and development of the knowledge-based economy. The progressive globalisation of the world economy also contributes to growth of the international trade, increased capital and workforce movements. In the neoclassical theory of international trade, the flows of factors of production are a substitute for trade, since the work or the capital is "exported" or "imported" within the goods being traded. Relocation of the production processes associated with the international capital movements allows for its more effective use. This is due to the fact that the capital invested in developing countries, which are relatively rich in workforce, is expected to be more productive than the one invested in the developed countries [Moszyński 2007]. The neoclassical Heckscher-Ohlin model allows drawing a conclusion that work and capital movements are conducive to reducing differences in the productivity of factors between the countries. In practice, absolute levels of wages do not tend to reduce. One of the important reasons for maintaining the higher wages in the developed countries is seen in technological advantages [Deardorff 2004].

The concept of value-added chain developed and formulated by Porter also refers to *offshoring*. It consists in describing the company business as a chain of operations set in chronological order. In terms of concept of value-added chain, building competitive advantage consists in improving the efficiency of the company value chain through strengthening its individual nodes or links between these nodes [Strategor 1995]. The concept of *offshoring* is closely related to the analysis and management of enterprise value chain. It requires that key competences are distinguished and the operations, which can be carried out more efficiently by a subsidiary established abroad or a foreign partner, are separated. Configuration and coordination activities aimed at creating added value and competitive advantage play here an important role [Oczkowska 2012].

Conventional *offshoring* processes, like other issues related to expansion of foreign companies, were analysed with the tools used by the so-called OLI (ownership – location – internalization) paradigm, provided by the Theory of International Production. However, due to changes in the global environment, in recent years the usefulness of tools provided by the OLI paradigm to analyse new and more specialised international business practices of companies, including outsourcing and *offshoring*, has become significantly lower. New concept of analysis of the associated processes of outsourcing and *offshoring*, called the DLE (disintegration – D, location – L, externalization – E paradigm) [Zorska 2012], turned out to be a more effective direction. The DLE concept includes two separate parts and, in this respect, differs from the OLI paradigm. The first one is the analysis of conditions and changes in the global environment and in the companies competing in the global market. The second part concerns determining the sources of competitive advantages and benefits gained by the companies meeting the conditions (DLE) to engage in various forms of outsourcing and *offshoring*. The task of the first analysis is to determine what are the external and internal factors, which have an impact on the conditions and their changes with regard to outsourcing and *offshoring* carried out by the companies involved in international business and how they operate. The analysis should consider the following [Zorska 2012]:

- conditions related to the economic globalisation process;
- changes to the global markets of production factors, in particular, the liberalisation of access to the markets of goods and factors in the countries conducting economic transition;
- changes in factors influencing the internalisation of operations carried out in the companies;

- adjustments of strategies and structures, which affect the disintegration of value-added chains of the companies and the externalisation of the value-generating activities;

The second part of the method of analysis proposed by Kedia and Mukherjee concerns the three DLE criteria, which justify the use of outsourcing and *offshoring* for the separated operations by the company. These conditions include [Kedia and Mukherjee 2009]:

- business disintegration advantages related to increased modularity of the company value chain – the D condition;
- advantages related to locating part of the business in other country providing values desirable for the business carried out (location advantages) – the L condition;
- achievable benefits from externalising the selected operations from own organisation (externalization advantages) – the E condition compared to the benefits of internalising these operations.

OFFSHORING AND THE LABOUR MARKET

The globalisation processes taking place in the world economy are forcing companies to conduct various activities aimed at improving their competitiveness. These include, inter alia, fragmentation of production, the main driver of which are changes in the level of business operating costs, including the labour costs. Companies often choose to order externally (to third parties) the tasks from one or more nodes in the value-added chain (outsourcing), and now, more and more often the orders, production or services are transferred outside the borders of the country (*offshoring*) [Maniak 2008]. Nature of delocalisation of production has changed over time. Originally, it involved the product development cycle; after reaching the peak phase, the production of some goods was transferred abroad. In this way, the production in the declining and less profitable sectors moved from the more developed countries to less developed states. In this context, the concept of delocalisation may be associated with deindustrialisation, because in many countries relocation of workplaces abroad is accompanied by a decline in the share of industry in GDP and employment. In recent years, the production is transferred not only to developing countries, but also to other countries offering lower cost. Currently, due to the growing importance of economies of scale and greater location flexibility in business operations, the operations of companies are based on building international networks, which integrate the production processes of companies located in different countries. In this new approach, relocation of production is less and less a unilateral flow from more developed countries to less developed ones, but more and more often it is based on bilateral flows between developed countries [Maniak 2008]. According to the data collected by the European Restructuring Monitor (ERM) in the years 2003–2013, about half of the jobs *offshored* from the EU countries remained in the European Union. One-third went to the new Member States and another 13% found a new location in the countries of the former EU-15 [Hurley et al. 2013]. Intensity of the *offshoring* decreased visibly after 2008, meaning that its effect on the destruction of jobs in Western Europe also alleviated. However, in addition to the *offshoring*, an opposite phenomenon has appeared, which has drawn an interest for some time, namely the so-called *reshoring*. *Reshoring* is mentioned most often in the context of American enterprises, which many years ago transferred their production to East Asia, and now decide to resume production in the United States. In the European Union, *reshoring* is present mainly in the German and Italian companies, which has an indirect impact also on the Polish economy. In 2012, the Fiat Group decided to move production of Fiat Panda from a factory in Tychy to Italy, which resulted in an outflow of 1,400 jobs from Poland. Another example of *reshoring* was the decision of Volkswagen made in 2007 to close a factory in Belgium, which resulted in more than 3,000 people losing their jobs and transfer most production to Wolfsburg in Germany. The identified causes of reshoring include, inter alia, higher production costs abroad than the initially expected ones, problems with product quality, problems in supply chain management and the closing cost gap between developed and developing countries. A factor, which improved the competitiveness of the American

industry, was embarking on shale gas production, which resulted in a significant fall in prices of energy in the United States [Lewandowski and Magda 2014].

In theory, a conflict between the benefits of moving the selected stages of production abroad in the form of *offshoring* (mainly related to an increase in productivity and reduction of costs) and the costs mainly related to deteriorated situation of the employees in local labour markets (loss of jobs, lower wages) is possible. However, the net impact of outsourcing activities on the local labour markets is often described as ambiguous and depends on the interaction between the different constituent effects [Parteka and Wolszczak-Derlacz 2014].

SOURCE DATA AND TEST METHODS

In the study, the information on wages of workers by different education level, *offshoring*, labour productivity and unemployment in 26 countries of the European Union in 2014. Their choice was dictated by the availability of statistical data was used. These values are based on the data provided by Eurostat, the World Input-Output Database and the Pordata database. Figure 1 shows the average monthly wage of workers in the countries of the European Union by their level of education. It is clear that in the analysed group of countries of the European Union a significant wage differences exist. The lowest rates for both low-skilled and high-skilled workers exist in the countries of Central and Eastern Europe, and the highest ones exist in the countries of Western Europe, and, most of all, especially in the Scandinavian countries. The largest wage gap between the high-skilled and the low-skilled workers exists in the countries of Central and Eastern Europe and in the countries such as Germany and Portugal (Fig. 1).

Direct product consumption rates show the value of products (goods and services) consumed directly by the analysed sector (branch) in relation to production of global unit production value. This rate can also be interpreted as direct *offshoring* rate. These coefficients were calculated according to the following formula:

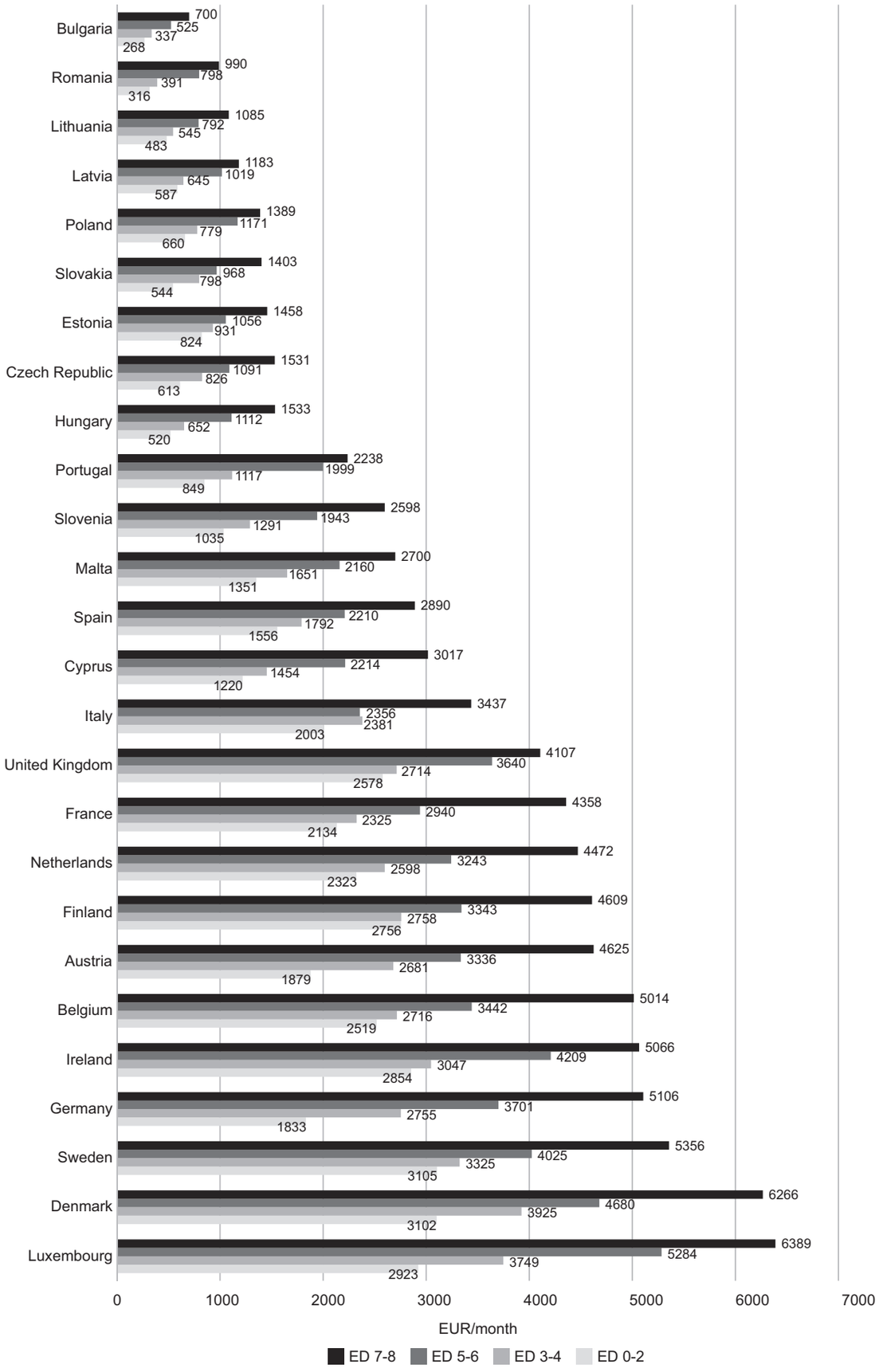
$$a_{ij} = \frac{x_{ij}}{X_j}$$

where: x_{ij} – flows of products manufactured in the country in the sector (branch) i and consumed by sector (branch) i expressed in base prices;
X_j – global production of sector (branch) j.

The *offshoring* activity is most intense in countries such as Luxembourg, Malta and Ireland. Nonetheless, the outsourcing of production stages abroad is much less intense in the large countries of the former EU-15, such us: Italy, Spain, United Kingdom, France (Fig. 2).

The research conducted using the method of multidimensional regression took into account labour productivity index and unemployment rate in individual EU countries. In 2014, Luxembourg, Belgium and Ireland were characterised by the highest labour productivity index. Other countries of Western Europe were also characterised by a high level of this index. Significantly lower labour productivity could be seen in the countries of Central and Eastern Europe. The highest unemployment rate was noted in the countries of the South Europe (Fig. 3).

The multiple regression model calculated using the least squares estimation was used to determine the impact of *offshoring* on the labour market of the selected countries of the European Union, in the form: $\ln Y = a_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4$, where: $Y_{(ED0\text{-}2,\ ED3\text{-}4,\ ED5\text{-}6,\ ED7\text{-}8)}$ represents level of monthly wages of employees



ED 0-2 – lower than primary, primary, ED 3-4 – secondary or post-secondary, ED 5-6 higher education of first degree (bachelor, engineering), ED 7-8 master's, doctoral.

Fig. 1. Average monthly wage levels by different levels of education in the EU Member States in 2014

Source: Own elaboration based on http://ec.europa.eu/eurostat/web/labour-market/earnings/database.

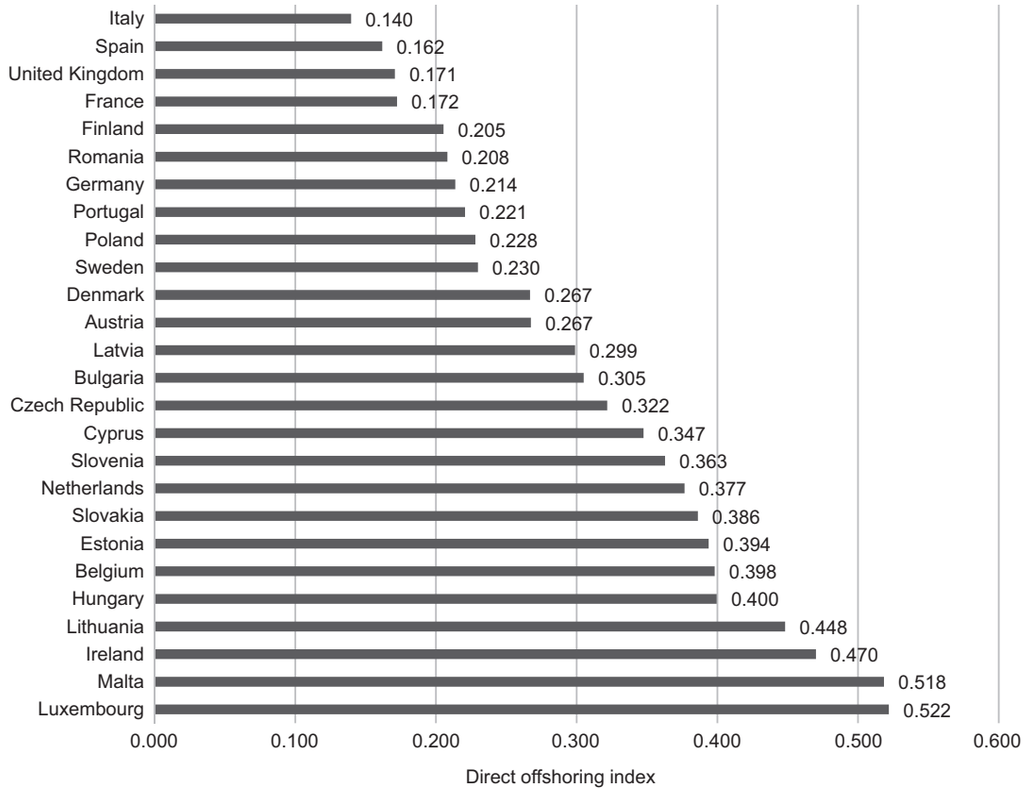


Fig. 2. Direct *offshoring* in the EU countries in 2014

Source: Own elaboration based on the data from http://www.wiod.org/database/sut_input16.

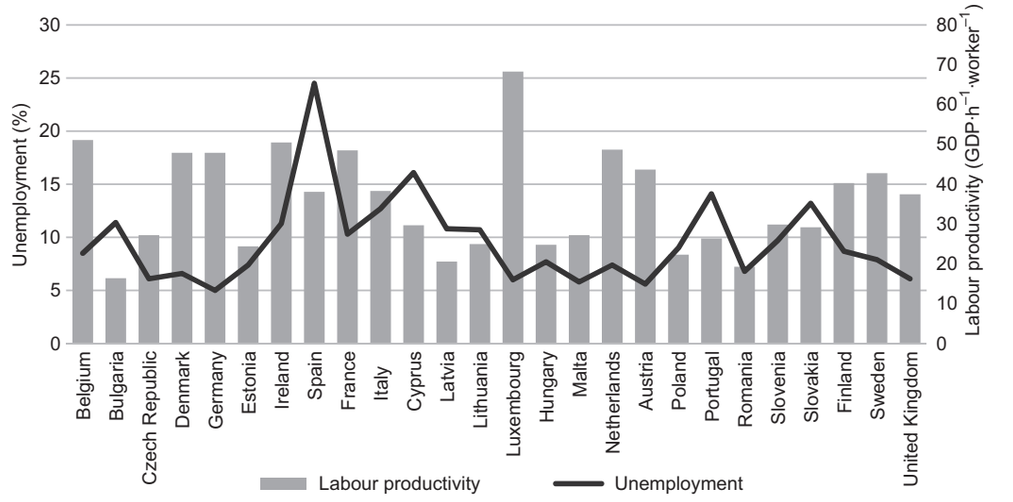


Fig. 3. Labour productivity and unemployment in the EU countries in 2014

Source: Own elaboration based on the data from http://www.pordata.pt/en/DB/ Search+Environment/New+Search, http://ec.europa.eu/eurostat/web/labour-market/earnings/database.

for different levels of education[1], X_1, X_2, X_3, X_4 represent: direct *offshoring* rate, labour productivity index and unemployment rate respectively, and β_1, β_3, β_4 represent structural parameters of the model estimated using the method of the least squares.

With the regression model, the expected change of the dependent variable due to the volatility of the explanatory variable by one unit, with other independent, explanatory variables (constant, *ceteris paribus*) is determined. The regression model is a model of relations between parameters, so independent variables do not always have to be a linear function of the original values. It is possible to indicate non-linear functions of explanatory variables, inter alia, notated in the logarithmic, exponential form. If the dependent variable and dependent variable are converted to a logarithm, volatility of the dependent variable is expressed in terms of elasticity and shows a percentage change of dependent variable, if the explanatory variable changes by 1%.

$$\ln Y_{\text{ED 0–2}} = -0.3608 - 0.3104 \ln X_1 + 2.0455 \ln X_2 - 0.0502 \ln X_3 \qquad R^2 = 0.90 \tag{1}$$
p-value (0.632) (0.079) (0.000) (0.377)

$$\ln Y_{\text{ED 3–4}} = 0.2012 - 0.3089 \ln X_1 + 1.9797 \ln X_2 + 0.1189 \ln X_3 \qquad R^2 = 0.92 \tag{2}$$
p-value (0.735) (0.030) (0.000) (0.766)

$$\ln Y_{\text{ED 5–6}} = 1.6773 - 0.2876 \ln X_1 + 1.6856 \ln X_2 - 0.1699 \ln X_3 \qquad R^2 = 0.90 \tag{3}$$
p-value (0.012) (0.050) (0.000) (0.229)

$$\ln Y_{\text{ED 7–8}} = 1.7340 - 0.2429 \ln X_1 + 1.7693 \ln X_2 - 0.1741 \ln X_3 \qquad R^2 = 0.94 \tag{4}$$
p-value (0.001) (0.029) (0.000) (0.105)

Based on the above regression equations, we can determine a percentage change in average wages of workers with different education level in the countries of the European Union, if direct *offshoring* rate changes by 1%. Moving some parts of production or services abroad causes a reduction of wages of all workers in the EU countries. The decline in wages, however, is decreasing with the increase in staff education. The biggest decline in wages could be seen among workers with lower than primary and primary education. According to equation (1), an increase of *offshoring* rate by 1% results in a decrease in wages by 0.36%. For the employees with the highest education degrees (master's, doctoral), an increase of *offshoring* rate by 1% results in a decrease in wages by 0.24% [equation (4)].

CONCLUSIONS

The progressive economy globalisation process is forcing companies to conduct various activities aimed at improving their competitiveness. These activities include: defragmentation and delocalisation of production, that is, *offshoring*. The process of *offshoring* has an impact on the labour market of the country, from which some production and service processes are moved abroad. This leads to a decrease in the share of industry in GDP and in employment, and, as a consequence, a decrease in wages. It can be concluded that the low-skilled and medium-skilled workers are more exposed to negative consequences of the intensification of international outsourcing processes. Decline in the wages of these workers, as a consequence of the *offshoring*, is visibly much significant than in the wages of the high-skilled workers.

[1] ED 0-2 – lower than primary, primary, ED 3-4 – secondary or post-secondary, ED 5-6 higher education of first degree (bachelor, engineering), ED 7-8 master's, doctoral.

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WPŁYW OFFSHORINGU NA EUROPEJSKI RYNEK PRACY

STRESZCZENIE

W niniejszym opracowaniu przedstawiono zróżnicowanie płac pracowników przy różnym poziomie wykształcenia w krajach Unii Europejskiej. Scharakteryzowano także poziom offshoringu w analizowanych krajach oraz jego wpływ na wysokość płac. Stwierdzono, że największa luka płacowa pomiędzy pracownikami bardzo dobrze i słabo wykwalifikowanymi występuje w krajach Europy Środkowo-Wschodniej, ale również w Niemczech i Portugalii. Wyniki analizy wskazują, że offshoring przyczynia się do obniżki płac pracowników w krajach Unii Europejskiej. Obniżka płac jest jednak największa w przypadku pracowników najsłabiej wykształconych, najniższa zaś w przypadku pracowników najlepiej wykształconych.

Słowa kluczowe: *offshoring*, rynek pracy, produktywność pracy

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APPLICATION OF THE MALMQUIST PRODUCTIVITY INDEX TO EXAMINE CHANGES IN THE EFFICIENCY OF HUMANITIES FACULTIES

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ABSTRACT

The aim of this study was to determine changes in efficiency of humanities faculties using the Malmquist Productivity Index (MPI). The analysis included 14 university organisational units supervised by the Minister of Science and Higher Education, for which relevant data were available. In the period from 2008/2009 to 2014/2015, the average Malmquist index value was 28%, indicative of increased faculty productivity. Changes in technology growth did not affect the index figure, as their average in the analysed period was around 1. Changes in technical efficiency, which amounted to 34% per year on average, were the main factor driving increased productivity of faculties.

Key words: higher education, efficiency, Malmquist productivity index

INTRODUCTION

The public higher education sector in Poland is facing important challenges. One of them is the steadily decreasing level of financing, and another – the shrinking student population [Świtłyk and Wilczyński 2015]. As forecast by the Ministry of Science and Higher Education, continued demographic decline will cause the number of students to decrease to around 1.25 million in 2023–2025 [*Szkolnictwo wyższe w Polsce* 2013]. Both challenges will force universities to undergo organisational changes. Many of them will be compelled to terminate or suspend study programmes. This results not just from legal provisions that set out minimum enrolments in higher education institutions and the number of students in teaching groups, but also from pure financial calculations [Pietrzak 2016]. Moreover, the importance of measuring the efficiency of universities and their faculties will continue to grow.

Attempts to measure this efficiency raise doubts. This is mainly the result of the specific character of higher education, and especially the fact that academic activities revolve mostly around non-material values and are undertaken by various groups of stakeholders with different opinions on the purpose and role of universities. Finally, the "knowledge manufacturing" process and especially its effects are not easy to measure.

It should be added that studies on application of the Malmquist index to analysing the changes of university efficiency are rare in Polish scientific literature. Research on this topic has been conducted by, among others, Ćwiąkała-Małys [2010], Świtłyk and Wilczyński [2015], and Pietrzak [2016]. The reluctance of researchers to tackle this issue is the result of, among others, the lack of comparable data (both quantitative and qualitative). Statistics concerning the results of universities and their faculties in teaching, scientific or implementation

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activities are difficult to obtain. Collecting them often requires getting directly in touch with those in charge of academic units and, in many cases, browsing through statistical data available only in hardcopy.

The aim of the studies was to define the changes in efficiency of humanities faculties from 2008/2009 to 2014/2015. The studies covered faculties of universities supervised by the Minister of Science and Higher Education, for which suitable data from the academic years 2008/2009, 2011/2012 and 2014/2015 was available. In the studies, the authors planned to verify the following research hypotheses:

- H1: From 2008 to 2015, the productivity of humanities faculties has increased.
- H2: Changes in technical efficiency (EFCH) were the main factor driving increased productivity of humanities faculties between 2008 and 2015.

LITERATURE REVIEW

Public universities undergo transformation because of problems with financing, competition from alternative educational institutions, the mass character of higher education, or bureaucratisation [Sułkowski 2016] "No longer scientific and cultural-making institutions (...) [they] are clearly turning into enterprising or even »industrial« universities. Traditional academic values are displaced by market rules" [Czerepaniak-Walczak 2013]. Hence, a university's activities are increasingly being described in business terminology. Notions such as "production of knowledge", "supply of educational services", "educational services market" or indeed "efficiency of higher education processes" are widespread. It is the last of these that the authors decided to focus their research attention on.

Defining the efficiency of higher education institutions and efficiency in general is a non-trivial task. As stressed by Kozuń-Cieślak [2013a], there is a broad range within which this notion may be understood and interpreted. Even though efficiency is commonly used by economists, financial analysts, engineers, managers and politicians, its semantic value is unclear [Kozuń-Cieślak 2013b]. A good reference point for solving definition problems is praxeology [Kulawik 2010]. According to commonly accepted ideas in this field, efficiency has both a narrow and a broad meaning. In the broad meaning, efficiency consists of effectiveness, profitability and economy (productivity). On the other hand, efficiency is more narrowly equated with economy (productivity)[1], understood as the ratio of achieved effects (outputs) to sustained expenditures (inputs) [Kulawik 2010]. This narrow meaning of efficiency was also used by Penc [1997], Jóźwiak [1998], or Bórawski and Pawlewicz [2006]. Therefore, speaking about the efficiency of universities the authors have in mind the relationship between effects achieved by these institutions as regards their teaching, scientific and enterprising activities[2] and the material, financial and especially human expenditures they have sustained. It should be noted that in this definition the authors paid tribute to neoclassical economy and its assumption that enterprises (and consequently universities) are "black boxes". As stressed by Szuwarzyński, "as a result of the complexity of their processes, universities must be viewed as multi-input and multi-output units". In many cases, these inputs and outputs are not measurable, nor is using economic criteria in the decision process always possible [Szuwarzyński 2006].

Research on the efficiency of universities has usually been conducted within a single country only. This is because no universal higher education system exists and the features of universities in each country vary [Wolszczak-Derlacz 2013]. So far, the subject of analyses were universities and their faculties in countries, such as: Australia [Mamun and Rahman 2016], China [Hu and Liang 2008], Spain [Agasisti and Pérez-Es-

[1] In this article, the notions of efficiency and productivity will be used interchangeably.

[2] These three kinds of activities are the foundations on which the mission of a third generation (enterprising) university rests.

parrells 2010], Japan [Kaneko 1997], South Africa [Taylor and Harris 2004], Turkey [Bayraktar et al. 2013], the UK [Glass et al. 2006] or Italy [Agasisti and Ricca 2016]. In Poland, measurements of university efficiency have, to the best of the authors' knowledge, originated with Szuwarzyński [2006]. Nevertheless, his study was "strictly illustrative" in nature and its main limitation was the modest range of empirical material available (just one university and its eight faculties). In recent years, increased interest in this topic can be observed in Poland, undoubtedly consequent upon the situation of the higher education sector, its financial standing and efforts to reform this area of public life [Wolszczak-Derlacz 2013]. Articles discussing the issue of measuring the efficiency of academic centres have been written, among others, at the Gdańsk University of Technology, Bialystok University of Technology, West Pomeranian University of Technology in Szczecin, University of Wroclaw, Jagiellonian University, or the Warsaw University of Life Sciences – SGGW. Continued research on the efficiency of universities is of course recommended. In this respect, it pays to operate on as large and varied research samples as possible – so far, only a few studies have been conducted on faculty level [Pietrzak 2016]. It must, however, be stressed that the task is difficult, as already noted in the introduction.

RESEARCH METHOD AND MATERIALS

The majority of previous research concerning the measurement of efficiency of higher education institutions made universities the basic unit for analysis. However, universities are made up of many faculties. This is similar to business organizations where large corporations typically consist of many independent divisions (branches) treated as *strategic business units* (SBU). Therefore, in the opinion of the authors, when measuring the efficiency of universities, the unit for analysis should be a faculty and not the academic organisation as a whole.

Based on this assumption, the study included faculties where humanities are taught. According to the OECD classification, these include, among others, history, archaeology, languages, literature, philosophy, ethics, religion and art [Pietrzak 2016]. Currently, public universities in Poland run almost 120 faculties of this kind, however, comparable data is available only for 14 of them. The necessary statistical information has been derived from the "Rector Reports on University Activities" published in Public Information Bulletins.

The choice of the period from 2008/2009 to 2013/2014 as the study scope was dictated by the availability of data. Prior to 2008/2009, only a few universities published reports citing the number of students, number of publications or number of pursued research topics. On the other hand, when the study commenced, the most current data was from 2014/2015.

In order to determine changes in efficiency of humanities faculties in time, the *Malmquist Productivity Index* (MPI)[3] was used. The index structure is based on comparing the relationships between several inputs and several outputs of the same subject at various points of time [Baran 2014]. The Malmquist Productivity Index for a subject is the product of the Technical Efficiency Change Index[4] (EFCH) and the Technology Growth Change Index[5] (TECH) according to the following formula [Färe et al. 1994].

[3] MPI is the index used most frequently to quantify changes in efficiency [Świtłyk and Wilczyński 2015].

[4] Technical efficiency is defined as the relationship between output obtained with specific inputs to maximum possible outputs which could be obtained with those inputs.

[5] Technology growth is defined as changes in manufacturing technology in the studied period. In case of universities, this will be for example the popularisation of e-learning platforms in teaching activities.

$$M(y_{t+1},\ x_{t+1},\ y_t, x_t) = \underbrace{\frac{D^t(y_{t+1},\ x_{t+1})}{D^t(y_t,\ x_t)}}_{\text{EFCH}^{t+1}} x \left[\underbrace{\frac{D^t(y_{t+1},\ x_{t+1})}{D^{t+1}(y_{t+1},\ x_{t+1})} x \frac{D^t(y_t,\ x_t)}{D^{t+1}(y_t,\ x_t)}}_{\text{TECH}^{t+1}} \right]^{\frac{1}{2}} \quad (1)$$

where: $D^t(y_{t+1},\ x_{t+1})$ – efficiency when using technology of year t for data from year $t + 1$;

$D^t(y_t,\ x_t)$ – the unit's efficiency in period t while using the then available technology and for data from period t;

$D^{t+1}(y_{t+1},\ x_{t+1})$ – the unit's efficiency in period $t + 1$;

$D^{t+1}(y_t,\ x_t)$ – efficiency while using the technology of year $t + 1$ for data from year t.

When the Malmquist Productivity Index value is larger than 1, it is assumed that there was a productivity increase in the period from t to $t + 1$. On the other hand, when the index value is smaller than 1, this means that productivity decreased, while the value of 1 means that efficiency remained unchanged. EFCH and TECH values are similarly interpreted [Coelli et al. 2005].

The Malmquist Productivity Index for subject P has been illustrated in Figure 1 and can be decomposed as follows [Cooper et al. 2007]:

$$EFCH\ (P) = \frac{\frac{BD}{BP_2}}{\frac{AC}{AP_1}}, \qquad TECH = \sqrt{\frac{AC}{AE} \cdot \frac{BF}{BD}}$$

and thus $MPI = \frac{AP_1}{BP_2}\sqrt{\frac{BF}{AC} \cdot \frac{BD}{AE}}$

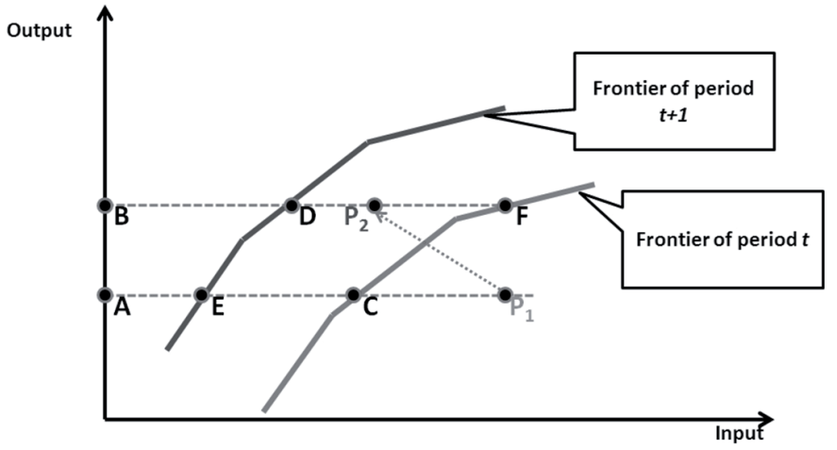

Fig. 1. Illustration of the Malmquist Productivity Index

Source: Cooper et al. [2007].

RESULTS OF RESEARCH

To determine changes of efficiency in time for humanities faculties, the output-oriented MPI was used as strategies of the studied faculties focus more frequently on making academic teachers more active than reducing the headcount. The following diagnostic values have been used in the calculated model:

1) output y_1 – showing how active are the faculties in teaching processes (number of students),
2) output y_2 – showing the academic activity represented by the number of publications of faculty members (number of publications);
3) output y_3 – showing the initiative of faculties in obtaining external funds in the form of grants and research conducted by faculty members using university resources, also called KZL (number of research projects);
4) input x_1 – number of academic teachers.

The selection of variables for the study has been based on substantive criteria, taking into account literature concerning studies on university efficiency (Table 1), as well as their availability.

Table 1. List of selected empirical studies justifying the selection of diagnostic variables

Diagnostic variable		Empirical study
Input x_1	number of academic teachers[a]	• Ćwiąkała-Małys [2010] • Kounetas et al. [2011] • Worthington and Lee [2008]
Output y_1	number of students	• Abbot and Doucouliagos [2003] • Carrington et al. [2005] • Ćwiąkała-Małys [2010]
Output y_2	number of publications	• Johnes and Johnes [1995] • Leitner et al. [2007] • Wolszczak-Derlacz [2015] • Worthington and Lee [2008]
Output y_3	number of research projects	• Agasisti and Johnes [2009] • Worthington and Lee [2008]

[a] The table relies on the number of academic teachers due to the lack of uniform standards in the manner of conferring academic degrees and appointing teachers to professorship. Each country has its own traditions in this respect.

Source: Own study.

First, it has been assumed that the selected output represents three foundations on which an enterprising university's mission rests (of course only to the extent allowed by the limited availability of data). Second, due to the small number of studied subjects (14 faculties), the number of diagnostic variables could not have been too high. Assuming three variables on the output side, the authors were forced to select only one variable on the input side[6]. With this limitation in mind, it was decided that the key input is people, especially academic staff.

The average annual increase of productivity measured using MPI for all faculties in the studied period was 28% (Fig. 2). Therefore, hypothesis 1, that productivity of humanities faculties has increased from 2008 to 2015, has been confirmed.

[6] The total number of inputs and outputs should be three times less than the number of study subjects.

It should be stressed, however, that from 2008/2009 to 2011/2012 the observed MPI level was decidedly higher at 1.53, while in the subsequent three years from 2011/2012 to 2014/2015 it was merely 1.02 (Fig. 2). The decrease of the Malmquist Productivity Index (MPI) level was mainly driven by changes in the technology used. The average annual Technology Growth Change Index (TECH) in the studied period from 2008/2009 to 2014/2015 was around 1, it should be noted however that its level has decreased from 1.15 to 0.84 between the first period and the next (Fig. 2). On the other hand, the average annual index of technical efficiency changes (EFCH) in the studied period was on a similar level and amounted to 34%.

Therefore, hypothesis 2, i.e. changes in technical efficiency (EFCH) being the main factor driving increased productivity of humanities faculties from 2008 to 2015, has also been confirmed.

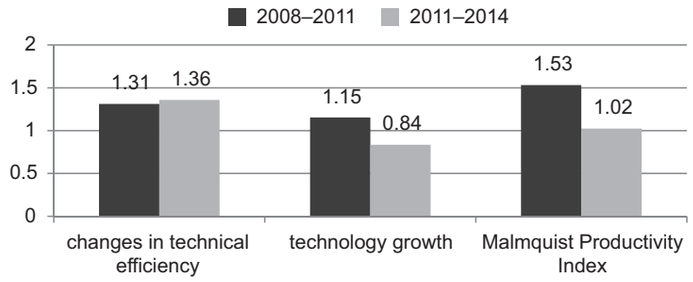

Fig. 2. Malmquist Productivity Index, changes in technical efficiency, technology growth for humanities faculties
Source: Own study.

By analysing the average MPI for particular humanities faculties, it must be considered that 8 out of 14 studied units improved their productivity on an average annual basis. The highest average annual increase of productivity has been noted at the Faculty of Arts of the Silesian University and the Faculty of *Artes Liberales* of the Warsaw University (Fig. 3).

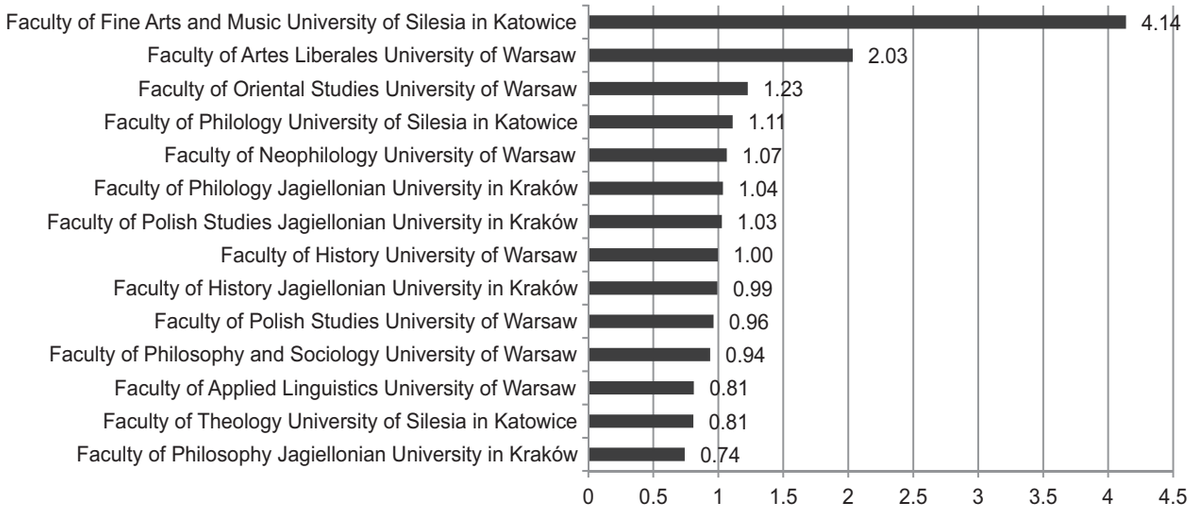

Fig. 3. Average annual value of the Malmquist Productivity Index for specific humanities faculties
Source: Own study.

Considering the Technical Efficiency Change Index (EFCH) of faculties, it was observed that, in the studied period, 8 faculties regularly improved their technical efficiency each year. The highest average annual technical efficiency change indexes have been observed at the Faculty of Arts of the Silesian University (3.46) and the Faculty of Applied Linguistics of the Warsaw University (2.19) – Figure 4. On the other hand, the Faculty of Philosophy and Sociology and the Faculty of History of the Warsaw University had the lowest (below 1) average annual technical efficiency change indexes. The largest average annual increases of the Technical Efficiency Change Index (TECH) have been noted at the Faculty of *Artes Liberales*, Faculty of History and Faculty of Philosophy and Sociology of the Warsaw University (Fig. 5). It can also be assumed that the smallest technology growth occurred at the Faculty of Applied Linguistics of the Warsaw University.

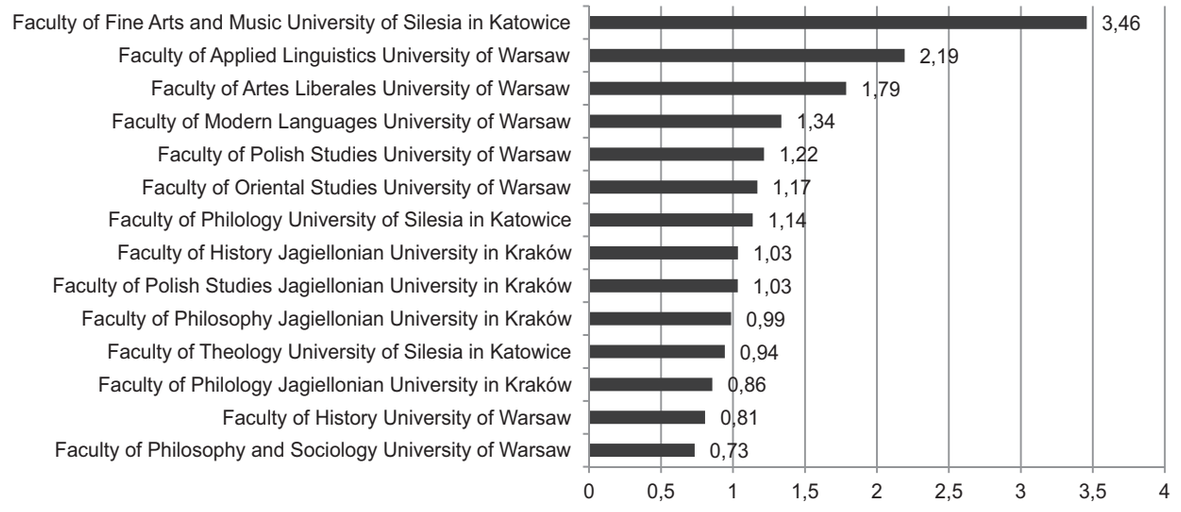

Fig. 4. Average annual change of technical efficiency (EFCH) of specific humanities faculties
Source: Own study.

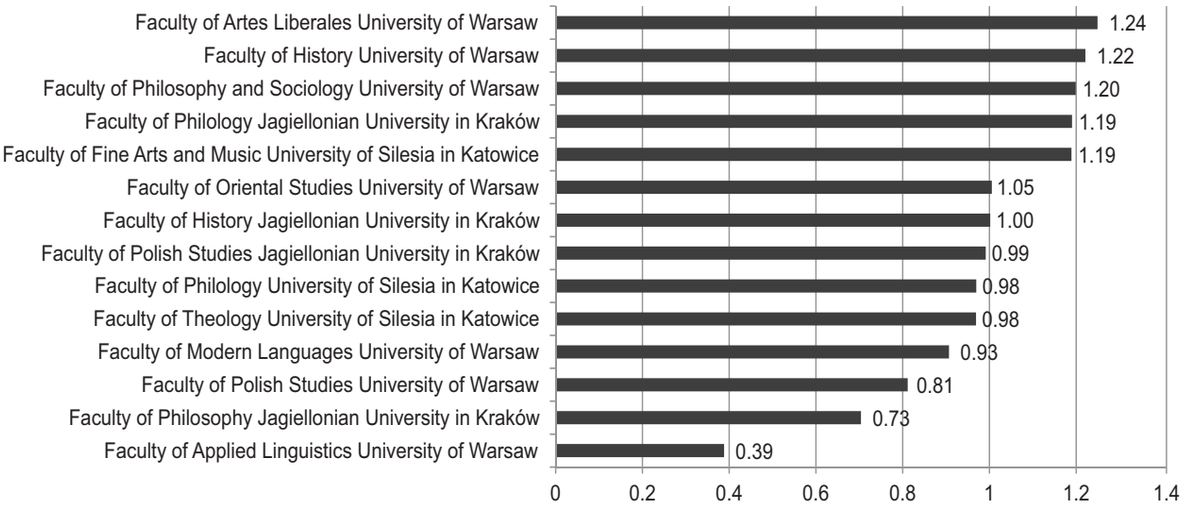

Fig. 5. Average annual change of technology growth (TECH) of studied humanities faculties
Source: Own study.

CONCLUSIONS

Studies on the efficiency of humanities faculties have led to formulating the following conclusions:

1. In the period from 2008/2009 to 2014/2015, the average level of the MPI of the studied faculties was 28%. Changes in technical efficiency, which amounted to 34% per year on average, were the main factor driving increased productivity of faculties.
2. The highest MPI values have been noted at the following faculties: Faculty of Arts of the Silesian University (4.14) and Faculty of *Artes Liberales* of the Warsaw University (2.03).
3. The largest average annual changes of technical efficiency occurred at the Faculty of Arts of the Silesian University (3.46) and the Faculty of Applied Linguistics of the Warsaw University (2.19). In turn, the largest changes of technology growth were discovered at three Warsaw University faculties: *Artes Liberales* (1.24), History (1.22) and Philosophy and Sociology (1.20).

Accordingly, the obtained results allowed to confirm the adopted research hypotheses. The authors are, however, aware that the assumptions made and methods used are full of defects.

One may challenge the adopted assumption that universities (or, more specifically, humanities faculties) should be viewed as "black boxes" whose activity consists of transforming inputs (expenditures) into outputs (effects). It should be added, however, that universities are nowadays expected to make their activities cost-efficient just like enterprises do. Universities are being transformed into enterprising universities, largely for objective reasons (due to problems with financing from public funds or growing competition from alternative education institutions). The set of diagnostic variables used in the study is not without controversy, either. The adopted approach resulted from lack of access to microdata on quality in particular areas of faculty activities, for example the number of students graduating with first class honours, time necessary for graduates to find a job, number of publications in journals on the MJL (Master Journal List). It should be noted, however, that the diagnostic variables used by the authors were widely used in both domestic and foreign studies on measuring the efficiency of higher education institutions.

Another round of criticisms of the achieved study results can be derived from the applied method. The Malmquist Productivity Index is sensitive to uncommon observations as well as changes in the number of inputs/outputs or objects. Similarly, the applied method is not statistical in nature and hence the statistical properties of obtained results, such as statistical errors, cannot be determined. It should therefore be stressed that the quality and credibility of study results depend on the selection, quality and completeness of the empirical material.

Consequently, there is a need to continue studying the efficiency of public universities and their faculties, applying the Malmquist Productivity Index among others. In this respect, it would be worthwhile to operate on large, yet homogeneous research samples. This will allow to use a larger number of variables, both as inputs and outputs, and also to avoid issues resulting from sensitivity to uncommon data.

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ZASTOSOWANIE INDEKSU PRODUKTYWNOŚCI MALMQUISTA DO BADANIA ZMIAN EFEKTYWNOŚCI WYDZIAŁÓW REPREZENTUJĄCYCH NAUKI HUMANISTYCZNE

STRESZCZENIE

Celem podjętych badań było określenie zmian w efektywności wydziałów grupy nauk humanistycznych z zastosowaniem indeksu produktywności Malmquista (MPI). W analizach uwzględniono 14 jednostek organizacyjnych uczelni podległych nadzorowi Ministra Nauki i Szkolnictwa Wyższego, dla których dostępne były odpowiednie dane. W latach 2008/2009 – 2014/2015 przeciętna wartość indeksu Malmquista wynosiła 28%, co wskazuje na poprawę produktywności wydziałów. Zmiany postępu technologicznego nie miały wpływu na wielkość indeksu, ponieważ średnia wartość w analizowanym okresie oscylowała wokół jedności. Głównym czynnikiem wzrostu produktywności wydziałów były zmiany w zakresie efektywności technicznej, które kształtowały się przeciętnie na poziomie 34% rocznie.

Słowa kluczowe: szkolnictwo wyższe, efektywność, indeks produktywności Malmquista

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FARM OWNERS' INTERVENTIONS DURING ECONOMIC CRISIS

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ABSTRACT

This paper covers the issue of the effect of the economic crisis on farms organization. Research was conducted in the south of Poland, of which a certain portion has been presented to demonstrate the interventions undertaken by farm owners in light of the deteriorating economic situation. The research indicates that the choice of strategy for surviving the crisis, which shows in deteriorating management conditions, was determined by the farm type. Nevertheless, the most common decisions were about lowering consumption of current production assets and reducing capital-intensive investments. The spectrum of intervention measures undertaken by respondents in periods of economic crisis was therefore based mainly on temporary yet significant reduction of production costs in order to improve (or safeguard) short-term financial performance of a farm.

Key words: economic crisis, interventions, farms

INTRODUCTION

Free market economy, which is influenced by opposite forces, develops in cycles. The processes of economic life do not usually advance in a consistent, peaceful or stable manner, economic indicators do not grow evenly, and the rates of their changes are periodical [Czech-Rogosz et al. 2009]. Increasing globalization and broader opening to international exchange strengthen the exposure to cyclical market fluctuations that have a significant effect on the activity and condition of the economy as a whole as well as its particular components, including agriculture [Idzik 2007]. Impulses of the general economy, in view of increasing integration of agriculture with the market environment, tend to affect the economic situation of agriculture more and more intensively, and therefore to affect the development conditions of that sector [Grzelak 2013].

At the moment, free market economies usually tend to undertake various attempts at preventing cyclical fluctuations, particularly economic losses (also in the agricultural sector) occurring in the course of downturn in the economy. However, these attempts are usually not capable of effectively driving elimination of negative processes, although they certainly affect the advancement of these processes [Płonka 2015]. State interventionism, particularly undertaken as an anti-crisis measure, mainly leads to decreasing the amplitude of cyclical fluctuations in agriculture and partial mitigation of inconvenience caused by crisis occurrences [Płonka and Musiał 2012].

The downturn which was particularly intensified during 2008–2012 led to multiple changes defining the agricultural sector. With deteriorating stability of agricultural/food markets, decreasing agricultural produce prices, increasing prices of production resources and therefore deteriorating pricing relations in agriculture, have forced agricultural producers to face the difficult task of adapting to new management conditions [Runowski 2009].

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The consequences of economic recession have exerted pressure on interventions to be undertaken not only by the government but mainly by farmers, who decide about the status of their agricultural establishments, their development opportunities, and in frequent cases their chance of survival. Agricultural producers were left to decide about such matters as effective responding, taking strategic decisions, and adapting skillfully to the variations of the overall economic situation. Resolution of the problems which occur with regard to the varying growth rate, emphasized by Marciniak [2002], would usually lead to specific and significant economic losses emerging from continuously decreasing reasonableness behind the management model.

MATERIAL AND METHOD

The background presented above has become the basis for defining the research objective related to recognition and thereafter evaluation of interventions undertaken by farm owners in response to deteriorating economic situation. The scope of research covered the farms located in Małopolskie voivodeship that were active on the market. The paper presented a fragment of the research outcome concerning 50 farms located in two targeted sub-regions of the voivodeship, namely the Wadowice poviat and the Tarnów poviat. These sub-regions are characterized by weather and soil conditions beneficial for farm production, as well as a significant group of relatively large farms in the region, and significant incomes derived from operating a farm by farmer families' budgets. The following criteria were applied in the process of selecting farms for the research: involvement in commercial production and participation in the production resources market; involvement in activities adapted to the local environment, i.e. representing the most commonly applied field system or animal production system, representing diverse directions and intensity of production.

Acquisition of full and adequate source data and selection of the right indicators and measures for proper and reliable representation of variations in global processes is important in analyzing the economic situation. It is common knowledge that tracing the key macroeconomic values is sufficient to determine the actual state of the economy, such as: GDP, unemployment rate, inflation rate, export and import volumes, investment outlays, prices, consumption. However, it seems reasonable to build appropriate synthetic measures which are sensitive to economic fluctuations and composed of sub-factors. Therefore, in order to recognize the history of the economic fluctuations in the agricultural sector during the last few years, one of the economic situation assessment methods for farming has been applied, namely the synthetic indicator developed by the SGH Warsaw School of Economics, Institute of Economic Growth[1]. The data obtained through systematic long-term research illustrate the history of cyclical changes in agriculture; furthermore, certain additional arguments support the use of such data, namely [Adamowicz 2013, Grzelak 2013, Grzelak and Seremak-Bulge 2014]:

- these ratios apply both to the actual business area and to the financial area of operations;
- the events are presented on a dual basis, i.e. for each variable, the assessment of the events is presented (as-is state) along with the anticipated directions of future changes (forecasts);
- the data is considered expert information, as the farmers and their farms are the immediate sources of information;
- the information provided is not registered as quantitative statistics, i.e. the forecasts for the immediate future, opinions about the condition of the sector, operating barriers, investment goals;

[1] Another method applied to determine the economic changes in agriculture in Poland is the method used by the Institute of Agricultural and Food Economics, National Research Institute – Synthetic Indicator of the Business Outlook in Agriculture – SWKR; in addition, there is the method in use by the Central Statistical Office of the Republic of Poland since 2012 (assessment of economic situation at farms). According to Grzelak and Seremek-Bulge [2014], the Synthetic Indicator of the Business Outlook in Agriculture (SWKR) is a reference indicator relating to the Overall Indicator of the Business Outlook (OWK).

In addition, the so-called price scissors have been determined, defining the proportion of prices of agricultural products (typically produce) sold by farmers to the prices of products they buy, which constituted the partial indicator of changes of the economic situation in agriculture.

The results of studies conducted at farms were analyzed on the basis of the farm type criterion, defined by the proportion of the standard production value (SO) from specific agricultural activities groups within the overall standard production of the farm concerned. Among the studied establishments, there were farms specializing in field crops (cereals, oil seeds, high protein crops and root crops), production of bovine animals for slaughter and milk, production of swine, and "mixed-type" farming establishments involved in various types of crops and animal production.

RESEARCH RESULTS

The globalization process and broader opening to international exchange strengthen the economy's sensitivity to activity fluctuations [Kieniewicz and Lorenowicz 2003, Idzik 2007]. The fluctuations of the economy are represented in specific sectors, not excluding farming, as emphasized by Kowalczyk [2010]. With the variability of the economic environment, farms are being more and more strongly affected by the changes occurring in their more or less distant environment [Griffin 1999, Runowski 2009]. Moreover, these transformations are largely determined by administrative and legal regulations applied both that the national and the European Union level. The latter largely affect the final shape of the agricultural system, the condition of specific farms, or the scale and structure of produce generated by farmers [Płonka and Musiał 2012]. These measures, particularly in the form of interventions, become particularly important during periods of economic downturn. Among the sector-specific fluctuations of the economy, as illustrated by examples known from history, agriculture and farms have been among the sectors to most strongly experience the effects of the major economic crises [Płonka and Paluch 2015]. This theory has been confirmed, for example, by the 1930's Great Depression, or the crisis associated with systemic reforms, where the consequences – particularly in the agricultural industry – have not yet been fully overcome [see e.g. Idzik 2007, Musiał 2009, Wilkin 2009, Zieliński 2012, Adamowicz 2013].

The contemporary transformation processes within the agricultural sector, including farms, occur during economic downturn, recession or crisis periods. Since 2008, rapid deterioration has been recorded for the economic standing of agriculture and the economy as a whole, demonstrated by negative values of economic indicators (Fig. 1). Intensification of crisis occurrences on the financial market, particularly including the U.S. commercial banks' system, has become global and affected all the areas of the economy, not only in the majority of the EU Member States but also in Poland[2]. Therefore, the business cycle indicator has dropped from the maximum of the last decade, i.e. from 13.7 to –29.4 pts. The poor economic standing was also perceived in the field of agriculture and farms, and its negative consequences have been observed by the present day. Within a period as short as one year, the synthetic business cycle indicator in agriculture decreased by as many as 37 points (from 9.0 registered in 2007 to –28.0 in 2009, which was one of the lowest levels since 1999). The downturn that showed in negative values of indicators was maintained for the subsequent years (excluding Q3 2010, and 2014), until 2016 as the final year of the analysis.

[2] According to Lewandowski et al. [2013], despite the maintained positive GDP values, the domestic economy growth rate has decreased significantly below the long-term trend – this was no different in Poland than in the other European economies.

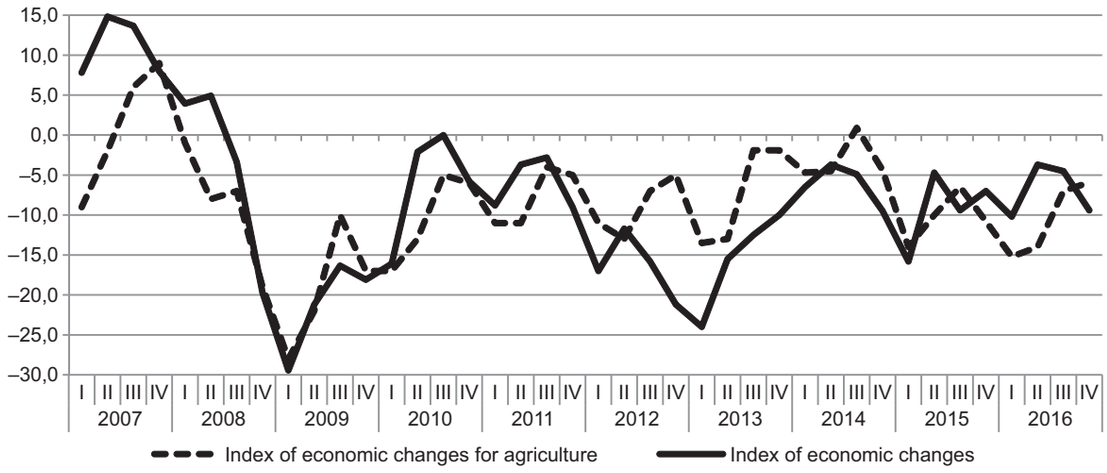

Fig. 1. Economic situation in Polish economy and agriculture during 2007–2016

Source: Own study based on the economic situation of agriculture [2007–2017].

With the deteriorating pricing tendencies, both on the global and the domestic market, agricultural producers have been facing the difficult task of adapting to the new and more difficult economic conditions. The decrease of demand for agricultural produce, which was evoked as early as at the end of 2007 as a consequence of the global demand breakdown, has led to a major extension of the pricing scissors (Fig. 2). With the value decreasing below the 100 threshold, the relationship of farm produce threshold compared to the basic prices of production resources necessary for production deteriorated. According to the research by Płonka [2015], the nearly 20% decrease of procurement prices of agricultural produce during 2007–2009 was associated with the approx. 18% growth of production resource prices. It should be added here that the pricing scissors' indicator value of 2009 at 91 represented ca. 70% of the 1989 status; therefore, the value decreased by as much as 30 percentage points

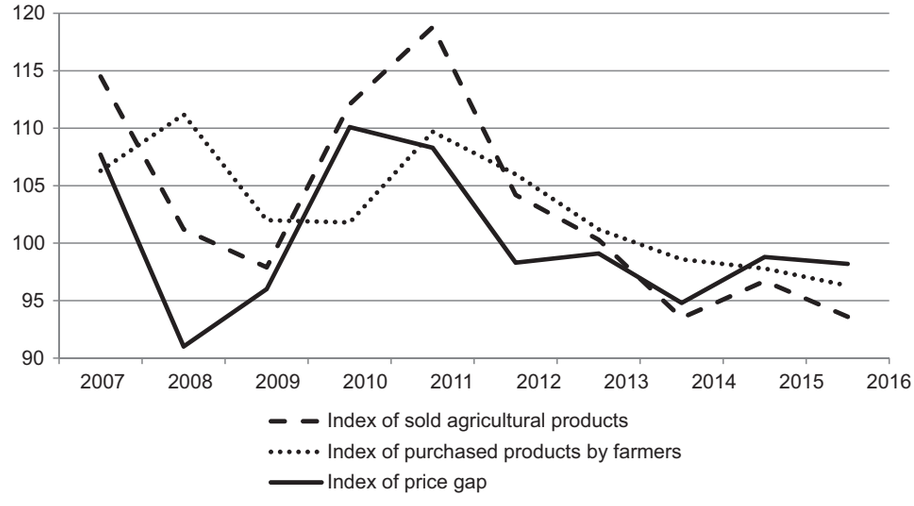

Fig. 2. Index of price gap in the years 2007–2016

Source: Own study based on Statistical Yearbook [2013, 2016].

during the period of nearly 20 years. For comparison, according to Mundlak [1988], more than 80 years had passed in the agricultural system of the United States for that decrease to reach as deep.

The consequences of economic recession have exerted pressure on agricultural producers deciding about the status of their agricultural establishments, their development opportunities, and in frequent cases their chance of survival. In response of the downturn in agriculture, farm owners have faced the necessity to adapt their farms to the changing conditions, which were disadvantageous for them. These farm owners would then undertake certain interventions to prevent their farms against the negative (and usually costly) consequences of economic downturn. These activities were usually within the area of the primary farming aspects, such as: changing the farm land area, changing the production volume, changing the consumption of necessary production assets, changing the extent of capital investments.

The analysis of study results on farms specializing in field crops has demonstrated that certain efforts would be undertaken in these farms during economic downturn period to adapt them to the deteriorating conditions, primarily regarding reduction of investment outlays and consumption of production assets (Fig. 3). All the respondents pointed to these interventions as the primary strategies for survival during the period of downturn in agriculture. Moreover, for half of all the farmers in this group, another intervention measure was to reduce their present production volumes, by 20% on average as compared to the level preceding the change period. None of the farm owners specializing in farm crops would increase their farm land resources in response to the economic downturn. One could suspect that this was largely due to limited supply of land, and therefore to the nearly expired trading in farm land in the respective region [Płonka and Musiał 2012]. Nevertheless, the respondents perceived the reasons of their decisions in this area as the shortage of funds for increasing the land area through buying land or acquiring land through paid lease.

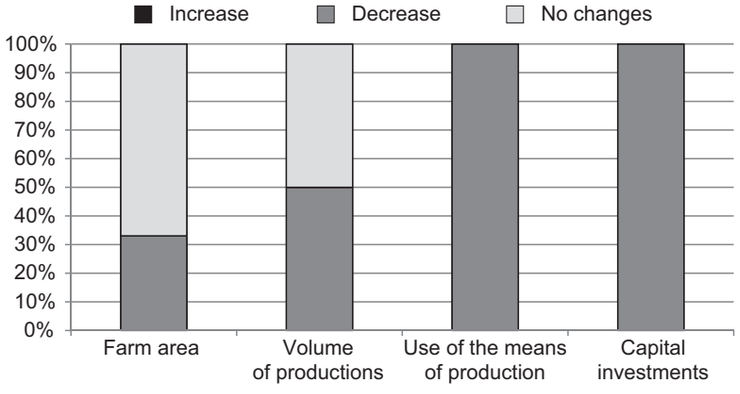

Fig. 3. Interventions at farms specializing in field crops
Source: Own study.

Similar adaptive reactions to the changing conditions were also declared by the owners of so-called mixed-production farms. They would most commonly respond through limiting investments in fixed assets and more extensive investments in resources necessary for production. Only one person took the effort to maintain the investments they decided to implement at their farm, as they were required to pursue certain investment activities specified in their application for EU aids under the Rural Areas Development Programme (Fig. 4). Among the representatives of this group of farms, minor intervention attempts were also observed, in the form of increasing the farm land area and therefore the extent of production (particularly animal production). However, in light of the remaining measures, these attempts did not play a significant part.

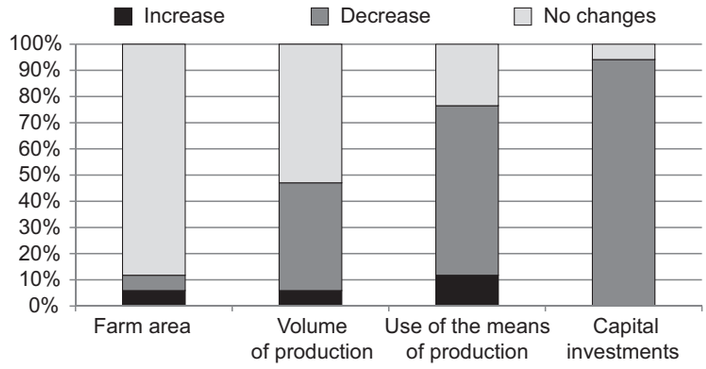

Fig. 4. Interventions at mixed-production farms

Source: Own study.

Gradual withdrawal from production in response of the deteriorating conditions were least experienced by farms specializing in cattle breeding (Fig. 5). The owners of these farms would decide to increase the production volume (42% of respondents) or to maintain the current number of cattle (21% of respondents) in response to the economic downturn. For more than half of the respondents who declared certain efforts to intensify their production, these measures were tantamount to a change of their management organization as regards the increase of arable land area. Specifically, farmers were forced to produce more feed as a consequence of the increasing number of animals, and therefore they had to expand their land resources [Płonka 2015].

Another aspect which merits attention is that, despite the deteriorating management conditions, most commonly demonstrated in disadvantageous pricing relations for farmers, over 60% of respondents from that group of farms would maintain their present consumption of current production assets. The situation was similar for capital investments. Over 70% of farm owners specializing in cattle breeding would declare that the economic downturn did not have a negative effect on their investments. The efforts undertaken to maintain the existing investments were mainly due to the fact that they were mandatory under the selected Rural Areas Development Programme measures and the financial aid obtained thereunder. It should be added that, compared to the other parties under review, these farms were considered economically strong organizations, capable of developing their production assets on the basis of their own funds, as a result of the value of their incomes.

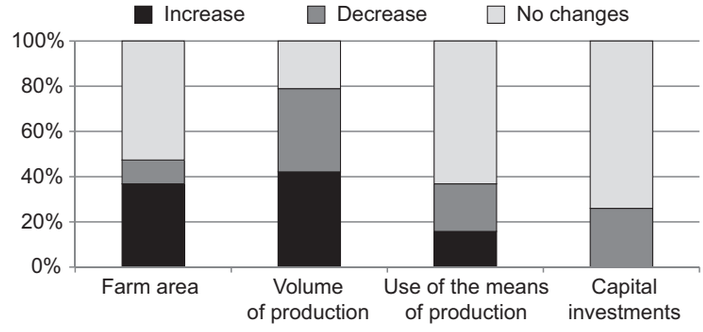

Fig. 5. Interventions at farms specializing in cattle breeding

Source: Own study.

The research indicates that the interventions aimed at protecting the organizations under review against the negative consequences of downturn in agriculture were least commonly undertaken by farm owners focusing on swine production (Fig. 6). The vast majority would not make any changes in the organization of their farms within the aspects under consideration, as they maintained their present farm land volume (100% of respondents), production volume (67% of respondents), or investments (89% of respondents). The causes of such behaviours can be seen in the prices per 1 kg of slaughter animals, which were relatively advantageous during that period for pork producers. Specifically, these prices realistically increased in 2008 to reach 5.05 PLN·kg^{-1}, i.e. approx. 22% higher than the prices of the preceding year[3], which used to be considered one of the least beneficial years in terms of live swine sales prices [Płonka and Paluch 2016].

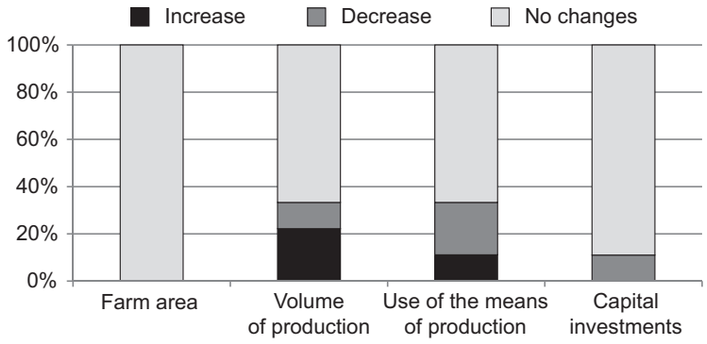

Fig. 6. Interventions at farms specializing in swine breeding
Source: Own study.

Only one in five owners of swine farms would decide to engage in intervention measures during periods of deteriorating market conditions, while at the same time increasing their present production volumes. However, these measures would not affect the sizes of farms, as it was the case for nearly half of the farms that decided to increase cattle production. The respondents argued that the increase of the prices of slaughter animals was the reason of non-existence of the positive correlation between these aspects of farm organization, as it encouraged the increase of the number of animals kept at the specific farm. They would also point to their farms' capability of own production of animal feed, not previously utilized to the maximum, which did not involve the necessity of increasing the land resources.

CONCLUSIONS

During the last 25 years, the economic situation on the farming market in Poland was highly volatile. The boom/downturn periods occurring in alternation (or the periods of high/low economic activities) used to determine the shape of contemporary farming, its state, competitive edge and development perspectives. With the intensive changes in the environment, agricultural producers were often facing the difficult tasks of adapting to the new management realities which, primarily during downturn periods such as deteriorating agricultural production profitability, required adequate measures to mitigate the negative and typically costly consequences of economic

[3] In terms of fixed prices determined according to the yearly prices of consumer goods and services published by the Central Statistical Office of the Republic of Poland.

downturn. The right decisions and changes determine the ultimate operating efficiency of farms and their growth opportunities, as well as their chances of survival in many cases.

It has been determined on the basis of field study results that, in response to the impairment of the economic standing, farm owners were pursuing certain interventions, such as changing farm land areas, production assets consumption and capital investments. The actual choice of strategies for surviving the economic recession depended on the type of farming establishment, i.e. on the type of production pursued by the specific farm. The most common adaptation strategy undertaken by owners of farms focused on plant or mixed production was to withdraw from fixed assets increasing by reduction or elimination of capital investments. The other way to protect farms from the consequences of the deteriorating production profitability was to withdraw from maintaining the current levels of consumption of current production assets and a transition towards extensification of production. The interventions undertaken by owners of animal production farms were slightly different, as they were more prone to decide to increase their current production volume[4] or – for cattle growing farms – to multiply their land resources.

However, pursuant to the completed research, it can be noted that the spectrum of intervention measures undertaken by respondents in periods of economic crisis was based mainly on temporary yet significant reduction of production costs in order to improve (or safeguard) short-term financial performance of a farm. The primary cause thereof should be the increase of production resources' price increases during 2008–2012 which, according to the research by Płonka [2015], were systematically increasing by over 7% per annum, unlike the prices of farm produce.

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DZIAŁANIA INTERWENCYJNE WŁAŚCICIELI GOSPODARSTW ROLNYCH W OKRESIE KRYZYSU GOSPODARCZEGO

STRESZCZENIE

W opracowaniu podjęto problem oddziaływania dekoniunktury gospodarczej (kryzysu) na organizację gospodarstw rolnych. Przeprowadzono badania w południowej Polsce, z których fragment zaprezentowano w artykule, ukazując działania interwencyjne właścicieli gospodarstw rolnych wobec pogarszającej się koniunktury gospodarczej. Z badań wynika, iż wybór strategii przetrwania kryzysu przejawiającego się w postaci pogarszających się warunków gospodarowania uzależniony był od typu gospodarstwa. Najczęściej podejmowane decyzje dotyczyły jednak zmniejszania zużycia obrotowych środków produkcji oraz ograniczania inwestycji kapitałochłonnych. Spektrum działań interwencyjnych podejmowanych przez respondentów w okresie kryzysu gospodarczego bazowało więc głównie na doraźnej, lecz znaczącej redukcji kosztów produkcji, mającej na celu poprawę (lub też ochronę) krótkoterminowych wyników finansowych gospodarstwa.

Słowa kluczowe: kryzys gospodarczy, działania interwencyjne, gospodarstwa rolne

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RISK OF OVERINVESTMENT IN MUNICIPALITIES

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ABSTRACT

This article describes investment activities of self-government territorial units. Its aim is to present the importance of investments for the provision of public services by municipalities. The opinions of the respondents about the causes of excessive or misguided investments and the ways of reducing their scale were presented. Surveys were conducted in 2015 and the temporal scope of the analysis is 2009–2014. The importance of investments for the provision of public services, shaping the living conditions of inhabitants, and conducting business activity were described. Based on that, overinvestment was identified as a negative trend in public resources management. The most frequent causes of excessive investment are megalomania of the municipality authorities and their desire to gain the support of the inhabitants (voters). Another important aspect is the lack of sufficient social control in the decision-making process regarding investment tasks execution. It was also demonstrated that overinvestment is due to the purpose of spending financial resources, not to the relative amount of investment expenses. Among the actions preventing excessive or misguided investments, the cost and benefit analysis was indicated the most often. Using strategic planning tools is also beneficial for the effectiveness of investing in self-government.

Key words: municipality, local economy, investments, infrastructure, overinvestment, public services

INTRODUCTION

The basic aim of the territorial self-government is the implementation of tasks focused on fulfilling the needs of the local community. The common needs of inhabitants are the core interest of municipal management, conducted mostly as an obligatory task of municipalities. They form an economic category of public services defined as public administration activities concerning providing the inhabitants with particular goods, such as: road maintenance, water supply, sewage disposal, maintenance of schools and culture establishments [Witkowski 2011].

The provision of public services requires self-government territorial units to have a material base that has to be produced, operated, and maintained. The needs of the society, which increase together with the progress of civilisation, make constant investing necessary in order to improve the standard of services. The investments focus on the expansion, modernisation, and revitalisation of technical infrastructure elements.

Infrastructural investments generate significant expenses from the local budgets, which affects the economic condition of municipalities. Achieving economic benefits as a result of investment projects forces local authorities to invest rationally. This means constructing objects justified by economic calculation, without falling into the pressure of creating infrastructure elements that will not be fully used.

The aim of the paper is to present the importance of investments for the provision of public services by municipalities. The opinions of the respondents about the causes of excessive or misguided investments and the ways of reducing their scale were presented.

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MATERIAL AND METHODS

Achieving the aims required using both primary and secondary research materials. Budget indicators and municipality debt indicators for 2009–2014 from the studies of the Ministry of Finance were used as secondary data. After selection, the following set of diagnostic variables was used:

- W_1 – current revenues to total revenues' ratio;
- W_2 – operating surplus to total revenues' ratio;
- W_3 – property expenditures to total expenditures' ratio;
- W_4 – operating surplus and assets sales revenue to total revenues' ratio;
- W_5 – operating surplus and property revenues to property expenditures ratio (self-financing ratio);
- W_6 – total liabilities to total revenues' ratio;
- W_7 – charge of total revenues with expenditures on debt management.

Apart from the public statistic data, the results of own survey-based research conducted in 23 rural, urban-rural, and urban municipalities from Lubelskie, Małopolskie, Podkarpackie, Śląskie, and Świętokrzyskie provinces were used. Object selection was designed to include municipalities with different investment scales and uses of structural funds. The questions in the survey concerned the different aspects of investment activity of municipalities, including overinvestment. The research was conducted in 2015 on a purposive group of respondents who were leaders in their local environments and could evaluate the investment activity of municipalities. After verification of the answers, 187 questionnaires were qualified for analysis.

Descriptive statistics methods were used to prepare the data. Measures of central tendency and dispersion measures (arithmetic mean, standard deviation, and variation coefficient) were calculated. Additionally, induction and deduction were used in the ratiocination process. The public sector economy served as a theoretical basis.

Importance of local investments in the provision of public services

According to the conception of Charles Tiebout [1956] and the assumptions of fiscal federalism, taxes and local fees paid by the inhabitants constitute an equivalent for the local public good offer. The provision of public goods by local territorial self-government depends on many factors, one of the most important of which is availability and state of technical and social infrastructure objects [Rondinelli et al. 1989]. The objects of municipal infrastructure have to be successively modernised in order to assure the high standard of services. It usually takes on the form of carrying out investments financed from self-government budgets. The amount of investment expenditures is therefore an important element shaping the living standard and level of services provided to the inhabitants and entrepreneurs, which may determine their location decisions. The decentralised provision of public goods consumed locally is more effective than centralised decisions about them [Oates 1972]. In this case, the improved effectiveness of public goods allocation is a result of the better recognition of needs by local authorities. Reflecting the local preferences in undertaken activities, including investments, is the least difficult for municipal authorities, which are the closest to the citizens.

The evaluation of the effects of investments financed using public funds is a complex process requiring a multi-dimensional approach to costs and benefits. In this case, it is even more difficult, as many effects of infrastructural investment implementations are of a long-term nature and reveal themselves after a relatively long time after the project's completion. Another inconvenience is due to the so-called external effects and the difficulty of their quantification [Czempas and Marcinek 2017]. External effects of infrastructure development are benefits (or costs) for economic entities and the community. They can be of a supply or demand nature. Supply effects consist of production efficiency improvement being a result of capital growth and efficiency improvement, while demand effects concern the growth of consumption and investment in a given area due to increased interest in a given infrastructure and, in consequence, the increase of the number of economic entities and households. It is also worth mentioning that, apart from external effects due to infrastructure development, there are

also external effects between self-governments. This phenomenon occurs when the activities of one municipality affect the inhabitants of other municipalities [Dahlby 1996].

The evaluation of the systemic effectiveness of an investment and the choice of tasks to be implemented should always be based on the analysis and evaluation of feasibility and viability of the project [Bojarski 2004]. The arguments presented above show that this evaluation in the public sector is complicated and cannot be based solely on the criterion of financial viability, but should take the scale of needs and benefits for the local community into account.

Investments in terms of the financial situation of local self-governments

The execution of investment projects by territorial self-government is determined by many factors, one of the most important of which is the financial situation of a given unit. The structure of revenues and the direction of expenses depend on the investment activity capabilities and scope.

Between 2009 and 2014, the financial situation of the municipalities, which were due to the economic situation of the country, and to a lesser extent, to the availability of EU funds (Table 1). Macroeconomic factors were

Table 1. Comparison of selected budget indicators of Polish municipalities between 2009 and 2014[a]

Specification	2009	2010	2011	2012	2013	2014
Rural municipalities						
W_1	93.7	90.9	88.6	90.3	92.2	92
W_2	10.8	7.4	7.2	8.6	9.8	9.4
W_3	20.6	24.9	22.2	17.2	16.3	18.1
W_4	12	8.4	8.2	9.5	10.8	10.3
W_5	109.3	63.4	101.3	153	162.9	112.6
W_6	17.2	26.9	30.6	28.8	27.8	27.7
W_7	4.1	4.9	8.1	9.2	8.9	5.8
Urban-rural municipalities						
W_1	92.5	89.3	88.6	90.0	92.1	91.9
W_2	8.3	4.9	6.0	6.9	8.3	8.0
W_3	21.2	23.9	21.6	16.8	15.3	17.0
W_4	10.7	7.1	7.9	8.5	10.2	9.6
W_5	90.6	60.6	84.8	131.2	152.3	105.4
W_6	23.9	32.7	37.1	35.8	34.6	34.1
W_7	5.0	5.9	8.0	9.4	9.7	5.7
Urban municipalities						
W_1	91.1	86.7	87.4	89.6	91.4	91.7
W_2	5.2	3.2	5.3	5.4	6.9	7.8
W_3	21.7	23.3	20.8	16.4	14.2	15.9
W_4	8.7	7.1	8.3	8.5	10.1	10.5
W_5	61.7	66.5	91.9	106.8	255.4	124.8
W_6	25.8	32.4	35.6	35.5	33.6	32.1
W_7	5.3	6.1	7.1	8.0	8.5	5.0

[a]During the period of creation of the paper, the data for 2015 were still unavailable.

Source: Own research based on Indicators of financial situation of self-government territorial units for 2009–2014.

reflected mostly in the operating surplus to total the revenues' ratio, which was decreasing in the initial period. The availability of financial funds within structural funds allocation affected mostly the investment expenditures to total expenditures' ratio. Until 2011, in each of the analysed municipality groups, more than 1/5 of the total amount of expenditures of self-government budgets was spent on investment. Later, the ratio value decreased significantly. It was due to the depletion of financial resources from the 2007–2013 programming period and the delay of implementation of funds for 2014–2020.

The self-financing ratio is very important in the evaluation of self-government territorial units' investments. It describes the relation between the operational surplus developed in the budget increased by property revenues and total property expenditures. If its value is 100%, all the investment expenditures are financed with property revenues obtained by the municipality and the surplus developed in the current budget. Lower values indicate a relatively big scale of investments and the necessity to finance them using repayable external sources such as loans and municipal bonds issue. High values (over 100%) may be caused by two things. The first one is the municipality's high capacity to invest from its own budget (high operational surpluses and property revenues). The other is the result of reducing investment activities and related expenditures. It is worth emphasising that such a phenomenon can be beneficial when it is necessary to implement a savings plan in self-government budget, but in long-term it slows down local development processes.

The analysis of the self-financing ratio indicates that in the first part of the analysed period the municipalities had to get into debt. This situation was visible in particular in urban municipalities between 2009 and 2010 and in urban-rural municipalities in 2010. In the second part of the period, due to investment activity reduction, self--financing ratios had high values (over 100%) regardless of the type of municipality.

In order to evaluate the financial situation and analyse the level of structural funds absorption in municipalities participating in the survey, the values of basic financial indicators were summarised in Table 2.

In the group of the analysed municipalities, a significant variation of financial condition, level of indebtedness, and amounts obtained from structural funds were observed. Low values of debt indicators occurred mostly in municipalities that did not use many EU funds, therefore it would not be correct to conclude that a low municipality debt level is always a positive phenomenon. Similarly, the highest self-financing ratios were observed in municipalities that invested the least (such as Poręba and Dębica). High investment expenditures level was due to the necessity of looking for external financing sources, both non-repayable (EU funds) and repayable (bank loans), thus the above-average debt in units that invest a lot. It was also observed that investment processes and external funds acquisition were very limited in municipalities with the highest current revenues to total revenues ratio.

Overinvestment in the economy

Many authors consider investment undertakings to be positive actions aimed at creating favourable development conditions. This argument also justifies the expenditures related to them [Swianiewicz 2011, King 2016]. However, rational decisions based on cost calculation regarding the implementation of specific investment tasks are postulated. In order to assure that investment resources are not wasted, infrastructural objects should be expanded based on the inhabitants' needs [Standar and Średzińska 2008, Czempas 2013]. International research results show that not all infrastructural investments lead to the increase of economy efficiency [Cadot et al. 2006]. In Poland, the problem of overinvestment [Marliere 2016] and its unfavourable impact on the municipal economy have just been noticed. Years of neglect and huge "infrastructural gap" have dominated the discourse, complementing the investment activity of self-governments. The belief that the available aid funds have to be used quickly and fully additionally supported this way of thinking, while limiting or even diminishing the opinions that investment processes need to be rationalised.

The respondents were asked if they noticed overinvestment in their municipalities. 38% stated that all the implemented investments were fully used. The overinvestment phenomenon was noticed by a total of 30% of the respondents. 25.5% believed that it concerned isolated cases and only 7% stated that this phenomenon often

Table 2. Average value of financial indicators of the analysed municipalities between 2011 and 2014

Municipality	W_1	W_2	W_3	W_4	W_5	W_6	W_7	Value of projects	Amount of co-financing
	%							PLN per capita	
Aleksandrów	100.0	8.4	8.8	8.4	100.4	0.7	0.0	248.5	235.1
Biskupice	95.3	11.7	13.8	11.7	143.2	21.8	7.8	530.1	448.3
Chełmiec	93.7	14.1	19.7	15.4	110.9	10.7	3.4	794.4	615.3
Czarna	89.6	3.6	13.1	6.3	109.8	51.2	17.9	7 319.9	7 062.3
Częstochowa	91.7	5.9	15.3	7.6	92.6	44.3	4.1	2 358.8	1 851.4
Dębica	94.2	7.3	7.9	9.5	217.8	35.7	10.3	1 712.1	1 275.1
Jędrzejów	93.2	3.0	13.3	4.2	72.2	37.7	4.7	3 422.5	2 882.4
Kazimierza Wielka	91.3	6.2	18.0	7.3	89.2	53.7	7.4	3 035.4	1 953.8
Kłaj	90.8	8.3	18.5	8.6	106.0	49.4	12.2	12 395.8	12 105.3
Laskowa	92.0	7.4	12.2	7.7	144.8	50.0	8.6	1 014.4	518.0
Limanowa	93.9	13.3	20.7	13.3	91.8	34.5	10.8	545.9	291.0
Łazy	77.4	1.1	21.5	9.2	127.6	54.4	11.7	1 690.5	1 353.2
Mszana Dolna (rural)	90.6	10.0	17.5	10.1	141.5	29.6	7.4	299.3	197.4
Olkusz	91.7	3.6	12.0	6.8	98.3	35.5	7.5	1 964.6	1 530.5
Poręba	96.9	2.7	2.9	5.4	390.8	45.0	6.2	928.4	823.2
Sandomierz	92.7	3.2	12.5	5.0	79.0	45.8	7.2	1 802.0	1 440.5
Skawina	81.7	7.8	26.0	11.9	100.0	42.2	10.0	3 240.4	2 569.1
Tarnów	94.4	12.7	18.8	13.0	96.8	45.3	13.0	16 417.6	16 128.5
Wieliczka	86.3	6.6	24.2	7.6	79.1	66.3	7.8	1 674.3	1 459.6
Wojnicz	92.4	9.8	14.4	11.5	126.7	50.8	11.9	4 968.2	4 275.6
Zamość (urban)	89.2	5.5	13.9	6.4	124.8	25.7	3.7	2 380.2	1 725.8
Zamość (rural)	95.0	11.8	14.2	12.4	135.0	34.3	10.5	4 212.7	3 070.8
Zawiercie	91.3	7.5	19.9	8.9	78.5	24.3	1.9	1 569.4	1 220.8
Arithmetic mean	91.5	7.5	15.6	9.1	124.2	38.6	8.1	3 240.2	2 827.5
Standard deviation	4.72	3.67	5.35	2.95	66.23	15.05	4.07	3 941.60	3 923.72
Variation coefficient	0.05	0.49	0.34	0.33	0.53	0.39	0.50	1.22	1.39

Source: Own research based on Indicators of financial situation of self-government territorial units for 2009–2014 and Local Database (LDB) of the Central Statistical Office.

occurred in their municipalities. 31.5% did not have any opinion. Thorough the analysis of budget indicators in municipalities, which were seen as overinvested most frequently, did not provide a basis for clear conclusions. Investment expenditures of these municipalities did not differ much from the average for the entire population. One can therefore conclude that it is not the value of expenditures that causes overinvestment, but rather the type of undertakings. Among the most frequent examples of overinvestment in self-governments were social infrastructure facilities (mostly sport facilities, such as sports halls and playgrounds, and cultural institutions, such as community centres, parks, as well as park areas, market places, and parking areas). It is worth mention-

ing that obtaining subsidies from external funds was relatively easy for such undertakings. Above-average debt level and costs of its maintenance were the only indicators typical for municipalities where overinvestment was observed.

Table 3. Comparison of respondents' statements regarding the reasons of overinvestment

Factors conductive to overinvestment	Percentage of answers (%)	Number of answers
Good financial situation of the municipality	13.9	26
High availability of EU funds	40.1	75
Megalomania of the authorities	46.5	87
Desire to gain support of the inhabitants	44.9	84
Lack of social control	43.9	82
Large capabilities of incurring debt	35.8	67

The respondents could pick more than one answer, so the values do not add up to 100%.

Source: Own research.

The most frequently indicated reasons of overinvestment in self-governments were the attitude of authorities, resulting in the construction of showy objects and undertaking projects in order to gain support of the inhabitants. In particular, the second reason is described in public sector economics as an element of electoral cycle theory [Drazen 2000]. Representatives of the local self-government, who are conformist and opportunist towards the voters, often make erroneous and economically unjustified decisions on investment projects execution.

Only a slightly smaller number of respondents pointed to a lack of social control and high availability of EU funds as factors supporting the construction of objects that are not fully used in municipalities. The lack of social control may mean limited ability of the inhabitants to affect the authorities' investment decisions made during their term. In some situations this may even lead to formation of local coteries and the alienation of the establishment. The availability of external non-repayable funds, which is also indicated in other studies [Gorzelak 2014], may lead to economically unjustified investing having more in common with spending available resources than with rational management [Stawicki et al. 2009]. The number of persons who pointed to a good financial situation of a municipality as a reason of investments disproportionate to the economic needs was the smallest.

Surely, it is necessary for some municipalities to elaborate mechanisms limiting the risk of overinvestment or the incorrect structure of projects. Strategic planning tools, costs/benefits analysis, debt limits, and emphasis on public consultations of planned undertakings can be used for this purpose (Table 4).

Table 4. Comparison of respondents' statements regarding possible municipal authorities' actions reducing overinvestment

Actions preventing overinvestment	Percentage of answers (%)	Number of answers
Strategic planning	50.8	95
Investment cost and benefit analysis	64.7	121
Debt limits for self-governments	29.9	56
Public consultations	25.7	48

The respondents could pick more than one answer, so the values do not add up to 100%.

Source: Own research.

The cost-benefits analysis of particular investment projects was chosen by a majority of the respondents (64.7%) as a way to reduce negative results of misguided investments. It is a method that, based on certain assumptions, allows for evaluating positive effects of a given investment task. Therefore, it allows for assessing the relation between achieved economic, environmental, and social effects and the expenditures, which can serve as a basis for conclusions regarding project effectiveness. Diverse techniques of investment economic effectiveness evaluation (NPV, IRR, PI) are used, but one should remember that their use in the public sector is limited due to, among others, problems with clear quantification of effects. Another restriction is the criterion of the aim of public units' operation, which is definitely different in self-government than in commercial sector entities.

Almost half of the respondent stated that strategic management tools prevented overinvestment. It concerns mostly long-term planning, which allows including several investment projects in a complex municipality development plan, which gives them substantive justification instead of a politics-related basis of interim calculations. Including an investment task in a long-term plan (e.g. a development strategy) prevents self-government authorities from making decisions based solely or mostly on currently available subsidies [Cyburt 2014]. In such a situation, decisions to engage in projects, a subsidy for which is easy to obtain are often made, whereas tasks that the inhabitants consider more useful are disregarded.

Less than 30% of the respondents indicated statutory debt limits for self-governments as a way of overinvestment prevention. It is worth mentioning that the main cause of changes in the capabilities of incurring debt by self-government territorial units was the need to limit the debt of the entire public finance sector. A high debt growth dynamic of the self-government sub-sector was observed in the period of the investment boom related with intense use of EU funds. Self-government territorial units debt limits implemented in the amended Public Finance Act [2009] were meant to restrict incurring more and more liabilities, in particular by entities with low debt management potential. Slightly over 1/4 of the respondents stated that public consultations regarding conducted investments are an appropriate way of preventing overinvestment. The aim would be to choose the projects that are the most expected by the inhabitants. However, the attendance of such meetings is usually low, which may put the decisions made this way into question. The experience with participatory budgeting implemented in some self-governments may be used to some extent [Milewska and Jóźwik 2014].

The analysis of the answers did not demonstrate any significant differences in the statements about the main reasons of excessive investing between the municipalities where the phenomenon occurred and the municipalities where all the finalised projects were considered useful. However, it is worth mentioning that the only clear difference was that in the group in which overinvestment was observed, the availability of EU funds was mentioned more often as a cause.

SUMMARY AND CONCLUSIONS

Investments, which are one of the more important activities of self-government territorial units, determine not only the current level and standard of public tasks executed, but also affect the scope and pace of local development processes. Correctly planned and executed investment allows municipalities to accelerate economic development due to multiplier effects. Municipal investments, in particular infrastructural ones, generate high costs that must be covered by self-government budgets, which, when own resources are limited, leads to debt.

Using eternal financing (in particular in case of non-repayable funds) is an important support for local budgets, as it reduces the amount of own resources spent. However, the effectiveness of such support requires calculating investment viability. Otherwise, the undertakings may be economically unjustified, not fully used or even needless for local communities.

The desire to build remarkable, but not necessarily reasonable facilities leads to overinvestment. Relative easiness of obtaining financial resources combined with lack of rationality of the decision-making bodies results

in undertaking investment projects, which are not the most important from the point of view of the local communities, but are eligible for subsidies. Excessive investment in infrastructure generates unjustified expenses during implementation and high future maintenance and operation costs, which lead to the reduction of resources for more useful and justified purposes.

In order to prevent overinvestment, self-governments should conduct cost and benefits analyses and rely on strategic planning more. Including investments in complex local development programmes allows their optimal adjustment to local needs and a coherent vision of municipal infrastructure development. It gives priority to particular tasks, preventing bad investment decisions, often made with no regard to rationality. A limited amount of budget resources will force the self-government to invest rationally based on effectiveness and assets saving criteria.

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ZAGROŻENIE ZJAWISKIEM PRZEINWESTOWANIA W GMINACH

STRESZCZENIE

W artykule podjęto problematykę działalności inwestycyjnej jednostek samorządu terytorialnego. Celem artykułu jest przedstawienie znaczenia inwestycji dla świadczenia usług publicznych przez gminy. Zaprezentowane zostały również opinie respondentów na temat przyczyn i możliwości ograniczenia skali nadmiernych lub nietrafionych inwestycji. Badania ankietowe przeprowadzono w 2015 r., a zakres czasowy analizy obejmuje lata 2009–2014. Wskazano na znaczenie inwestycji w dostarczaniu usług publicznych i kształtowaniu warunków życia mieszkańców oraz prowadzenia działalności gospodarczej. Na tym tle dokonano identyfikacji zjawiska przeinwestowania jako niekorzystnego trendu w gospodarowaniu środkami publicznymi. Do najczęstszych przyczyn nadmiernego inwestowania zaliczają się megalomania władz gmin i chęć zdobycia sympatii mieszkańców (wyborców). Jako ważny czynnik wymieniano również brak wystarczającej kontroli społecznej w procesie podejmowania decyzji o realizacji zadań inwestycyjnych. Dowiedziono również, że za zjawisko przeinwestowania odpowiada cel przeznaczenia środków finansowych, a nie względna wielkość wydatków inwestycyjnych. Wśród działań zapobiegających nadmiernemu lub nietrafnemu inwestowaniu najczęściej wymieniano analizę kosztów i korzyści. Pozytywnie na efektywność inwestowania w samorządzie wpływa również stosowanie narzędzi zarządzania strategicznego.

Słowa kluczowe: gmina, gospodarka lokalna, inwestycje, infrastruktura, przeinwestowanie, usługi publiczne

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SUSTAINABLE DEVELOPMENT AND THE BUSINESS CONTEXT OF CSR BENEFITS ON THE POLISH MARKET

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ABSTRACT

This paper identifies the development of innovative, good practices in CSR and sustainable development in Poland in 2011–2016. In the researched years, it was found that the greatest number of practices were recorded in the area of social involvement and development of local communities, workplace and environmental practises. The conducted analyses show that in the Polish market in the context of sustainable development, there are emerging new business paradigms, innovative CSR strategies as SDG's implementation to building the competitive advantage of companies. The effectiveness of CSR activities is difficult to measure. On the example of the analysed companies it can be stated that they shape the intangible as well as tangible value. The intangible values are the social capital and trust in the company, while the tangible values are savings and revenue growth.

Key words: sustainable development, social responsibility, business models

INTRODUCTION

The sustainable development goals create possibilities and business opportunities and, on the other hand, become a necessity on the market. Since 2015, 193 Member States of the United Nations have unanimously adopted the New Agenda containing 17 Sustainable Development Goals (SDG) [Agenda 2030]. Corporate Social Responsibility (CSR) practices are now seen as one of the important elements in the SDG's performance and at the same time affecting the financial result. More and more entrepreneurs are taking action for their stakeholders and communities, treating them not as costs but as investments. At the same time, the awareness and understanding of monitoring, to which extent the companies' involvement in social and environmental activities translate into profits [Waddock and Graves 1997, Makower 2009, Porter and Krame 2011].

The concept of sustainable development becomes one of the most frequently discussed topics in the context of enterprise and supply chain management. There is the development of innovative ideas and solutions for the use of residue, maximum environmental protection and "zero waste" concept. In a long-term strategy, socially responsible activities give benefits to society and the environment, which translates into a company's image and hence increased profits.

The aim of this compilation is to identify the development of good practice in the field of CSR and sustainable development in Polish companies in 2011–2016.

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MATERIAL AND METHODS

The data about tendencies of changes in CSR strategy as part of achieving sustainable business goals in Poland were taken from the official sources the applicable literatures and Responsible Business Forum (FOB) Report, Responsible Business in Poland in 2011–2016. In total, more than 880 good practices gathered in CSR reports were analysed (Table 1).

Table 1. Sample size – Responsible business in Poland, good practices in years 2011–2016

Year	Number of companies	Number of good practices
2011	106	209
2012	106	262
2013	135	403
2014	124	420
2015	136	452
2016	188	880

Source: Own compilation based on [Raport Odpowiedzialny biznes w Polsce, za lata 2011, 2012, 2013, 2014, 2015, 2016].

The analyses conducted are an attempt to answer the two research question:

1. Weather in the Polish market new business paradigms are emerging in the context of sustainable development?
2. How CSR strategies are being developed as SDG's implementation for building the competitive advantage of companies?

The descriptive and comparative methods were used in the research paper, as well as the simple statistical method.

SUSTAINABLE DEVELOPMENT AND BUSINESS STRATEGIES

The sustainable development is an overriding approach in shaping current business activities. The key element in the new paradigm of development is the technocratic (egocentric) approach that follows the prosperous economy, complemented by factors that, to some extent, take into account the most obvious requirements for the safe use of environmental resources [Borys 2012]. The strategic business planning is increasingly based on sustainable development assumptions (Fig. 1).

<table>
<tr><td colspan="4">Sustainable development strategy</td></tr>
<tr><td colspan="4">Sustainable development of quality of life as the primary goal</td></tr>
<tr><td colspan="4">Sustainable socio-economic development as the primary goal</td></tr>
<tr><td colspan="4">Operational goals sustainable development</td></tr>
<tr><td>Economic governance</td><td>Social governance</td><td>Environmental governance</td><td>Spatial governance</td></tr>
<tr><td colspan="4">Integrated governance</td></tr>
<tr><td colspan="4">Monitoring of strategy implementation and strategy update system</td></tr>
</table>

Fig. 1. Sustainable development in the structure of strategic planning

Source: Own compilation based on [Borys 2012].

The strategic approach of entrepreneurs is based on environmental (ecological), social, economic and spatial goals. The sustainable development is increasingly sector-specific. The concept of sustainable transport, sustainable logistics, sustainable consumption and production is well-known. This applies both to the macroeconomic level and the organization level. However, the management in the context of globalization is characterized by certain specificity. As a result of this process, there are opportunities and new threats, temptations, challenges, dilemmas which force the ethical reflection. They affect different entities: individuals, businesses, organizations and entire economic and political systems. The new social, ecological, cultural and political issues generated by the globalization process have an ethical component. The emergence of such ethical dilemmas in business and marketing development is confirmed in scientific studies [Woźniczka 2016]. In business activities, but not only, the development of socially responsible movement and the concept of "global management" is being discernible. The managers, in the implementation of CSR programmes, notice the "chance for success" in pursuing the sustainable development [Lewicka-Strzałecka 2006].

In the case of the Polish economy, in the course of several decades, there have been major transformations. The change of system and membership in the European Union caused that in recent years the attention is paid to the implementation of the sustainable development idea. Its impact on the business sector is evident, as the role of resource management in a sustainable manner has increased and the responsible stakeholder management gained the importance. An analysis of current CSR good practices related to active engagement in Agenda 2030 makes it clear that managers see the greatest chances mainly in the implementation off our goals of sustainable development. Such goals include: Goal 8 – decent work and economic growth; Goal 12 – responsible consumption and production; Goal 4 – quality education and Goal 3 – good health and well-being [CSR consulting 2016].

The business recognises the long-term benefits in SDG as a result of strategic actions, increased customer trust, better reputation, and increased goodwill.

It should be emphasized that over time, the perception of business changes. Earlier it was thought that partly the business was causing problems (including economic crisis or global warming) while sustainability was treated as purely moral and charitable issue. Currently thinking about business sustainability is the foundation of a modern company that cannot imagine the development without acting for the sake of the planet and society [*From My World*... 2015].

New business models show that traditional approaches are increasingly replaced by one of four new, breakthrough formulas (Table 2). The sustainable development is a leitmotif in shaping the innovative, ambitious visions and aspirations, which are also likely to generate profits [Kardas and Jasińska 2010].

In Poland in the context of sustainable development and CSR we are not in the lead, but there have been changes in the absorption of new rules. The entrepreneurs especially analyse and define the specific CSR solu-

Table 2. New business paradigms in the context of sustainable development

New business models in terms of sustainable development			
Social X	Lean X	Integrated X	Circular X
Breakthrough ventures come from the group of companies that promote the positive impact on society and building the value not only through financial but also social goals	The key to the future is the ability to optimize the use of resources and capital, but not only financial and intellectual, but also social and natural	The companies seek common values within different economic, social and environmental systems	A lasting advantages are likely to be achieved by those companies that will focus on the management of a closed facility – with products that live eternally, using the resources obtained in a sustainable way

Source: Own compilation based on [*Breakthrough Business*… 2016].

tions within the framework of the established sustainable development goals. More and better practices, often innovative, which in a responsible and sustainable way for some time have been shaping a competitive advantage on the market [*Raport. Odpowiedzialny*… 2017]. On the other hand, for many companies, these changes resulting from the megatrend for sustainable development are still a big surprise [*Fundacja Centrum CSR.pl*… 2016]. Also in the case of stock-listed companies and RESPECT index composition there are more and more companies in the index portfolio, in 2009 there were 16 of them, in 2010 – 22 and in 2016 – 25 companies, including 4 debutants. This demonstrates the growing popularisation of the sustainable development concept on the Polish financial market [Dmitruk 2016].

Particular attention should be paid to the consumption of widely understood environmental resources, which have become a real and significant expense for any business activity and a permanent element of economic strategies. Mostly in the food and agriculture industries, particular attention is paid to the FMCG (Fast Moving Consumer Goods) [Guide et al. 2003]. This includes fast-moving goods such as groceries. The concept of supply chain closed loop management is becoming more and more frequently discussed issue in Poland. This involves concentrating the efforts, i.a. on the management of residues, by-products and waste in such a way that the level of waste transferred to landfills or incineration plants is minimized. It turns out that the food and agricultural industry, due to its specificity, generates many challenges in the area of reuse. The closed loop of supply chain includes the flows within the chain covering the four main areas of logistics activities: supply, production, distribution and return flows [Szmelter 2016].

In practice, the entrepreneurs increasingly create long-term business strategies that take into account the aspects of sustainable development (Fig. 2).

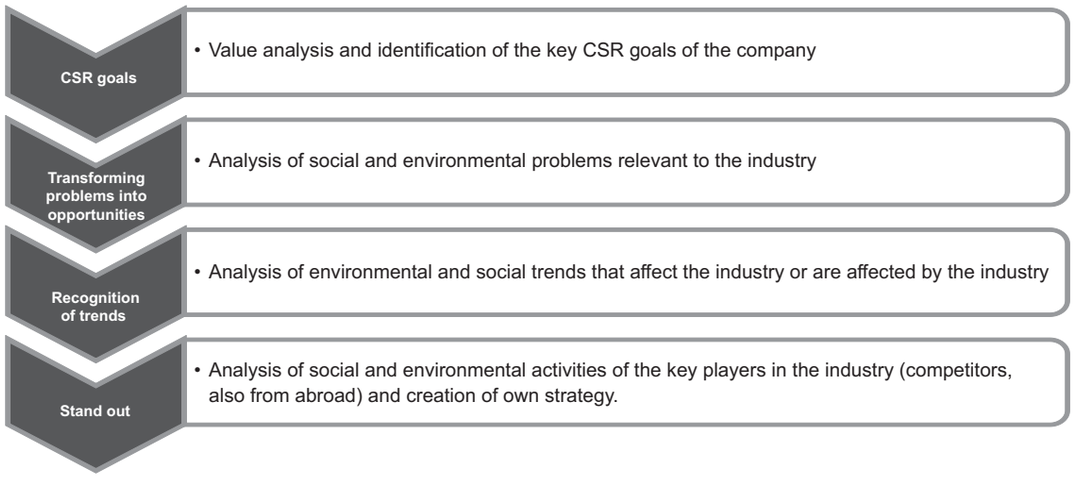

Fig. 2. CSR strategy as SDG implementation and building a specific competitive advantage
Source: Own study.

As shown in Figure 2, there is a growing number of CSR models/strategies based on stakeholder mapping, value analysis, and key corporate goals, identification of problems in the industry and then searching for the innovative/specific solutions. The CSR strategies are a competitive advantage for the growing number of aware consumers requiring the implementation of solutions for sustainable development [Stawicka 2015]. The implementation of socially responsible principles towards society, employees or the environment also results in greater market success, usually those companies which show higher revenues and profits, are listed higher on the stock exchange [Aniszewska 2012].

CSR STRATEGIES AS SDG IMPLEMENTATION FOR COMPANIES ON THE POLISH MARKET

For companies operating on the Polish market, the concept of sustainable development is realized through specific strategic models. Typical approaches are shaped by socially responsible practices in the market, environment, society and employees areas. Since 2010, with the gradual consolidation of the ISO 26000 Standard, the responsible practices have been developed according to 7 CSR areas that cover the full range of activities, such as organisational governance, human rights, workplace practices, the environment, commercial practices, consumer issues, social responsibility, and local community development. The next step in specifying the guidelines towards the responsible business were SDG released in 2015.

Poland is not a country without a history of ethical business approach, although over time there have been some actions that have resulted in the fact that the social trust in business has remained at a very low level for many years. The Corporate Social Responsibility in contemporary form has emerged with international corporations that have transferred the standards, ethical codes, or a specific organisational culture. At present, the CSR activities towards the sustainable development are not only a practise of large enterprises, but a standard and even a necessity in small and medium enterprises [Mączyńska 2010].

Based on the Responsible Business Forum data, in the case of companies on the Polish market, the involvement in CSR practices is increasing year by year. There is a growing number of innovative ideas, projects, and activities. More and more companies submit their data and practices in social reports that by 2017 were prepared voluntarily[1]. The number of good practices undertaken by companies over the period 2011–2016 is presented in Figure 3.

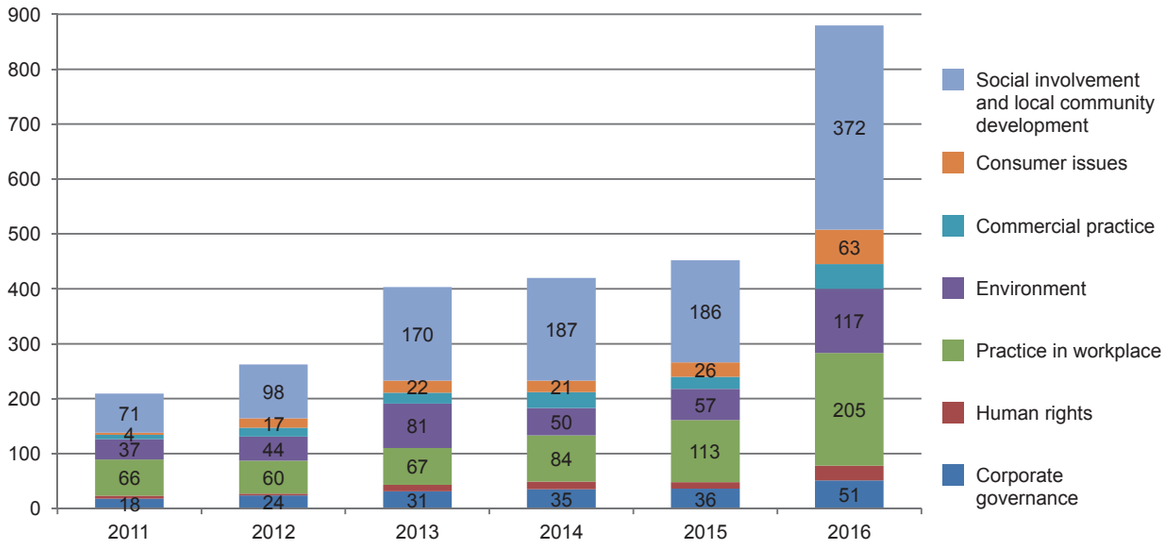

Fig. 3. Number of good practices in CSR areas according to ISO 26000 Standard in companies preparing social reports of good practices on the Polish market in years 2011–2016

Source: Own compilation based on [*Raport. Odpowiedzialny*… 2011, 2012, 2013, 2014, 2015, 2016].

[1] The amendment to the Accounting Act introduced the provisions for increasing the transparency of social and environmental information in the area of corporate social responsibility. This means that since 2017 the entities that employ 500 people a year or the total assets on the balance sheet is over 85 million PLN or the total net revenues from sales of goods and products is over 170 million PLN will have to disclose data related to their policies on social, environmental and employee issues. In addition, large stock companies are required to disclose the diversity data.

The information presented on Figure 3 shows that interest in carrying out socially responsible activities in all areas of responsibility according to the ISO 26000 Standard is growing. The greatest number of practices has emerged in the following areas: social responsibility and development of the local community, workplace practices and the environment. According to the guidelines contained in PN-ISO 26000:2012, social responsibility and the development of the local community are an essential part of sustainable development. The greatest number of practices was most often related to charity and philanthropic activities, educational campaigns, socially involved marketing, health prevention, entrepreneurship development, creation of workplaces, competence development, social innovation and social investment. Likewise, the number of practices in the field of environmental protection has increased. The activities related to biodiversity, eco-building, eco-efficiency, pro-environmental programmes or eco-products.

A good example on the Polish market is the initiative of Barlinek S.A. Group, a manufacturer of wooden flooring, which since 2000 has implemented the "1 for 1" principle. This is the original eco-programme where for one packet of Deska Barlinecka (*Barlinek plank*) sold, the company co-finances the purchase and planting of 1 tree seedling. With this initiative over 13 million trees were planted. As part of "zero waste" approach, Barlinek manufactures wood briquette and fuel pellets, which is an ecological heating fuel. The company engages and is a partner in the "breathe humanly" action, which informs about innovative, modern heating models and the impact of fuel quality on health protection. Thanks to the implementation of socially responsible practices, Barlinek S.A. seeks to improve economic efficiency because the effects of their actions exceed the costs incurred for implementation. At the same time, it is emphasised that socially and ecologically responsible actions affect the intangible value – create trust in the company and social capital as well as tangible value – save money and affect the revenue.

Similar CSR initiatives, related to the industry, are shown by ZT Kruszwica S.A., a leader in the market of vegetable oils and fats. As a food industry company, it promotes a sustainable agricultural model. The company's business is based on a fully integrated operational model that covers all the elements of oil plants processing – from the acquisition of the raw material, through its processing, to the packaging and distribution of the products to the end customer. It is characterised by a typical strategy of a sustainable supply chain. This allows for maintaining full control over the high quality of raw materials used in production. The company is also promoting a programme that for a long time has inspired the local communities to take long-term actions to improve the living conditions of bees in Poland through the creation of bee-friendly places. In this case, the effectiveness of the company is confirmed by the success of this initiative across the country. For example, social activities „Z kujawskim pomagamy pszczołom (*Helping Bees with Kuyavian Voivodeship*)" or „Akademia Mistrza (*Master Academy*)" have high KPIs – Key Performance Indicators, and the measure of their success is the large number of project participants and the high Social Return on Investment (SROI).

Another innovative example, in connection with sustainable development is the latest invention of the Polish company Drutex S.A., a manufacturer of window and door joinery. This is a window that allows watching TV, using the internet or working on the touch panel. Smart Window is designed to combine all the best features associated with energy efficiency or functionality of window joinery with additional multimedia functions. USB drive, external drive with multimedia files as well as the keyboard and mouse can be connected to the window. It's all about giving all the features of a tablet in a window, plus the ability to remotely control your home or use an intelligent window in the form of virtual shutters or awnings protecting against light.

There are more other innovative practices on the Polish market connected with the CSR and closely related to the industry. Figure 4 presents the structure of good practice growth in the various areas and in 2011–2016.

In the researched years, on the Polish market increasing shear of social involvement and local community development within the good corporate practice in CSR has been observed.

Among the CSR activities in the field of sustainable development, a number of long-term practices can be mentioned. Long-term practices are not only activities here and now, but they are involved in changing the minds and attitudes of stakeholders.

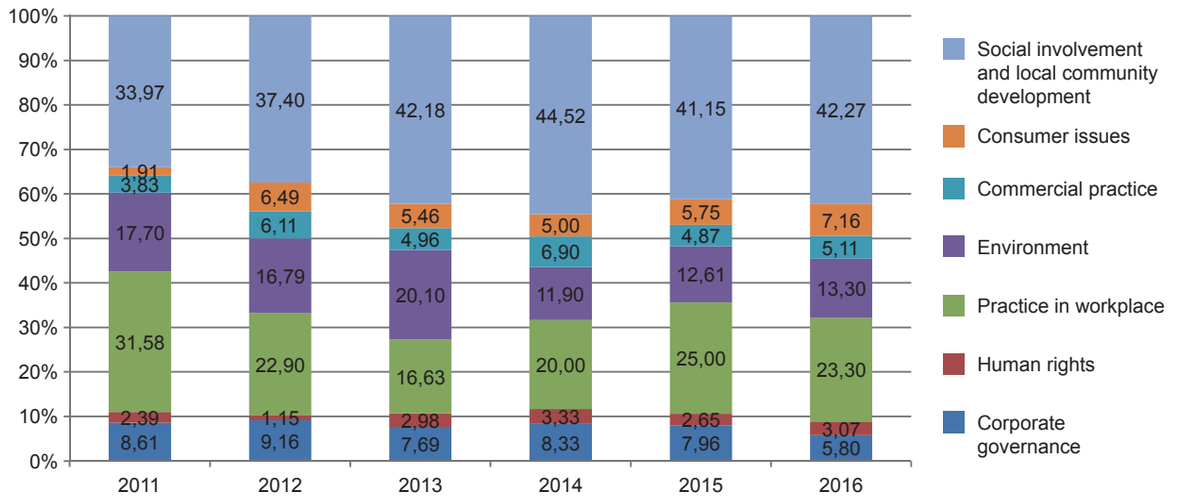

Fig. 4. Structure of good corporate practice in CSR areas according to ISO 26000 Standard in companies preparing social reports of good practices operating on the Polish market in 2011–2016

Source: Own compilation based on [*Raport. Odpowiedzialny*… 2011, 2012, 2013, 2014, 2015, 2016].

All initiatives of a socially responsible nature, although difficult to define in the economic aspect, are increasingly being the subject of real impact on the company's revenues.

The analysis of good practices on the Polish market indicates a growing number of companies interested in building competitive advantage based on careful stakeholder analysis and building competitive advantage, taking into account social and environmental aspects. The most common benefits of implementing such practices are presented in Figure 5.

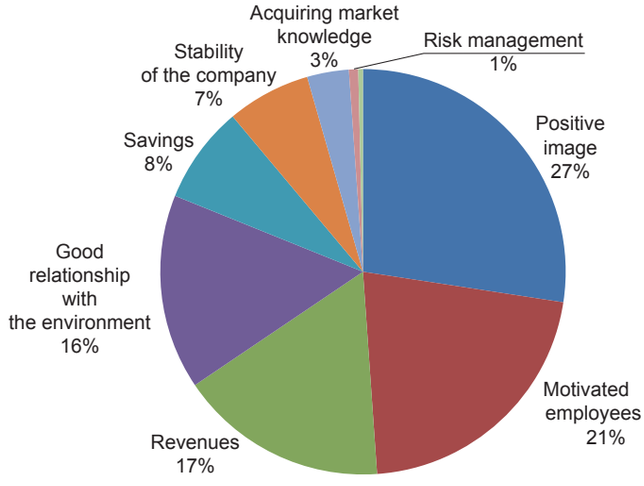

Fig. 5. Benefits of sustainable development principles in Polish companies implementing their own CSR business models

Source: Own compilation based on [Makuch 2012].

As shown in Figure 5, shaping the image is most often mentioned benefit of implementing the responsible actions. This is caused by the first receipt of good business information. Social responsibility is, however, a long-term strategy and therefore, in the long run, the emphasis is placed on building trust through good relationships with stakeholders, as well as greater, stable income and savings. Despite the difficulty in assessing the business benefits from a particular CSR action, it should be emphasised that business interest in corporate social responsibility and the achievement of sustainable development goals is growing rapidly.

CONCLUSION

Despite the early stages of SDG implementation, more and more companies underline the positive impact of socially responsible practices on their business. The development of innovative business strategies has been observed. The inspiration for other companies may be leader companies, who have already implemented a specific CSR strategy as the SDG implementation to build competitive advantage.

Over the years 2011–2016, the number of CSR good practices in the implementation of business strategies has increased four times. The greatest number of practices has been noted in the area of social involvement and development of local community, workplace and environmental practises. The social involvement and community development are the activities most often associated with charity and philanthropic activities, educational campaigns, socially involved marketing, health prevention, entrepreneurship development, creation of workplaces, competence development, social innovation and social investment.

The activities in the field of environmental protection mostly included eco-building, eco-efficiency, and eco-products. New business models: Social X, Lean X, Integrated X, Circular X, emphasize the legitimacy of doing business in a socially responsible way as the only right path to economic development, and this draws attention to the activities of entrepreneurs not only in economic but also the environmental and social aspect. Socially responsible initiatives, though difficult to identify in the economic aspect, are increasingly being the subject of real impact on company's revenues.

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ZRÓWNOWAŻONY ROZWÓJ A KONTEKST BIZNESOWY KORZYŚCI CSR NA POLSKIM RYNKU

STRESZCZENIE

W artykule dokonano identyfikacji rozwoju innowacyjnych, dobrych praktyk w zakresie CSR i zrównoważonego rozwoju w Polsce w latach 2011–2016. W badanym okresie stwierdzono, że najwięcej praktyk odnotowano w obszarze społecznego zaangażowania i rozwoju społeczności lokalnych, praktyk w miejscu pracy oraz środowisku. Prowadzone analizy ukazują, ze na polskim rynku w kontekście zrównoważonego rozwoju powstają nowe paradygmaty biznesowe, innowacyjne strategie CSR, jako realizacja SDG w budowaniu przewagi konkurencyjnej na rynku. Efektywność działań CSR jest trudno mierzalna, ale na przykładzie analizowanych przedsiębiorstw można stwierdzić, że kształtują wartość niematerialną jak również materialną. Wartość niematerialna to kapitał społeczny i zaufanie do firmy, z kolei wartość materialna to oszczędności i wzrost przychodów.

Słowa kluczowe: zrównoważony rozwój, społeczna odpowiedzialność, modele biznesowe

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DETERMINANTS OF PROFITABILITY OF ENTERPRISES OF MEAT INDUSTRY IN POLAND

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ABSTRACT

The aim of the study was to determine the strength and direction of influence of individual factors on the return on equity of the enterprises of the meat industry in Poland in 2008–2012. A detailed analysis covered 86 enterprises engaged in slaughtering and processing of pork and published financial reports in the analysed period. The profitability rate of the studied enterprises are identified based on the return on equity ratio. Du Pont analysis was used in order to determine the reasons for the change in structural system use. The research showed that the meat sector is characterized by relatively low profitability. This is primarily due to high production costs and low selling prices. The economic situation of the enterprises is affected by the high fragmentation of the industry and limited specialization. An additional difficulty are the emerging market affairs that reduce consumer confidence in meat products. Effective management of the enterprise of meat industry requires, therefore, successful analysis of indicators of profitability.

Key words: profitability, return on equity, Du Pont analysis, enterprises, meat industry

INTRODUCTION

Profitability of companies is a major objective the managers set, and is particularly watched by company stakeholders. That's why the rates of return are among the most important measures the companies target during a financial year [Zelgalve et al. 2014]. Profitability means achieving a positive financial result out of the economic activity. It expresses the degree to which the invested capital and assets as well as the resources used in the economic activity of the company have proved efficient. Therefore, it represents the relationship of the financial result to referenced economic values. It determines the functioning and development of individual economic entities and in the macroeconomic scale constitutes the engine of development of particular sectors and the whole economy. It is used not only to evaluate enterprises but also their management's ability to generate profits on capital employed. Profitability ratios are often regarded as the most important element of analysis of the company's economic and financial standing, not only for persons conducting business activity, but also for individuals and businesses entities of the immediate environment (e.g. business partners, customers, suppliers, banking institutions etc.).

Understanding the determinant profitability is the key factors that helps managers in developing an effective profitability strategy for their company [Gitman and Zutter 2012]. The meat industry is the largest sector of the food industry, both in Poland and the EU. Domestic output in this sector is close to EUR 12 billion and it represents approximately 18.0% of the entire food sector [Urban 2011]. Subsequent to Poland joining the EU, the meat sector was one of the fastest growing areas of Polish food economy. However, a continuous

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weakness this industry struggles with is a high fragmentation and slow consolidation processes, which is the primary cause of why a full advantage of the industry's potential has not been taken. The meat industry is facing many difficulties, although it is relatively resistant to economic fluctuations. The sector is negatively affected by declining pig population and high production costs (costs of energy and labour), and especially by high purchase price of raw materials, which represent the most important cost item in the profit and loss account of meat plants.

The analysis of profitability is one of the most valuable sources of information to properly assess the financial situation of the company. Profitability of a business entity is the higher, the greater is the profit are and the lower is the capital employed to generate it [Waśniewski and Skoczylas 2004]. The analysis means not only the study of the profitability ratios but also of their disaggregation and building correlation pyramids of the studied profitability to other ratios. The aim of this study was to determine the strength and impact directions of selected factors on the return on equity ratio of the meat companies engaged in the slaughtering of pigs and pork processing in 2008–2012. In order to achieve the main objective, two specific objectives have been formulated:

- identification of factors affecting the profitability of companies based on literature review;
- determining changes in profitability of selected meat companies.

MATERIALS AND METHODS

The research was based on the studies of reference books and on the data storage statistics from the Central Statistical Office of Poland and the General Veterinary Inspectorate. A detailed analysis covered 86 meat companies which provided financial reports in the years 2008–2012. The profitability of the surveyed companies was determined on the basis of the return on equity ratio which is one of the most important indicators of economic benefits obtained by all types of companies operating in the market economy. The ability to accumulate capital by generating profits is in the long run a decisive precondition to continue or discontinue a business, regardless of industry.

In terms of synthetic approach, however, this indicator does not create wide possibilities of interpretation as the only thing it allows for is to conclude whether the achieved profitability is the result of a high net profit or low equity. Much more knowledge about the cause and effect relationship provides the structural system called "a pyramid structure of ratios". It provides information not only on the profitability level but also indicates the reasons for its changes. It is an indispensable tool for a comprehensive assessment of the companies functioning. The study used the Du Pont analysis. Therefore, the following financial ratios have been defined here:

- return on equity (ROE) – the amount of net income returned as a percentage of a business equity;
- return on assets (ROA) – the amount of net income returned as a percentage of total assets of a business;
- return on sales (ROS) – the amount of revenues from sales returned as a percentage of total assets of a business;
- asset turnover ratio (ATO) – the ratio of the value of a company's sales or revenues generated relative to the value of its assets;
- equity multiplier (EMT) – the ratio of a company's total assets to its stockholders' equity.

Mentioned ratios were calculated for each of the companies surveyed in selected years. Subsequently, companies with outlying indicator values were removed from the group. For this purpose, scatter plots, arithmetic means, standard deviation and variation coefficients were calculated (Table 1). Finally, in the analysed group, remained 70 companies, which were the subject of analysis between the years 2008–2012. They do not belong to the representative group of all meat companies that deal with swine slaughter and/or swine processing, but some of them depend on trends and tendency over the years.

Du Pont's analysis is most often used for individual companies, but also in the literature of the subject there are studies that use this method based on the average for the group of entities [Jarka 2005, Bereżnicka and Franc-Dąbrowska 2008, Bórawski 2009, Wnuczak 2012]. In order to determine the dependencies and tendencies of changes in this group, the mean values of the indicators were used in further analyses.

To calculate the impact of the particular ratios (return on sales, total asset turnover and equity multiplier) on increase or decrease in on the return on equity ratio, the partial differences method was used. This method consists in simultaneous distinguishing individual partial deviations and partial deviations expressing the joint impact of factors as well as in treating them as separate elements of analytical analysis [Bednarski et al. 1993].

Table 1. Variability indices for the analyzed variables

Year	Return on equity (ROE)	Return on assets (ROA)	Return of sale (ROS)	Asset turnover ratio (ATO)	Assets on equity (EMT)
2008	2.17	1.44	2.47	0.65	0.96
2009	2.07	1.36	1.56	0.65	0.68
2010	1.05	1.23	1.47	0.57	0.75
2011	3.56	3.02	3.11	0.57	0.72
2012	3.10	1.68	2.17	0.66	0.74

Source: Author's construction based on financial reports of enterprises.

According to the partial differences method, the impact of the analysed factors on the return on equity was determined in the several following stages:

1. Determining absolute deviations of the analysed ratios.
2. Determining the impact of a change of ratio level on the level of deviation of the return on equity ratio.
3. Determining the joint impact of the combination of the two subsequent factors on ROE changes.
4. Calculating the joint impact of the all three factors on ROE deviations.
5. Comparing the sum of partial deviations and the absolute deviation of ROE.
6. Determining the force and direction of the impact of partial changes on ROE.

FACTORS AFFECTING PROFITABILITY OF COMPANIES

Profitability of companies is affected by many factors that can be divided into internal and external ones. They are interconnected, which could strengthen or weaken their impact on the financial results of the company. Furthermore, the effect can be different in the short and long term. According to D.W. Olszewski, the most important internal factors affecting the profitability of a company are [Szczepankowski 2007]:

- the value and structure of the company's assets;
- financial liquidity;
- development of sales;
- the capital or obligations structure;
- efficiency in working capital management;
- organization of the production process of the company;
- qualified employees.

Whereas the external factors that shape the profitability of the company can be divided into:

- macroeconomic factors – those which are governed by the state of the overall economy; they include a set of conditions related to the fact that the company operates in a given country or region, in a particular climatic zone, in particular political and legal systems and so on;
- sectoral factors – which characterizes the sector, industry, or branch to which the company belongs.

The most important macroeconomic factors include [Radosiński 2010]:

- the phase of the business (development) cycle;
- the price level of strategic raw materials;
- exchange rate policy, interest rate;
- inflation rate;
- the state's economic and fiscal policies;
- other factors such as the influence of trade unions or even applied accounting systems.

On a sectoral basis, the following factors can be distinguished [Cebrowska 2010]:

- intensified competitiveness;
- direction of demand changes;
- characteristics of markets, products and employed technologies, such as product uniformity or feasibility of automate manufacturing processes;
- capacity utilization;
- price level.

In the long term, provided a free flow of information and capital, profitability of the intersectoral systems levels off. In turn, in the short term there can be observed significant differences in this regard.

The meat industry is the largest but also the least profitable branch of the agri-food industry in Poland. This is due to the increasing cost pressure, i.e. increasing prices of feed, large fluctuations in the prices of livestock and consequently low profitability of meat production. A large number of business entities operating on the market and rapidly changing market conditions mean that the fight for the consumer is exacerbating. An additional difficulty is the scandals emerging on the market which limit consumer's confidence in meat products.

Companies in the meat industry faced a particularly difficult situation in 2008–2009 due to the crisis in the financial markets. During this period, many small and medium-sized companies in the meat industry ceased their activities. These were slaughterhouses that were particularly hard hit by the crisis, a large proportion of which ceased further activity due to high raw material prices and the lack of liquidity. In view of the crisis the balance of powers in the meat industry also underwent changes. Some of the biggest meat corporations distributing their products throughout Poland started to dictate their conditions [Szymańska 2014].

Large fragmentation of the industry adds to the negative trends in red meat market. According to the General Veterinary Inspectorate at the beginning of April 2013, 1,158 operators were active in the country, 658 of which were active in pigs slaughtering. The market is largely build by companies with a small production potential. These facilities have gained a strong position in the local market, creating their own brand. Generally, they have a disposable capital, which ensures efficient supply, and a chain of privately-owned shops, which facilitates the sale of the output. Nevertheless, they have a little bargaining power in negotiations with large chain stores and distributors, and they are under increasing pressure from their side. Companies with a high technical, logistical and capital potential make but a small group. It is them that constitute a natural partner for large-scale retail chains and demanding export markets. Due to a large diversity in the meat companies in the Polish market, consolidation processes are slow paced. Many entrepreneurs who have developed their business in recent years are reluctant to integrate with other entities.

Another problem, observed especially with regards to small and medium-sized companies, is insufficient specialization of their production. A lot of meat plants produce even dozens of different products, which does not favor effective utilization of a company's machinery and workforce. This prevents them from concentrating on

producing the most profitable kinds of meats and sausages. A significant fragmentation of Polish producers and their wide range of production also stems from the Polish tradition of producing meat and sausages for domestic or local market's needs. Many of them are products specific to the region, which is why some companies do not want to give up their original recipes and products.

A recent key factor determining the shape of the domestic market was the infestations with ASF virus in Poland. The following economic and political constraints caused the Polish exporters of pork to lose particularly important markets, including the countries of the Customs Union, China, Japan and Korea. As a result of these difficulties in the foreign trade Polish market faced an additional supply of meat, which led to significant price declines. Warehouses in many plants were filled with unsold products that were previously sent to the Eastern markets. In this way, some of the meat plants struggle with unused processing capacities.

CHANGES IN THE PROFITABILITY OF THE MEAT INDUSTRY COMPANIES

In the years 2008–2012 the return on equity in the analysed companies kept changing. It was probably related to the crisis in the financial markets. In 2008, it amounted to 12.49% (Table 2). The following year, this ratio increased by 5 percentage points (p.p.), and in 2010 reached 17.49%. Then, in years 2011–2012, as a result of the economic downturn on the live pig market, the return on equity ratio fell by 60.0%. The rate of return on assets showed similar trends but was lower. In 2008, it leveled 7.62%. In the next year it increased to 8.62% and in 2010 reached the level of 10.34%. In 2011–2012, it declined to respectively 4.31 and 4.07%.

Table 2. Average profitability indices in the analysed enterprises

Year	The size of ratios					Absolute deviations				
	ROE	ROA	ROS	ATO	EMT	ROE	ROA	ROS	ATO	EMT
2008	12.49	7.62	2.05	4.05	2.83	×	×	×	×	×
2009	13.04	8.62	2.74	4.20	2.55	0.55	1.01	0.69	0.15	–0.28
2010	17.49	10.34	3.49	3.69	2.43	4.45	1.72	0.75	–0.51	–0.11
2011	8.28	4.31	1.64	3.83	2.45	–9.21	–6.03	–1.85	0.14	0.02
2012	6.95	2.42	0.65	3.74	2.61	–1.34	–1.89	–0.99	–0.09	0.16

Source: Author's construction based on financial reports of enterprises.

The return on sales in 2008 amounted to 2.05%. In 2009, it increased to 2.74%, and the following year it reached 3.49%. In 2011, the return on sales, as well as other ratios of profitability fell by 53.0%. In the next year this ratio was only 0,65%. The asset turnover ratio changed in the analysed period changed from 4.20 to 3.69, which means that sales revenues were more times higher than the average value of the assets in the companies. However, whereas in 2008–2009 its value increased, in 2010 it was recorded to be reduced. In 2011, the average asset turnover ratio reached 3.83 but in 2012 its value decreased to 3.74. The value of the capital multiplier was the highest in 2008 and amounted to 2.83. In the years 2009–2010 it was recorded to be reduced to 2.43, and in the years 2011–2012 it reported an increase to 2.61.

In order to determine what factors were decisive for the change of the return on equity ratio, it was decomposed using the Du Pont model (Fig. 1). In practice, the system is widely applied for its strong operability, and achieved the goal to provide corporate financial position and operating results, and other information related to

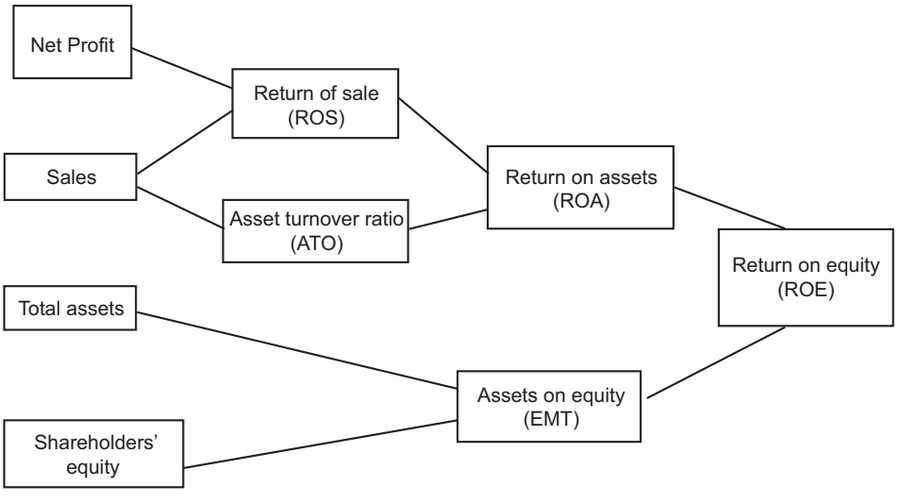

Fig. 1. Du Pont model in the analysis of enterprise efficiency

Source: Author's construction.

the target decision for investors, creditors and other stakeholders [Cheng et al. 2014]. This model shows that the return on equity is conditioned on the return on sales, asset turnover and the financial leverage according to which mechanism the increase in debt translates, on the one hand, into the reduction of the share of equity, and on the other, into the growth of profit per equity [Wędzki 2006].

Throughout the analysed period it was the return on sales that had the greatest impact on the return on equity changes in the meat companies (Table 3). The force of the impact was particularly high in 2010. Compared to the previous year, it increased almost 3 times. At the same time, the changes of this ratio in the first years of the analysis was positively correlated with the changes in the return on equity, while in 2011–2012 different correlations were recorded. In 2010, the increase in the return on equity was mostly due to a slight increase in the return on sales. The impact of asset turnover ratio on the level of return on equity in 2009 was small. The situation changed in 2010 when the importance of the asset turnover in shaping the return on equity increased dramatically, the correlations between these ratios being negative. In the years 2011–2012 again the impact of asset turnover ratio on the level of return on equity was very small, but the character of the relationship between these

Table 3. The impact of return on sales, total asset turnover and capital structure on the return on equity of the analysed enterprises

Year	Impact of changes of factors on size of deviation ROE			Strength of impact		
	ROS	ATO	EMT	ROS	ATO	EMT
2009	7.93	1.18	–3.25	135.22	20.10	–55.31
2010	7.99	–4.53	–1.46	399.75	–226.91	–72.84
2011	–16.60	0.58	0.10	104.25	–3.61	–0.64
2012	–9.33	–0.14	0.39	102.81	1.54	–4.35

Source: Author's construction based on financial reports of enterprises.

ratios was different. The impact of the equity multiplier was the highest in years 2009–2010. Simultaneously, the increase of this ratio contributed to the reduction in the companies' return on equity. A similar situation occurred in the years 2010–2011, but the importance of this ratio in shaping the return on equity was definitely lower.

Calculations show that in the analysed group of companies, in 2010 the return on equity decrease only by 0.55 p.p. A different situation was observed in 2011. Then the return on equity ratio declined by 4.45 p.p. in relation to the previous year. This was due to the following changes:

- reduced return on sales resulted in lowering the ROE by 16.60 p.p.;
- the increase of the assets turnover contributed to a lower ROE of 0.58 p.p.;
- the change in the capital structure led to the increase in ROE of 0.11 p.p.

In 2012, the reducing of the return on equity ratio was stopped. This ratio increase by 7.27 p.p. in relation to the previous year. It was significantly affected by the following changes (Fig. 2):

- the decrease in the return on sales triggered the increase in ROE of 9.33 p.p.;
- the decrease of the assets turnover contributed to a lower ROE of 0.14 p.p.;
- the change in the capital structure led to the decrease of 0.39 p.p. in ROE.

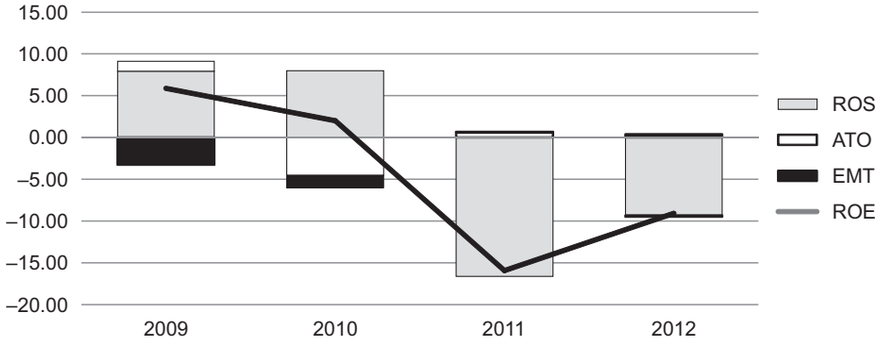

Fig. 2. Decomposition of ROE between 2009 and 2012

Source: Author's construction based on financial reports of enterprises.

CONCLUSIONS

1. The meat industry is the largest sector of the food industry, both in Poland and the EU. Subsequent to Poland joining the EU, the meat sector was one of the fastest growing areas of Polish food economy. Thanks to the EU subsidies a lot of companies increased and modernized their production potential. The situation on the pork market has worsened following the crisis in the financial markets. During this period, many small and medium-sized companies in the meat industry ceased their business activities due to high raw material prices and the lack of liquidity.
2. The meat industry companies are characterized by a relatively low profitability. This is mainly due to a low profitability of meat production, which is determined by high live pig acquisition costs and low selling prices of the products. The economic situation of the companies is also affected by the fragmentation of the industry and insufficient specialization.
3. Profitability of companies can be assessed using different ratios that determine the degree of efficiency of the invested capital and assets as well as the resources used in the economic activity of the company. In terms of synthetic approach, however, these ratios do not create wide possibilities of interpretation. Much more

knowledge about the cause and effect relationship provides the structural system of profitability ratios represented by the Du Pont's pyramid.

4. The research shows that the return on sales had the greatest impact on the changes of the ROE ratio. In 2012, of key importance was also the assets turnover. The impact of the return on sales on the ROE ratio was positive in 2009–2010 and negative in 2011–2012. In turn, the impact of asset turnover ratio on the return on equity was positive only in 2009 and 2012. The smallest effect on the changes in the return on equity was produced by the capital structure ratio.
5. By virtue of a great impact that the return on sales has on the return on equity, company managers should pay particular attention to this indicator, analyse the production structure, its volume and selling price. Making these analyses enables rational decision-making in business management in the meat industry.

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DETERMINANTY RENTOWNOŚCI PRZEDSIĘBIORSTW Z BRANŻY MIĘSNEJ W POLSCE

STRESZCZENIE

Celem badań było określenie siły i kierunków oddziaływania wybranych czynników na rentowność kapitału własnego przedsiębiorstw z branży mięsnej w Polsce w latach 2008–2012. Szczegółową analizą objęto 86 przedsiębiorstw, które zajmowały się ubojem żywca wieprzowego i przetwórstwem wieprzowiny oraz publikowały sprawozdania finansowe w analizowanym okresie. Rentowność badanych przedsiębiorstw określono na podstawie wskaźnika rentowności kapitału własnego. W celu określenia przyczyn jego zmian wykorzystano układ strukturalny, zwany analizą Du Ponta. Z badań wynika, że sektor mięsny charakteryzuje się stosunkowo małą rentownością. Związane jest to z dużymi kosztami produkcji, zwłaszcza pozyskania surowca oraz niskimi cenami sprzedaży produktów. Na sytuację ekonomiczną przedsiębiorstw wpływa także duże rozdrobnienie branży oraz ograniczona specjalizacja. Dodatkowym utrudnieniem są skandale wybuchające w mediach dotyczące produktów spożywczych, które ograniczają zaufanie konsumentów do produktów mięsnych. Efektywne zarządzanie przedsiębiorstwami mięsnymi wymaga zatem dokładnej analizy wskaźników rentowności.

Słowa kluczowe: rentowność, zwrotu z kapitału, analiza Du Pont, przedsiębiorstwa, przemysł mięsny

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PREVALENCE AND SPATIAL DISTRIBUTION OF FUEL POVERTY IN HOUSEHOLDS IN POLAND

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ABSTRACT

Fuel poverty is a phenomenon of experiencing difficulties in satisfying basic energy needs at the place of residence at a reasonable cost, which consists of maintaining an adequate heat standard and supplying other energy types to meet the basic biological and social needs of household members. The aim of the article is to characterise the prevalence and spatial distribution of fuel poverty in Polish households. The article presents the main causes and effects associated with this problem. Data from the Central Statistical Office (GUS) and the Institute for Structural Research (IBS) was used for analysis.

Key words: fuel poverty, household, energy costs, income

INTRODUCTION

The political transformation in Poland has brought with it many positive changes in the political, economic and social systems. Most of these have led to a significant increase in the quality of life for many Polish families. However, despite these positive effects, including a rise in the population's income, many households are still experiencing problems of an economic nature, including poverty [Kalinka 2014].

In order to diligently research poverty-related issues, it is necessary to focus on three aspects of this phenomenon. The first refers to the definition of poverty itself, the second to its origins, while the third should define some general social and economic solutions that can lead to overcoming poverty [Pilch and Lepalczyk 1995].

Many definitions of poverty have been put forward, but they all have a common element in that poverty is linked to the inability to meet certain needs at a desired level. Some authors point out that poverty is seen by society as a lack of sufficient means to subsist, as destitution, deprivation, etc. [Ratyński 2003]. In general, poverty can be defined as a state below a certain income threshold variable over time or a threshold for meeting the needs of an individual, family or social group [Boczoń et al. 1991]. Szamrej-Baran [2011] defines poverty as "the inability to lead a full life due to the scarcity of economic means". Poverty disrupts the balance between social and economic order.

MATERIAL AND METHODS

The aim of the article is to characterise the scale and spatial distribution of fuel poverty in Polish households. The article presents the main causes and effects associated with this problem. The analysis has been performed

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using data from the Central Statistical Office (GUS) and the Institute for Structural Research (IBS). Descriptive and graphical methods have been used to present results of the studies.

RESULTS AND DISCUSSION

One of the types of poverty observed in households is "fuel poverty". In Poland, this concept is quite new, even though the phenomenon itself is not. It is only in recent years that attempts have been made to define it and treat it as a separate item in relation to income poverty. Fuel poverty is only slightly correlated with income poverty, which indicates that it is distinct in nature from income poverty, even though a moderate overlap of these two concepts can be noted. Fuel poverty is a multi-faceted problem affecting economics, health, social affairs and housing.

Fuel poverty occurs when maintaining a comfortable temperature at home is a problem for household members; they have no means to pay for heating bills, repair broken heating systems or install new ones; the home or the flat are continuously cold and humid, often leading to illness [Stępniak and Tomaszewska 2013].

In order to understand the nature of fuel poverty better, it would be useful to trace the origins of this concept. The problem of fuel poverty was first noticed and defined in the UK, which has the most experience in combating this phenomenon. The impulse to take action against fuel poverty came from the analysis of data showing high death rate in the winter months. When performing the study, it was noted that many poor households live in cold, damp flats. The basic cause of this condition was determined, which was bad insulation of buildings, as well as a non-economical and inefficient heating system in dwellings (especially in older buildings). In order to counter the effects, work has been undertaken to improve the living conditions of households. The UK government has decided to reduce the scale of fuel poverty by 2018 [*The UK Fuel Poverty Strategy* 2008].

The United Kingdom is the only country where a definition of fuel poverty based on objective measures has been developed, which says that a fuel poverty situation applies to a household that has to spend more than 10% of its income on maintaining a sufficient level of heating [*The UK Fuel Poverty Strategy* 2008]. However, given the differences between countries, for example different climates, heating systems and income levels, this definition cannot be directly transferred and applied in other countries [Szamrej-Baran 2012].

The general definition formulated by the EPEE project co-funded by the European Commission identifies fuel poverty as follows: "where a household finds it difficult or impossible to ensure adequate heating in the dwelling at an affordable price." [EPEE Consortium 2008a].

The EPEE Project (European Fuel Poverty and Energy Efficiency Project) is co-financed by the European Commission, and, more precisely, received funding from the Intelligent Energy for Europe Programme. The objectives of the EPEE project are as follows: to raise knowledge and understanding of fuel poverty, to estimate the number of households subject to it in five partner countries (Belgium, France, Spain, the UK and Italy), as well as to identify mechanisms and actions to combat this phenomenon.

The EPEE reports outline three main causes for fuel poverty (Fig. 1), which occur separately or intensify each other [EPEE Consortium 2009]:

- low household incomes, limited financial opportunities, often economic poverty, making it impossible to pay regular energy fees;
- high energy prices and inefficient use of available energy – using ineffective, inefficient equipment, lack of awareness of unwarranted energy losses, lack of knowledge regarding simple energy-saving options;
- low energy efficiency of buildings, poor technical condition of residential buildings and heating systems, and their low energy efficiency.

By exerting an influence on the causes of fuel poverty, the scale of this phenomenon can be limited. Improving the energy efficiency of buildings and flats, using better insulation and a more efficient heating system reduces energy bills and, in effect, ameliorated the financial situation of households. Energy prices are a key factor

shaping household energy bills and budgets, and, consequently, their social position. The increase in the number of households in a situation of fuel poverty is linked to rising energy and gas prices. Low household incomes are another cause of fuel poverty.

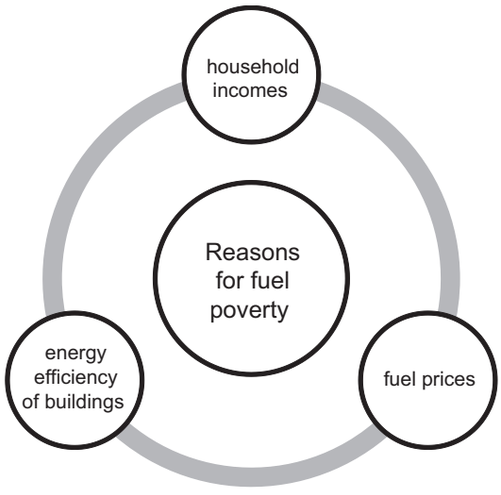

Fig. 1. Primary causes of fuel poverty according to EPEE
Source: Tackling Fuel Poverty in Europe. Recommendations Guide for Policy Makers. EPEE Consortium, September 2009.

Two important aspects are linked to fuel poverty: the financial (energy prices and household solvency within the scope of utility bills) and the technical (energy efficiency of the building).

According to the definition established in the UK, fuel poverty occurs in the case of households whose energy costs, mainly heating, account for more than 10% of income. It follows that the more expensive energy is, the more energy is consumed and the lower the income, the greater the risk of fuel poverty. Poor housing conditions (leaky windows, leaking roofs, damp walls and foundations or insufficient building insulation), as well as problems with the heating system – its lack, failure or ineffectiveness – compound this. These factors make it difficult to keep the right temperature in the dwelling and so increase energy consumption and, in effect, costs. Therefore, there is a clear correlation between the price of energy and the level of the problem in question. In 2002–2015 a significant increase in the prices of most household energy carriers in Poland was observed, which was mainly due to the rise in global fuel prices, but also related to causes originating in the country, i.e. introduction or increase in excise tax and increase in VAT. The biggest growth occurred in prices of fuel used directly in households. The increase in electricity and heat prices, of which the fuel price is a significant but not the only cost component, was relatively lower, despite the need to incur additional fiscal burdens. In relation to average total household expenditures, an increase in the share of expenditure on energy can be noted, from 10.5% in 2002 to 11.4% in 2015. The highest share of energy expenditure occurred in 2011–2013, when it exceeded 12% [GUS 2017].

In turn, by analysing the distribution of household spending on energy, it can be stated that in 2015 there was a falling tendency for this share, which accompanied an increase in disposable income. This was mainly because the share in question fell in the highest income group, which was the only one with a share of energy expenditure below the average for the population as a whole. In the other quintal groups, the share of expenditure was significantly higher, with the highest value for the third quintile (12.8%). This result may suggest that the problem of so-called fuel poverty is not just a question of income (Fig. 2).

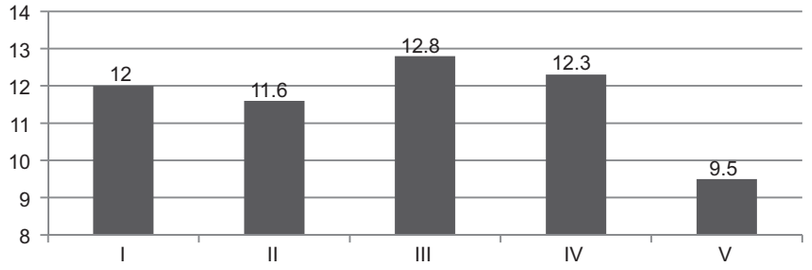

Fig. 2. Share of energy expenditure per capita in quintile groups (as per disposable income per capita) in percentage
Source: Energy consumption in households in 2015 [GUS 2017].

The objective measure of fuel poverty is therefore the relationship between household income and its energy expenditure. The subjective measure of poverty is the declared discomfort associated with the inability to maintain proper temperature in the dwelling (insufficiently warm in winter, insufficiently cool in summer), the quality of thermal insulation, default on energy payments. According to the results of a multi-faceted household survey, social cohesion research completed in 2015, 30% of Polish households declared they were unable to maintain an appropriate temperature in the dwelling [GUS 2017].

The energy efficiency of households in Poland has improved between 2002 and 2015. Consumption per dwelling decreased by 11.0% and by 7.2% when adjusted for climate. The highest consumption was observed in 2010, which was largely due to a severe winter, while the highest consumption adjusted for climate was in 2006. Consumption per dwelling in 2015 was 55.9 GJ, and 61.4 GJ when taking into account the weather conditions and these were the lowest values in the presented period [GUS 2017].

In Poland, the issue of fuel poverty has been covered most extensively by the Institute for Sustainable Development, the Institute for Structural Research and the Institute of Public Affairs, which co-operated on the first statistics-based description of fuel poverty in Poland based on the set definition of the group affected in our country.

The first institutional attempts to tackle fuel poverty in Poland were made in 2013 when the amended Energy Law Act introduced the definition of a sensitive recipient and in the draft Energy Policy of Poland until 2050 [2014] the concept of fuel poverty was mentioned.

According to BBGD (household budget survey) GUS data from 2014, fuel poverty according to the objective LIHC measure[1] touched about 9.6% of households (1.3 million), or 4.5 million people, in Poland. The phenomenon occurred in all voivodeships, but to varying degrees. Fuel poverty according to the LIHC measure was most prevalent in the eastern voivodeships: Podkarpackie (17% of households), Podlaskie (17%), Lubelskie (14%) and Opolskie (15%). The lowest prevalence was noted in the following voivodeships: Śląskie (6%), Mazowieckie (7%), Dolnośląskie (7%) and Pomorskie (7%). Therefore, the difference in the risk of fuel poverty between voivodeships on extreme ends was almost threefold.

According to the subjective measure of fuel poverty, 11.5% of Polish households declared living in premises not sufficiently heated in winter in 2014. As in the case of the LIHC measure, the scale of regional variation in subjective poverty was almost threefold: from 6.1% in the Podkarpackie voivodeship to 17.9% in the Lubuskie voivodeship. For most voivodeships, the relationship between the LIHC measure and the subjective measure of fuel poverty shows a negative gradient, i.e. the higher the percentage of poverty according to LIHC, the lower the percentage of poverty according to the subjective measure is (Fig. 3).

[1] LIHC (Low Income High Costs) – a measure of fuel poverty developed by Hills (2011) that is based on hypothetical energy expenditure. In order for a household to be classified as subject to fuel poverty according to the LIHC definition, it must meet two criteria simultaneously: low income (LI) and high hypothetical energy expenditure (HC).

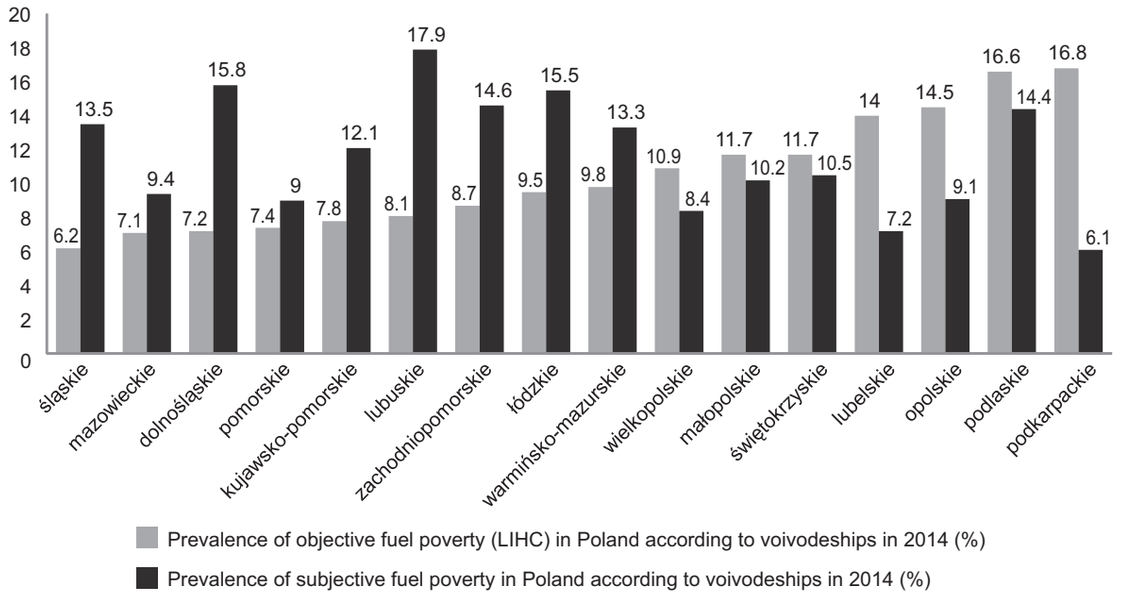

Fig. 3. Scale of fuel poverty in Poland by voivodeship in 2014

Source: Adopted from Lis et al. [2016].

As the above statistics and estimates show, the problem of fuel poverty in Poland is significant. The probability of its occurrence varies according to the place of residence, the structure and number of people in the household, and its wealth. The following are potentially most at risk: households of persons on disability pensions and pensioners, households located in small towns with a population of up to 20 thousand and between 20 and 100 thousand, occupying small (but not the smallest) dwellings – such with an area of 40–54 m^2, single-parent households and single parents [Kurowski 2012].

In terms of income sources, households of people without a source of income and pensioners had the biggest difficulties in heating dwellings in Poland in 2012 (Fig. 4). In terms of the households' place of residence, the households were located in villages and small towns with a population of up to 20 thousand (Fig. 5).

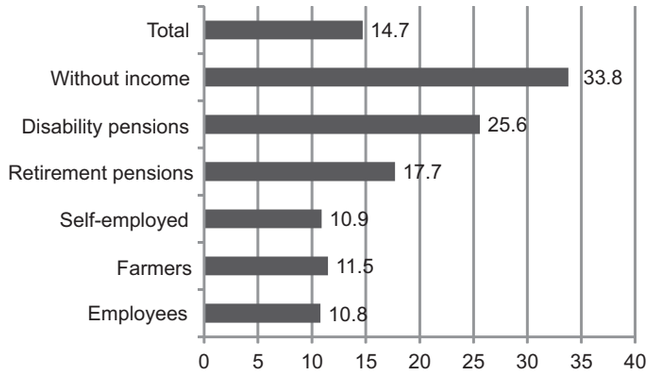

Fig. 4. Difficulties in heating a flat to household sources of income in 2012

Source: EU-SILC study [GUS 2017].

Aside from the economic situation, the problem may also be the technical condition of the home or flat (e.g. lack or insufficient thermal insulation, inefficient or expensive heating source, inefficient electrical equipment) and lack of adequate knowledge and awareness and, as a result, ineffective and inefficient use of heat and electricity [Pyka et al. 2014].

In addition, the highest percentage of fuel poverty was observed in buildings from 1946–1960 and the smallest in recently commissioned buildings (after 2006) and relatively new ones, i.e. built between 1996 and 2006. This shows the relationship of the phenomenon with the low energy efficiency of buildings, such as insufficient insulation or leaks in windows and doors [Owczarek and Miazga 2015].

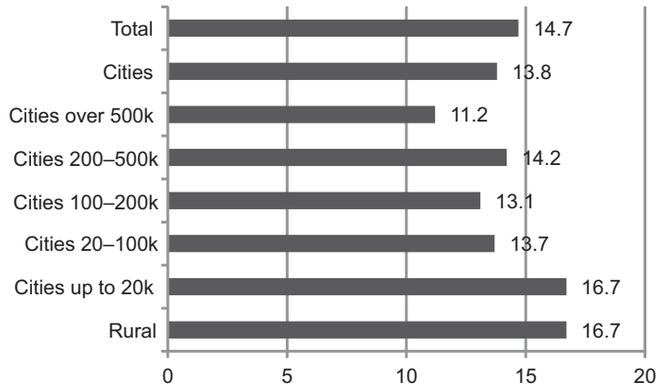

Fig. 5. Difficulties in sufficient heating of a flat according to the households' place of residence in 2012
Source: EU-SILC study [GUS 2017].

Fuel poverty can have a negative impact on physical and mental health. This mainly concerns socially vulnerable consumers, such as children, the elderly and the chronically ill. Permanent cold and humidity can lead to respiratory problems, such as asthma or bronchitis. People who find themselves in a fuel poverty situation are prone to mental health problems. Poor housing conditions can cause anxiety, leading to social exclusion and isolation, and have a negative impact on self-esteem. Another consequence of fuel poverty is building degradation. Moisture in dwellings can very quickly contribute to the degradation of a building. Inadequate insulation of windows, walls or doors contributes to heat losses. The worse the housing situation, the harder it is to maintain the right temperature and, in effect, stop the rising damp process. Households affected by fuel poverty may fall into the trap of over-indebtedness. Low-income households are unable to pay electricity bills, which leads to debt. The need to pay high energy bills leads to a decrease in income that could be used on other basic items such as food and transportation. Fuel poverty also has negative consequences for the natural environment, as it leads to increased carbon dioxide emissions. A low building energy standard leads to an increase in energy consumption needed to heat it, which contributes to an increase in carbon dioxide emissions [EPEE Consortium 2008b].

The introduction of a policy to combat fuel poverty requires identifying the situation and the affected individuals/households. Fuel poverty is becoming a multi-faceted problem that affects very different situations. It is therefore very difficult to choose indicators for households in fuel poverty, but it is not impossible.

The best way to prevent the phenomenon of fuel poverty are activities providing long-lasting effects and minimising the occurrence of the causes for the issue, which are primarily regular increases in energy efficiency of residential buildings through thermal efficiency improvements, as well as the conscious purchase of energy efficient appliances (including lighting) and sparing use of energy by persons at risk of the described issue [Stępniak 2016].

CONCLUSIONS

The issue of fuel poverty is very important for a large segment of society. This is especially true for those in an economically detrimental situation, especially in eastern Poland. Fuel poverty has negative consequences for cognitive development, health and even the lives of those exposed to it. Therefore, its existence should be included in social policy in the form of systemic solutions aimed at counteracting related undesirable phenomena. Fuel poverty can affect the following people: low income, collecting welfare, working part-time, in debt, elderly, disabled and single parents. The phenomenon can affect both families and individuals. Fuel poverty is being treated with increasing seriousness in the European Union. Although there are currently no documents and strategies directly devoted to its prevention and combating it, numerous legal acts – indirectly related to the subject – note the problem. Member States should recognise the fuel poverty situation and adapt the EU's common definition to its own national conditions. Undoubtedly, all measures must be taken to prevent fuel poverty, which affects the prevalence of poverty in general, as well as the level of social exclusion.

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SKALA I PRZESTRZENNE ROZMIESZCZENIE UBÓSTWA ENERGETYCZNEGO W GOSPODARSTWACH DOMOWYCH W POLSCE

STRESZCZENIE

Ubóstwo energetyczne to zjawisko polegające na doświadczeniu trudności w zaspokojeniu podstawowych potrzeb energetycznych w miejscu zamieszkania za rozsądną cenę, na które składa się utrzymanie adekwatnego standardu ciepła i zaopatrzenie w pozostałe rodzaje energii służące zaspokojeniu w adekwatny sposób podstawowych potrzeb funkcjonowania biologicznego i społecznego członków gospodarstwa domowego. Celem artykułu jest scharakteryzowanie skali i przestrzennego rozmieszczenia zjawiska ubóstwa energetycznego w gospodarstwach domowych w Polsce. W artykule ukazano najważniejsze przyczyny i skutki związane z tym problemem. Do analizy wykorzystano dane Głównego Urzędu Statystycznego oraz Instytutu Badań Strukturalnych.

Słowa kluczowe: ubóstwo energetyczne, gospodarstwo domowe, koszty energii, dochód

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SMART SHOPPING IN CONSUMER BEHAVIOUR OF POLISH SENIORS (REPORT FROM OWN RESEARCH)

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ABSTRACT

The observed demographic changes involving mainly progressive ageing of the Polish population are leading to increased market importance of the senior consumer segment. More and more seniors are following new consumer trends, including smart shopping. The article aims to provide some insight into smart shopping, as well as to outline the factors influencing the dissemination of such shopping behaviours, with a broader reference to consumer behaviours of Polish seniors. The first part very synthetically explains the concept and key determinants of the smart shopping consumer trend. The next section focuses on the research conceptualisation and a description of the sample and its characteristics. Based on the conducted research, the last part sheds light on seniors' consumer behaviour and attempts to define the extent to which seniors do smart shopping when making consumer decisions.

Key words: seniors, smart shopping, consumer behaviour

INTRODUCTION

Consumer decisions are affected by a range of determinants that have their source both in the broadly understood environment and in internal conditionings of the consumer as an individual. These elements form a collection of mutually interacting factors that continually evolve and influence changes of other factors. As a result, any analysis of the aspects affecting consumer decisions is a mix of causes and their effects, and researchers studying this field of life have to simultaneously operate at multiple levels of concepts and classifications.

The stereotype of older persons as lonely and poor is slowly starting to be replaced by the image of active people and consumers interested in active life whose approach to life is more hedonistic and who try to meet their own needs and those of their immediate family members. More and more senior consumers are following new consumer trends, including smart shopping, that is buying reasonably – cheaply and safely. This consumer trend implies a new structure, new forms and methods of consumption but also the emergence of new needs and motives for their satisfaction. Today, seniors are increasingly willing to follow these changes. The purpose of the discussion is to identify the influence of smart shopping on the decision-making process of Polish seniors.

The structure of the article is as follows. The first part very synthetically explains the concept and key determinants of the smart shopping consumer trend. The next section focuses on the research conceptualisation and a description of the sample and its characteristics. Based on the conducted research, the last part sheds light on seniors' consumer behaviour and attempts to define the extent to which seniors do smart shopping when making consumer decisions. Finally, major conclusions end this study.

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The concept and drivers of smart shopping of seniors – theoretical framework

The changes in the socio-cultural and economic conditions driven by globalisation and internationalisation lead to the emergence of characteristics of today's consumers who make consumer decisions related to consumer goods and services to be purchased. This also holds true for older consumers who ever more often look for goods and services that would meet their subjective needs while highlighting their individuality. Undoubtedly, the extension of the market offer of consumer goods is accompanied by changing functions of the goods that meet food needs. One of the consequences of changes in consumption among seniors is the fact that needs are satisfied in a more personalised way. Seniors more frequently tend to take consumer decisions based on a broader access to goods that are of various quality. Depending on their disposable income, they seek goods that would be satisfactory because of their quality, price and place of origin (particularly in relation to food products) [Urban et al. 1996, Kim et al. 2014, Atkins and Hyun 2016, Zalega 2016].

Smart shopping is construed as the search for the best market offer which fulfils the criteria specified by the consumer such as the best price of a product, its value or reputation of the company marketing the product. The shopper tries to find out about as many offers as possible in order to gather the greatest possible amount of information about a given product [Reformat 2013]. According to Lipovetsky [2006], smart shopping is a response to hyper-consumption prevailing in the prosperity period at the turn of the century. Mano and Elliott [1997] define smart shopping as a tendency for consumers to invest considerable time and effort in seeking and utilising promotion-related information to achieve price savings. Those authors distinguish three elementary components of smart shopping: marketplace knowledge, behaviours designed to acquire promotion-related information, and the consequences of taking advantage of price promotions. Smart shopping involves investing time in searching for information about promotions, comparing prices of different products (i.a. through web browsers), picking up bargains, "not paying over the odds", controlling emotions fuelled by advertising, and saving money [Rostek and Zalega 2015]. Other definitions suggest that smart shopping requires rational planning of household budget through buying only necessary and previously planned goods at a low price [Atkins and Kim 2012, Atkins et al. 2016, Voropanova 2015, Mittal 2017].

An individual whose consumption fits into this consumer trend is referred to as a "smart shopper". A consumer driven by this idea looks for promotions, takes advantage of bargains, compares prices of products to be purchased, also through web browsers, before making the final purchase. A smart shopper does not like to overpay, and is even oriented towards saving money. Purchasing decisions made by such a shopper are thought through: they are not the result of emotions continually fuelled by the media [Schindler and Bauer 1998]. In addition, a smart shopper takes into account value for money, functionality, composition, and the extent to which the product is a must-have.

Therefore, smart shopping is particularly common among university graduates who make informed purchasing decisions. People with lower levels of education find it more difficult to analyse and assess offers correctly as offers are deliberately designed in a complicated and not very transparent way by producers. This contributes to such persons taking seemingly rational decisions: they completely refrain from shopping or choose cheaper products at the expense of lower quality. Savings so built up are only apparent because products that quickly wear out must be frequently replaced [Zalega 2013]. It is worth stressing that smart shoppers are not unbridled bargain hunters who spend most of their free time in shops looking for the cheapest products and are not interested in promotions as such. Smart shoppers usually buy products that they currently need and do not pay attention solely to their low price. Thus, they calculate the time and cost of transport to a particular shop in order to determine the cost-effectiveness of a promotion.

Smart shopping is driven by the Internet and associated mobile applications, alongside the recent financial and economic crisis [Garretsoni and Burton 2003]. They are contributing to changes in the hitherto habits of consumers. Smart shoppers want to save not only their money but also time. By using technologies such as the smartphone, computer or tablet, they can substantially reduce the time spent shopping and can more easily find

all kinds of discounts and product/service information. With the Internet, smart shoppers are able to quickly check prices of products/services in other shops, but also to compare them by using price comparison websites (e.g. Ceneo.pl, Skąpiec.pl, Nokaut.pl, Tanio.pl). Undoubtedly, such consumer behaviours contribute to money being more efficiently spent by consumers, including older people.

The increased attractiveness of online shopping means that consumers are more and more frequently visiting physical shops solely to view specific products and making their actual purchases online. American marketing specialists have coined the term ROPO (Research Online Purchase Offline) to refer to this phenomenon [Czernecka and Zalega 2017]. These consumer behaviours, called "showrooming", involve consumers inspecting the products they want to buy in order to find out how they look in reality and then using price comparison websites to look for the shop offering these products at the lowest price. The trend opposite to showrooming is webrooming [Nesar and Sabir 2016]. In this case, consumers use the Internet to collect information and opinions about products, but they actually buy them in a traditional shop.

Since 2012, many mobile applications have been available in the Polish market, hence there is no need to manually search for products on price comparison websites. It is enough to take a photograph of a product and an application will find the shop where the consumer will find the product at the lowest price.

The deep interest in price comparison sites in Poland is confirmed by research demonstrating that Polish consumers are ranked first in Europe in terms of popularity of such services. According to the research conducted by the IAB Europe research firm, price comparison sites were used by over 78% of all buyers in the first quarter of 2016. This implies that almost 8 out of 10 people planning to shop compare product prices before making a purchase [*Porównywarka cenowa*... 2016]. Such consumer behaviours are being ever more frequently displayed by seniors.

It should be noted, however, that with the continued technological progress, the market sees the emergence of more and more sites and applications that refer to the idea of smart shopping as well as those that try to deceive consumers by offering them many low priced products or products that are bought under the influence of emotions or impulse given the way in which they are advertised. It is difficult for consumers to use only savings-related sites and applications as market vendors are trying to increase sales at all costs by offering newer and newer products. Just as customers want to buy the best products at the lowest prices, vendors want products to be sold at the highest possible price. Therefore, it is necessary to provide a "golden means" that reconciles both sides.

Smart shoppers tend to prepare for even the simplest and most frequent food purchases. The best way is to make a list of products that must be bought at a given moment. These are all the products that a consumer intends to purchase and that are currently running out or will run out soon. Shopping may be planned through making a list in the paper or electronic form, or by means of several dozens or even hundreds of mobile applications available in the market. All one needs to do is enter the search term in an application shop search engine (App Store, Google Play) and install the application on one's device (very often free of charge). It is estimated that all *smart shopping* applications generate nearly USD 12 billion in revenue [Samcik 2016].

As argued by Schindler [1989], the effects of smart shopping may be considered from the point of view of consumer satisfaction derived from the shopping done. Such satisfaction may be gained not only from utilitarian benefits of shopping but also from emotional benefits such as a sense of accomplishment and pride that are often shared with the closest family members.

Conceptualisation of research

The empirical material contained in this article comes from direct research conducted in the form of a survey questionnaire on a sample of 2,537 households in 2014–2015 in 10 Polish cities of various populations and sizes. In accordance with the research assumptions, the sample included persons over 65 years of age who took independent purchasing decisions in the market. In order to select the sample, the selective quota sampling procedure was used. The characteristics (quotas) covered by the research were: sex and age.

The survey was conducted among participants of the University of the Third Age (UTA) at state universities in: Warsaw, Kraków, Łódź, Poznań, Gdańsk, Katowice, Lublin, Białystok, Toruń and Wrocław, as well as among members of parochial clubs in parishes located in the Archdioceses of Warsaw, Kraków, Łódź, Białystok, Gdańsk, Katowice, Lublin, Poznań, Wrocław and the Dioceses of Warsaw-Praga and Toruń.

Selection and characteristics of the research sample

Studying consumer behaviours is an extremely intricate process. This is due to the complexity of consumption and consumer purchasing behaviours in the field of consumer decision-making. Such research encompasses an important step to explain the phenomenon examined, namely adoption of specific indicators. This is essential because an indicator is used to define a certain characteristic of an object or phenomenon which is in such a relation with another characteristic that indicates the occurrence of the latter when it occurs itself. An indicator is a measurable, i.e. empirically available, variable. When consumer behaviours are investigated, indicators explaining the complexity of this phenomenon include demographic (sex, age, place of residence, household size) and socio-economic (education, income) indicators.

The survey covered 71% of women, with only every third respondent being male. There were definitely more women than men and people aged 65–74 formed the largest age group in the sample[1]. Place of residence was also an important variable in the research. In line with the research assumptions, the sample comprised respondents who lived in the largest Polish cities.

Respondents were also asked about their level of education. The questionnaire included four categories of education: primary, basic vocational, secondary and higher education. Respondents with secondary education formed the largest group. Nearly 2/5 of those surveyed declared this level. Every fourth respondent was a university graduate, and those with basic vocational education represented a similar percentage. In the sample surveyed, people with primary education formed the smallest group (11.4%).

Nearly half of those surveyed were members of households consisting of two persons, while fewer than 2/5 represented three-person households. Every sixth respondent was a member of a single-person household.

The largest group of respondents included people whose monthly income per capita did not exceed PLN 2,000.00. For every third respondent, the monthly income per household member ranged from PLN 2,001.00 to 3,000.00. In turn, every fourth person interviewed had monthly disposable income per capita of between PLN 3,001.00 and 4,000.00. The smallest group of respondents included households where the income was above PLN 4,000.00 per capita a month.

Consumer behaviour of people aged 65+

When analysing consumer behaviour of people aged 65+, it is important to remember that they make up a widely diverse group in terms of income and needs, preferences and lifestyles which is, nonetheless, very attractive for many entities, including companies and banks.

In order to understand shopping habits and preferences of the elderly, it is necessary to analyse: the shopping frequency, respondents' attitudes to shopping, factors taken into account when shopping, and preferred shopping locations where consumer goods and services can be bought.

[1] The Anglo-Saxon literature uses the following division of older people: (1) young old – people aged 60/65–74; (2) old old – people aged 75–84; and (3) the oldest old – people aged 85 and more. The age classification in this study is similar to that proposed by the WHO [Moschis 1992]. The author divided seniors into: (1) young old – people aged 65–74, (2) old old – people aged 75–84, and (3) the oldest old – people aged 85 and more. According to the UN, the conventional old-age threshold is 65. It should be remembered, however, that old age is not just the number of years that a person has lived. We distinguish calendar (chronological) age and biological age. Many factors often cause very large discrepancies between chronological and biological ages.

The findings concerning how often the elderly do shopping confirm that the seniors surveyed can be considered as active consumers. Every fourth respondent does shopping every day, more than 2/5 of seniors – a few times a week, every third – once a week, and only 2% of all respondents shop less frequently. It can, therefore, be stated that as many as 66% of the elderly are active consumers who systematically visit both small shops and local bazaars as well as shopping malls and shopping centres.

This frequency is influenced by the age of respondents (Kendall's tau-b coefficient was 0.177 for $p \leq 0.01$). Young old seniors do shopping far more often than the oldest old. In the 65–74 age group, more than 3/5 state that they do shopping every day, which may be said for every third respondent in the 75–84 age group and for only one in ten oldest old respondents.

Seniors' education is another variable that statistically significantly influences the frequency of shopping done by the surveyed people aged 65+ (Kendall's tau-b coefficient was 0.157 for $p \leq 0.01$). It has been found that the higher the educational level, the more frequent shopping. Hence, it is not surprising that seniors with higher education say that they do shopping every day more often than those with primary education. The survey reveals that women state that they tend to do shopping daily more frequently than men (Cramér's V 0.274 for $p \leq 0.01$). In addition, a better financial situation of seniors is directly reflected as more frequent shopping (Kendall's tau-b coefficient was 0.124 for $p \leq 0.01$). Shopping is done every day by almost every second respondent with a monthly income of more than PLN 3,000.00 per capita and by every third senior with a monthly income of PLN 3,001.00–4,000.00 per person. Only one of ten respondents aged 65+ earning a monthly income per capita of less than PLN 2,000.00 declares daily shopping. This group of seniors does shopping once or a few times a week.

Based on the analysis of the research material, it can be stated that the financial situation of the seniors surveyed had a major effect on the shopping frequency when price reductions were offered (Kendall's tau-b coefficient was 0.126 for $p \leq 0.010$). The better the financial situation of people aged 65+ was, the less numerous the respondents who tended to shop under the influence of discounts were. The survey demonstrates that more frequent purchases motivated by price reductions were reported by seniors in a bad and very bad financial situation (69.3%), by more than 2/5 of respondents assessing their financial situation as good, and by almost every ninth respondent in a very good financial situation.

It was also noted that shopping was done by seniors attending courses at Universities of the Third Age (UTA) more often than by those who were members of parochial communities (Cramér's V was 0.271 for $p \leq 0.01$).

The survey reveals that the place of residence of older people is not a statistically significant variable that affects the frequency of shopping. It appears that senior inhabitants of Warsaw, Kraków, Poznań and Wrocław most often declare that they do shopping daily, whereas the elderly from Białystok and Lublin do this least frequently.

Respondents' attitude towards shopping is an extremely important element to consider when analysing senior's shopping habits and preferences (Table 1).

In the context of the findings, it can be concluded that almost 3/5 of seniors like shopping or like it very much. Every third person aged 65+ claims to be reluctant to shop, and only every seventh senior admits disliking shopping.

A positive or negative attitude towards shopping is determined by age, education level and wealth of the seniors surveyed. Shopping is a big or very big pleasure for people aged 65–74, mostly women with secondary or higher education, earning a monthly income of over PLN 3,000.00 per capita and living in Warsaw, Kraków and Poznań. The survey results indicate that senior university graduates reported that they liked shopping more often than those with primary education (Kendall's tau-b coefficient was 0.161 for $p \leq 0.01$). The analysis also suggests that women not only were far more inclined to shop more frequently but also declared that shopping was a great pleasure for them, as compared with men (Cramér's V was 0.309 for $p \leq 0.01$). In turn, a better financial situation motivated the seniors interviewed to do shopping more often and also made them more frequently

Table 1. Attitudes towards shopping among the seniors surveyed (%)

Items	Attitude towards shopping			
	I like it very much	I like it	I do shopping because I have to	I don't like it
Total	24.8	34.3	26.3	14.6
Age:				
65–74	39.3	40.3	15.2	5.2
75–84	19.0	39.5	21.4	20.1
85 and more	16.1	23.1	42.3	18.5
Sex:				
Female	26.7	35.1	24.3	10.9
Male	22.9	33.5	28.3	18.3
Education:				
Primary	23.5	33.6	29.5	13.4
Basic vocational	22.6	35.2	25.8	16.4
Secondary	27.3	33.9	26.7	12.1
Higher	25.8	34.5	23.2	16.5
Income per capita:				
Up to PLN 2,000.00	12.5	30.9	34.2	22.4
PLN 2,001.00–3,000.00	21.7	31.8	27.8	18.7
PLN 3,001.00–4,000.00	30.5	35.2	20.9	13.4
More than PLN 4,000.00	34.5	39.3	22.3	3.9
Place of residence:				
Warsaw	26.1	35.2	24.9	13.8
Kraków	25.6	35.7	25.8	12.9
Łódź	23.9	34.3	26.7	15.1
Wrocław	24.8	33.9	25.1	16.2
Poznań	26.1	35.0	25.7	13.2
Gdańsk	25.8	34.1	25.9	14.2
Katowice	25.1	33.9	26.9	14.1
Lublin	22.9	33.7	27.3	16.1
Białystok	22.8	34.2	27.8	15.2
Toruń	24.9	33.0	27.0	15.1
UTA students	27.9	37.2	24.0	10.9
Parochial community members	21.7	31.4	28.6	18.3

Source: The author's research.

claim that shopping was a source of big or very big pleasure (Kendall's tau-b coefficient was 0.109 for $p \leq 0.01$). In addition, some of them (mostly women) said that they liked shopping or liked it very much, emphasising that they often did shopping with a neighbour or friend.

In contrast, the greatest reluctance to do shopping was reported by the oldest seniors (85+), principally men with higher and basic vocational education, earning a per capita monthly income not exceeding PLN 2,000.00 and living in Wrocław and Lublin.

Having general knowledge of the frequency of shopping done by the seniors surveyed, an essential question may be asked: When making purchasing decisions, do older people fit into the consumer trend of smart shopping?

The surveyed seniors as smart shoppers

From among the plethora of new (alternative) consumer trends in the purchasing behaviours displayed by today's consumers, the elderly chiefly follow the smart shopping trend.

As many as 87.4% of people aged 65+ who have completed primary or basic vocational education stated that they looked for promotions and price reductions when shopping, and 82.3% of them reported that they always looked for the lowest prices. On the other hand, more than half of respondents with higher education said that they decided to purchase goods and services based on an analysis and assessment of the offer, taking into account not only the price of the product itself but also its quality, composition and functionality. This clearly confirms that smart shopping is most popular among wealthier and better-educated senior consumers.

More than 84% of the those interviewed plan their shopping (make a list of products needed) and budget at home before going out. By shopping according to a plan, they find it easier to avoid the temptation to buy unplanned products. Most respondents also claimed that they tried not to be driven by emotions and to buy only those products that they needed at the optimum time for their purchase. It may, therefore, be said that this is a rather rational behaviour, as taking time to think a purchase decision out makes it possible to spot additional opportunities, notably to check whether the product will be cheaper, since many shops announce their own price promotions to encourage shopping. Moreover, smart seniors ever more frequently read product descriptions and check product compositions. Every tenth respondent shopping in physical shops and every third senior shopping online did so.

The research on smart shopping also suggests that almost 87% of respondents go shopping after having a meal so that they are full and in a neutral mood. By contrast, every third senior tries to avoid buying unnecessary items by picking a small trolley and using information available in shops (e.g. unit prices). In turn, more than 2/5 of people aged 65+ strive to save on small purchases in order to afford to buy more, thus acting in line with the familiar English proverb "Take care of the pennies, the pounds will take care of themselves".

The survey conducted shows unambiguously that smart seniors are chiefly female university graduates aged 65–74 who live mainly in Warsaw, Kraków and Poznań and UTA students. It has also been found that seniors with a monthly per capita income of above PLN 2,000.00 were more inclined to search for savings when buying not only food but also non-food products, primarily clothing and footwear. As many as 3/4 of university graduates earning the highest monthly income per family member thought that it was relatively easy to decide on price-quality relationship, composition and functionality of clothing and food products. Only every tenth senior (most usually from Warsaw, Poznań and Wrocław) visited the so-called outlet centres, which are the essence of smart shopping as they offer good quality products at prices lower by 30–70% than prices of the same products in other shops. Over 2/5 of people aged 65+ use shop-specific loyalty programmes (available at a particular shop), every third uses loyalty programmes of many shops such as PAYBACK (collecting points or stamps), and merely every tenth senior uses cashback schemes (for example, schemes whereby some money spent in particular shops is returned).

A similar behaviour of older consumers was observed by Campbell [2008] who – based on his research – demonstrated that older people are mostly thrifty consumers who spend money as reasonably as possible. This is mainly because they spend their shopping time primarily looking around, gathering information and critically comparing prices of consumer goods and services. Due to their limited disposable income, seniors adopt a rather rational approach to shopping and rarely give in to emotions, impulsive behaviour and imitation.

Smart shopping is closely linked with the shopping trend called "showrooming". Showrooming means visiting shops for the sole purpose of inspecting and testing products with the intention to buy them elsewhere and at a cheaper price, most commonly in online shops that offer discounts (e.g. discount codes, regular customer discounts, birthday discounts) or in less expensive shops. Inspecting and comparing products in shops is driven by two needs. Firstly, the confidence that the product price is the best possible offer, and secondly,

that the product will meet our expectations and is suitable for us. Such a behaviour is often accompanied by simultaneously checking online shop offers, taking product photos, sharing them on Instagram, reading and providing feedback on specific models in social media, etc., by using smartphones [*Showrooming z telefonem...* 2016].

The survey reveals that only every eighth senior said that they went to a physical shop, but only to inspect products rather than buy them. After testing the product, that is viewing, touching and checking it, respondents returned home and finalised the transaction online. Such a behaviour was most common for seniors in the 65–74 age group, chiefly male university graduates with a monthly income exceeding PLN 3,000.00 per capita who lived in Warsaw (21.3%), Kraków (15.6%) and Gdańsk (15.1%), and primarily UTA students (16.7%). Merely 8.3% of parochial community members were interested in this shopping trend.

Slightly more elderly people are following the shopping trend that is opposite to "showrooming", namely "webrooming". Webrooming involves watching products on the Internet and finalising transactions in a physical shop, whereas showrooming works the other way: people inspect products in a shop and buy them online. Rather than walking around shops for many hours, webroomers prefer checking products online and choose a traditional shop to confirm the product utility, verify the product personally by trying it on or testing it, in order to ultimately finalise the purchase. This is a more and more common way in which consumers shop for clothing, footwear, electronics and cosmetics. It is the Internet that eventually convinces them to buy in a physical shop [*Polaków wziął webrooming*… 2015]. This is facilitated by consumer-dedicated applications of clothing, chemist's and other shops, online reviews, bloggers' promotion and opinions, web forums, etc.

Based on the analysis of the research material, it can be said that almost every fourth senior respondent claimed to use the Internet to collect information and opinions about products yet to make the actual purchase in a physical shop. When buying in offline shops, over half of seniors following the webrooming trend use applications that allow them to find a product at a better price than in another shop. This was a more popular behaviour in the case of women aged 65–74 with higher and secondary education, earning PLN 3,001.00–4,000.00, living in Warsaw (33.7%) and Gdańsk (26.4%), who were mostly UTA students (34.3%). Webrooming was significantly less popular among senior parochial community members. Merely 14.9% of them followed this shopping trend.

CONCLUSIONS

Until recently, seniors were seen as a group with limited consumption needs, low level of activity and incomes. The stereotype of older persons as lonely and poor is slowly starting to be replaced by the image of active people and consumers interested in active life whose approach to life is more hedonistic and who try to meet their needs and those of their immediate family members. Today, seniors are increasingly creative, using technological advances in their daily lives, which consequently affects their consumer attitudes and behaviours. With the acquisition of new skills, they are following many new consumer trends, including smart shopping.

The surveyed senior smart shoppers pay most attention to the price and quality of the products and services they buy. They are rather reasonable shoppers. Almost 4/5 of them do not buy items that prove to be unnecessary later, and only every fifth senior happens to do so. It can be concluded that most of the surveyed people aged 65+ are smart shoppers because they opt for a variety of solutions that help shop reasonably. When planning shopping, the most popular solutions include browsing through promotional brochures available at the shop entrance, browsing the Internet for offers, and taking advantage of lower prices in online shops. Most smart shoppers are found in the group of well-educated people aged 65–74, principally women with a disposable per capita income in excess of PLN 3,000.00 who live in the largest urban agglomerations.

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SPRYTNE ZAKUPY W ZACHOWANIACH KONSUMENCKICH POLSKICH SENIORÓW W ŚWIETLE WYNIKÓW BADAŃ WŁASNYCH

STRESZCZENIE

Obserwowane zmiany demograficzne związane głównie z postępującym procesem starzenia się polskiego społeczeństwa wpływają na wzrost znaczenia segmentu konsumentów-seniorów na rynku. Seniorzy coraz częściej ulegają nowym trendom konsumenckim, do których zaliczane są sprytne zakupy (ang. *smart shopping*). Celem artykułu jest przybliżenie pojęcia *smart shopping*, w tym scharakteryzowanie czynników wpływających na upowszechnienie się tego typu zachowań zakupowych, szerzej odnosząc się do zachowań konsumenckich osób starszych w Polsce. W pierwszej części tekstu, w sposób bardzo syntetyczny, wyjaśniono pojęcie i kluczowe czynniki determinujące trend konsumencki, jakim są sprytne zakupy. W dalszej części opracowania skoncentrowano się na konceptualizacji badań oraz opisie próby i jej cech charakterystycznych. Z kolei w ostatniej części artykułu, na podstawie przeprowadzonych badań, naświetlono zachowania konsumenckie osób starszych oraz spróbowano uchwycić, w jakim stopniu badani seniorzy ulegają sprytnym zakupom podczas podejmowania decyzji konsumpcyjnych.

Słowa kluczowe: osoby starsze, sprytne zakupy, zachowania konsumpcyjne

CONTENTS

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The journal *Acta Scientiarum Polonorum Oeconomia* features original scientific articles related to all aspects of economy, for example: food economy, European consumer goods market, sustainable regional development, development of culture environment, post crises political and social processes, human and social capital, labour market – gender perspective, public finances, rural development and entrepreneurship, social and innovative entrepreneurship, tourist economy.

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

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Turski, W. (1972). Projektowanie oprogramowania systemów liczących (Software design of computing systems). Mat. konf. Projektowanie maszyn i systemów cyfrowych. Warszawa 2–5 czerwca 1971. PWN, Warszawa, 132–139.

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