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THE EFFECT OF MACROECONOMIC FACTORS ON CHANGES IN REAL ESTATE PRICES – RESPONSE AND INTERACTION

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Abstract. In most European real estate markets, in the last decade, rapid changes in property prices, both upward and downward, were observed. Those fluctuations can be attributed to changes in economic and social factors that affect the property market. The aim of this study was to determine how housing prices are changing under the influence of macroeconomic factors. A multiple regression model was developed for a quantitative analysis of correlations between control variables and the market state variable. The model was modified by accounting for lag values determined for each variable. The results of the study suggest that during periods of instability, the real estate market is a driver of social and economic changes.

Key words: real estate market, macroeconomic factors, lag

INTRODUCTION

The fulfillment of housing needs is one of the fundamental human desires. According to Maslov's hierarchy of needs, housing satisfies the basic physical requirements for safety and survival as well as the need for social contact, esteem and self-actualization. Housing fulfills a broad spectrum of needs, which implies that the property market, where housing resources are transferred, affects the behavior of individuals as well as the entire society.

The real estate market is a system of cross-correlated market participants who offer and exchange properties by transferring the rights to own and use that property under specific market conditions [Kałkowski 2003]. The property market is connected to the business and social environment by a system of communicating vessels. Stagnation in one of the segments and lack of communication between the sectors have a negative

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impact on the remaining elements of the system [Foryś 2011]. As a recipient of signals generated in the market environment, the property market also generates signals that affect the environment. This leads to mutual feedback, and both the property market and its environment respond strongly to changes in those signals. This process is inseparably connected with time: signals of different type and strength as well as different responses of the property market and its environment are encountered in every unit of time. The above implies that the property market is an open system capable of exchanging signals with other open systems. It is also a dynamic system which indicates that its evolution over time can be described mathematically [Ott 1997].

By sending signals to the environment and receiving feedback, the real estate market undergoes structural transformation in time. If the system's sensitivity threshold to external stimuli is exceeded, it becomes destabilized and moves from a nearly balanced state to a state that is far from equilibrium. This behavior is indicative of market instability: in the process of adapting to environmental stimuli, the market rapidly changes its structure.

Considerable changes in real estate prices were observed on the Polish housing market within relatively short time intervals. Those fluctuations can be attributed to changes in economic and social factors that affect the property market. This study analyzes variations in housing prices to investigate the lag in the market's responsiveness to changes in selected environmental stimuli. The possibility of building mathematical models which describe fluctuations in property prices based on macroeconomic data was also examined. The analysis covered the housing market in the city of Olsztyn, in the north-eastern part of Poland. The discussed research problem and the adopted methodology can be related to any local market operating on free market principles.

The aim of this study was to determine how housing prices are changing under the influence of macroeconomic factors and measure the level of delays in these changes. The value of that lag relative to the market state variable was analyzed for every control variable

DETERMINANTS OF REAL ESTATE MARKET GROWTH – DATA DESCRIPTION

The real estate market is connected to the social and economic environment by a system of communicating vessels. The market responds to changes in macroeconomic and demographic indicators, and it receives stimulatory feedback. Dynamic changes in key market parameters can influence the basic parameters describing the market environment. The main problem in research studies investigating the market's vulnerability to environmental changes is the selection of market state variables and control variables.

Selection of market state variables
Market state variables may include the value of real estate, rent prices, return rate, number of property transactions, time required to sell the property and property price indicators. The price of real estate is most often selected as the market state variable. The price, the dynamics of price changes and change trends are robust indicators of market situation, and those variables are popularly used for analytical purposes. Gatzlaff and

Ling [1994] investigated the determinants of variability in housing prices, whereas Qiu [2009] performed a similar analysis on the market of commercial property. The correlations between property prices and fiscal and monetary policies were studied by Darrat and Glascock [1993]. The causes of price bubbles in real estate were investigated by Gros [2007], whereas Ito and Iwaisako [1995] observed that sudden fluctuations in property prices on the Japanese market result from changes in the fundamentals, such as growth of the real economy or interest rates.

Based on a review of the referenced studies, the price of 1 m^2 of an apartment (dwellings) was adopted as the market state variable for analyses of relationships between the real estate market and its environment. The prices were quoted in Olsztyn – a regional capital city with a total area of 88.33 km^2, estimated population of 180,000 and population density of 1,986 people per 1 km^2. The Register of Prices and Values kept by the City Administration Office in Olsztyn was the source of data representing 11,997 residential property transactions (apartments). The register combines information about all types of transactions including non-market transactions therefore, the database had to be filtered to produce data for market transactions only. In the filtering process, non-market transactions were eliminated from the database based on the following criteria: transactions identified as non-market transactions, transactions involving the Municipality of Olsztyn (including real estate sold both outside and during public auctions, granted discounts), donations, sale of fractional ownership of property, real estate with easements, semi-detached houses, conditional sale of property. The filtered database comprised 9,212 property transactions concluded in Olsztyn between January 2001 and November 2011. The aforementioned, data was used to calculate the average prices per 1 m^2 of apartments in monthly intervals (Fig. 1).
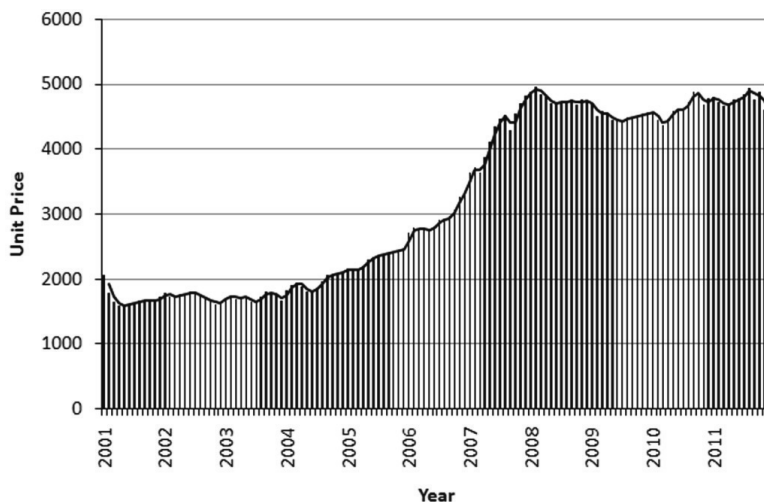
Fig. 1.   Average per square meter prices changes of apartments in Olsztyn between January 2001 and November 2011

Source: Own study.

Several phenomena observed in the analyzed period could point to the instability of the property market. Due to changes in the system's control variables, the market leaves the trajectory of its evolutionary path (defined by the market state variable – P). The sudden changes in property prices noted between January 2007 and the first months of 2008 do not adjust the existing trend because the system has to search for a new state of equilibrium that corresponds to new market conditions, as determined by control variables. The aforementioned period was characterized by the highest differences between minimum and maximum prices which reached PLN 4,500 and an estimated 10% monthly increase in apartments prices. The local property market was stable in 2001–2006 and 2008–2011, minor variations in real estate prices were noted where an upward trend was followed by a downward trend.

Selection of control variables

The choice of control variables is more complex because the selection of factors that determine variations in property prices in time and space continues to be a subject of debate in scientific publications. Adams and Füss [2010] investigated the long-term effect of dynamic changes in selected macroeconomic factors on variations in property prices in 15 countries. Their empirical results indicate positive effects on house prices arising from an increase in economic activity, construction costs and the short-term interest rate and negative effects stemming from an increase in the long-term interest rate. In a study analyzing the significance of factors that lead to variations in property prices, Żelazowski [2011] examined economic indicators (GDP, construction costs, household incomes) and demographic factors (population, age structure, migration balance). Kasparowa and White [2001] studied the responsiveness of house prices to macroeconomic forces and found that real estate prices are driven by income growth and interest rates. Iacovello and Minetti [2003] argued that the availability of mortgage loans and liberal lending procedures drive demand and increase property prices. Quigley [1999] analyzed the correlations between economic cycles and real estate prices, while Sornette and Woodard [2010] observed that the situation on the financial market is the underlying cause of rapid changes in real estate prices. According to the European Central Bank [2003], changes in interest rates on financial markets affect property prices and business cycles on the real estate market (number of construction and upgrading projects), cost and availability of loans (for households and businesses, thus influencing the demand for loans), debt servicing costs and decrease consumer spending. In a study of the Polish housing market, Foryś [2011] examined economic (GDP, performance of construction and assembly markets, unemployment rate, number of new apartments, availability of loans, state spending on housing) and social drivers of growth (demographic factors, marriage rates, divorce rates, natural population increase, migration balance).

The following control variables were adopted for the study: gross domestic product (GDP), inflation rate (IR), average interest rate quoted by the central bank (ARN) which comprises the reference rate, the lombard rate and the rediscount rate, unemployment rate (UR) and the number of new dwellings (NND). The sources of aforementioned data were the Central Statistical Office and the National Bank of Poland. Relations between the state variable (P) and selected macroeconomic indicators (GDP, IR, ARN, UR, NND) is shown in Figure 2.
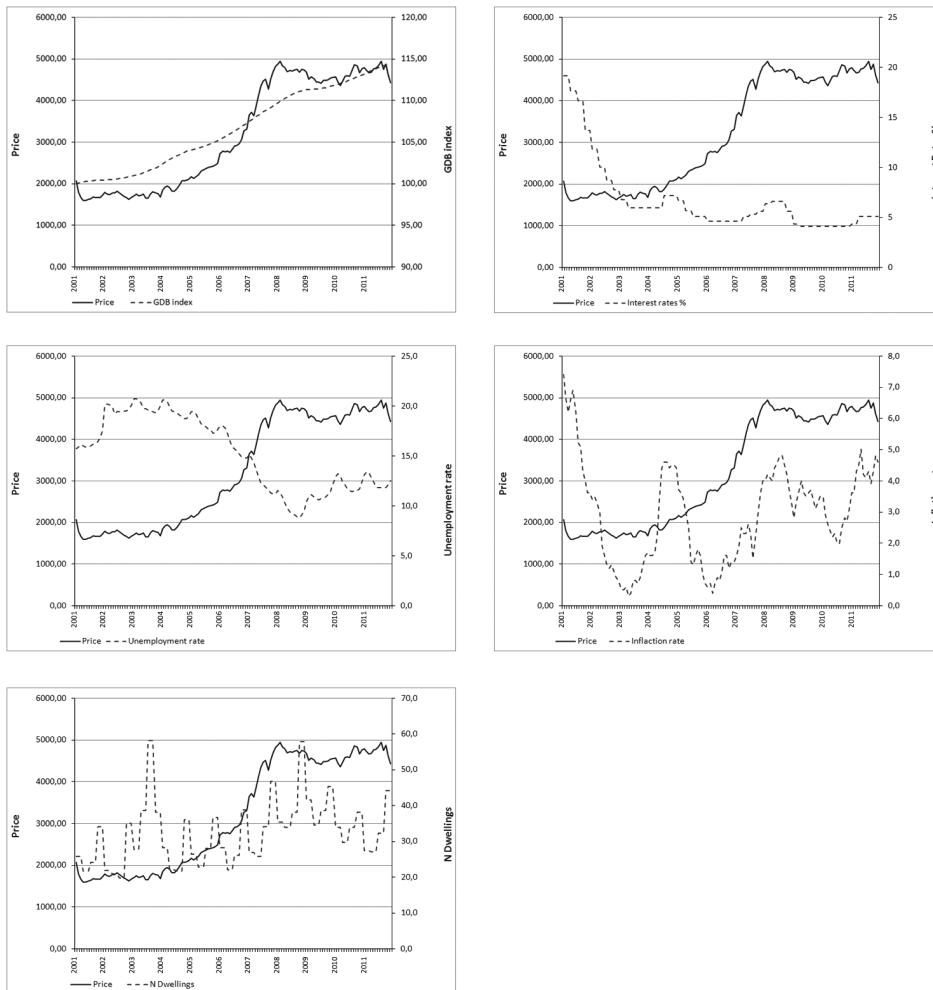
Fig. 2.   Selected macroeconomic indices and average apartments prices
Source: Own study.

A graphic interpretation of the relationships between control variables and averge prices of 1 m^2 of residential property reveals cyclic changes in NND (number of new dwellings) and IR (inflation rate), and in both cases, the drop in variable values was preceded by a rise in property prices in 2007. In the following years, an increase in the number of new apartments, i.e. excess supply over demand, and rising inflation which increased the cost of foreign capital for housing investments halted the increase in property prices and led to their gradual decrease. Unemployed and interest rates have a negative relationship with changes in real estate prices and a drop in UR and ARN values leads to an increase in housing prices. A high positive relationships was observed between GDP and P (price of 1 m^2 of an apartment).

RESULTS AND DISCUSSION

In the first part of the study, the suitability of selected control values was investigated relative to the applied market state variable. The variables are described in detail in section 2 of chapter 2. Preliminary research has shown that the distributions of the variables are similar to the normal distribution. The analyzed variables were used to build a linear correlation matrix (Table 1).

Table 1.   Matrix of correlations between the analyzed variables

Specification	GDP	ARN	UR	IR	NND	P
GDP	1.000	−0.637	−0.864	0.196	0.378	0.967
ARN	−0.637	1.000	0.301	0.505	−0.342	−0.551
UR	−0.864	0.301	1.000	−0.404	−0.422	−0.933
IR	0.196	0.505	−0.404	1.000	−0.054	0.233
NND	0.378	−0.342	−0.422	−0.054	1.000	0.400
P	0.967	−0.551	−0.933	0.233	0.400	1.000

Source: Own study.

All of the adopted variables are correlated with transaction prices at a significance level below 0.001. A very strong positive correlation was observed between transaction prices and GDP. Transaction prices were also positively correlated with the inflation rate (IR) and the number of new dwellings (NND). The discussed variable showed a strong negative correlation with unemployment rate (UR). A negative correlation between transaction prices and interest rates (ARN) was also reported. Macroeconomic indicators are cross-correlated due to the existence of complex economic mechanisms, but the above should not significantly affect correlation modeling with the use of regression models. A multiple regression model was developed for a quantitative analysis of correlations between control variables (explanatory variables) and the market state variable (explained variable) and to determine whether the selected control variables adequately describe the market state variable. The results of multiple regression analysis are shown in Table 2.

Table 2.   Results of multiple regression analysis ($R^2 = 0.976$, $R^2_{adj} = 0.975$, F = 1,024.1, $p < 0.0001$, standard error of estimate = 208.47)

Specification	ß	Standard error ß	t	p
Intercept	−9 234.57	1 858.888	−4.968	0.000
GDP	145.01	15.033	9.646	0.000
ARN	−21.59	14.175	−1.523	0.130
UR	−174.58	14.021	−12.452	0.000
IR	−32.80	21.542	−1.523	0.130
NND	−3.99	2.412	−1.652	0.101

R^2 – determination coefficient, R^2_{adj} – adjusted determination coefficient, F-value of F-test, β – regression coefficients, t – value of Student's test, p – significance.

Source: Own study.

The results of the Fischer-Snedecor test (F-test) indicate that the developed model describes significant statistical relationships (at a significance level below 0.0001). The key variables were gross domestic product (GDP) and unemployment rate (UR). The significance level for interest rates (ARN), inflation rate (IR) and the number of new dwellings (NNR) exceeded 0.1. That could be attributed to cross-correlations between explanatory variables. The value of the determination coefficient (R^2) was reported at 0.975, which indicates that variation in the explained variable (P) is very well explained by explanatory variables (GDP, ARN, UR, IR, NND).

In the multiple regression model, control variables successfully explained the variation in the prices of residential property in Olsztyn in 2001–2011 due to the high significance of two explanatory variables: GDP and UR. Since they are highly correlated with transaction prices, those variables explain nearly the entire variance of the explained variable. A simple regression relationship between the analyzed variables and transaction prices is presented in Figure 3.
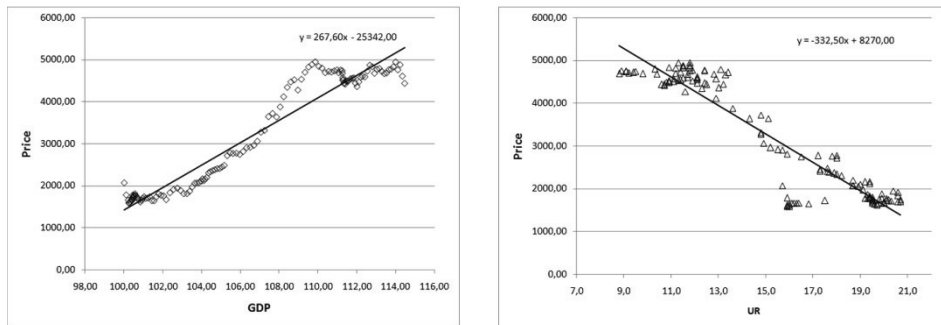
Fig. 3.   Regression relationship between gross domestic product – GDP (left side), unemployment rate – UR (right side) and apartments price – P
Source: Own study.

Previous studies were carried out on the assumption that a change in the control variable in a given time interval generates a direct change in the market state variable. The real estate market is characterized by low liquidity of real estate as commodity, therefore, property prices change slowly, and the market does not respond instantly to changes in economic and social factors.

At successive stages of the experiment, the lag in cross-correlations between control variables and market state variables was determined. An attempt was also made to answer the following question: Do changes in control variables contribute to changes in the market state variable or does the reverse apply?

Linear correlation coefficients were determined for average prices after the introduction of a time lag to examine the delay in the responsiveness of average housing prices to the adopted macroeconomic factors. Implementation of so-called lags can support the explanation of the cause and effect relationship between the variables. If we increase the lag and if the value of correlation coefficient is changing too, one can assume, that the

dependent variable (in this case apartments price) respond to the change in the independent variable values with some delay or in advance. It justifies the importance of determination of cause and effect. If it is possible to determine the lag level for which the correlation coefficient reaches a maximum, then we get the response time between cause and effect.

The correlation coefficients for time lags of 6, 12, 18, 24 and 36 months are presented in Table 3. The correlation coefficients for different lag values, both positive and negative, are shown in Figure 4.

Table 3.   Correlation coefficients between lagged macroeconomic indicators and average prices

Lag in months	GDP	ARN	UR	IR	NND
0	0.967	−0.551	−0.933	0.233	0.400
6	0.961	−0.601	−0.900	0.113	0.348
12	0.946	−0.649	−0.845	−0.014	0.352
18	0.924	−0.700	−0.761	−0.093	0.315
24	0.896	−0.733	−0.675	−0.134	0.319
30	0.865	−0.749	−0.575	−0.133	0.261
36	0.833	−0.770	−0.459	−0.135	0.215

Source: Own study.

The coefficient of correlation between GDP and transaction prices decreases with an increase in lag values. This implies that in the value of the analyzed variable become smaller as more time elapses between the increase in GDP and the survey of transaction prices. In this case, changes in GDP occur simultaneously with changes transaction prices, and a strong correlation for zero lag clearly points to the simultaneity of the studied phenomenon. The adopted index of changes in GDP values is based on lagged property prices, and despite the noted synchronicity, the presence of a causal relationship can be postulated.

An analysis of changes in interest rates (ARN) points to specific correlations between lag and the value of the correlation coefficient. An increase in lag values is accompanied by a clear increase in the absolute value of the correlation coefficient. That could suggest that changes in the analyzed factor lead to delayed changes in the prices of property. The results of the analysis suggest the presence of a cause-and-effect relationship where changes in interest rates drive changes in property prices after several months or even years. It takes approximately 22 months for interest rates to change in response to price changes. A change in interest rates is strongly felt on the market only after around 36 months. The aforementioned mechanisms point to the existence of mutual interactions.

The nature of correlations between unemployment rate and transaction prices is similar to that between GDP and prices. Changes in unemployment rate occur simultaneously with changes in transaction prices. At the maximum correlation strength, the nature and the sign of the time lag can indicate that after a certain time, changes in prices lead to changes in unemployment rate. The strongest correlation between unemployment rate and prices is observed when the dependency between these two variables is analyzed with a time lag of approximately seven months. That implies that changes in prices preceded changes in unemployment rate by around six months.
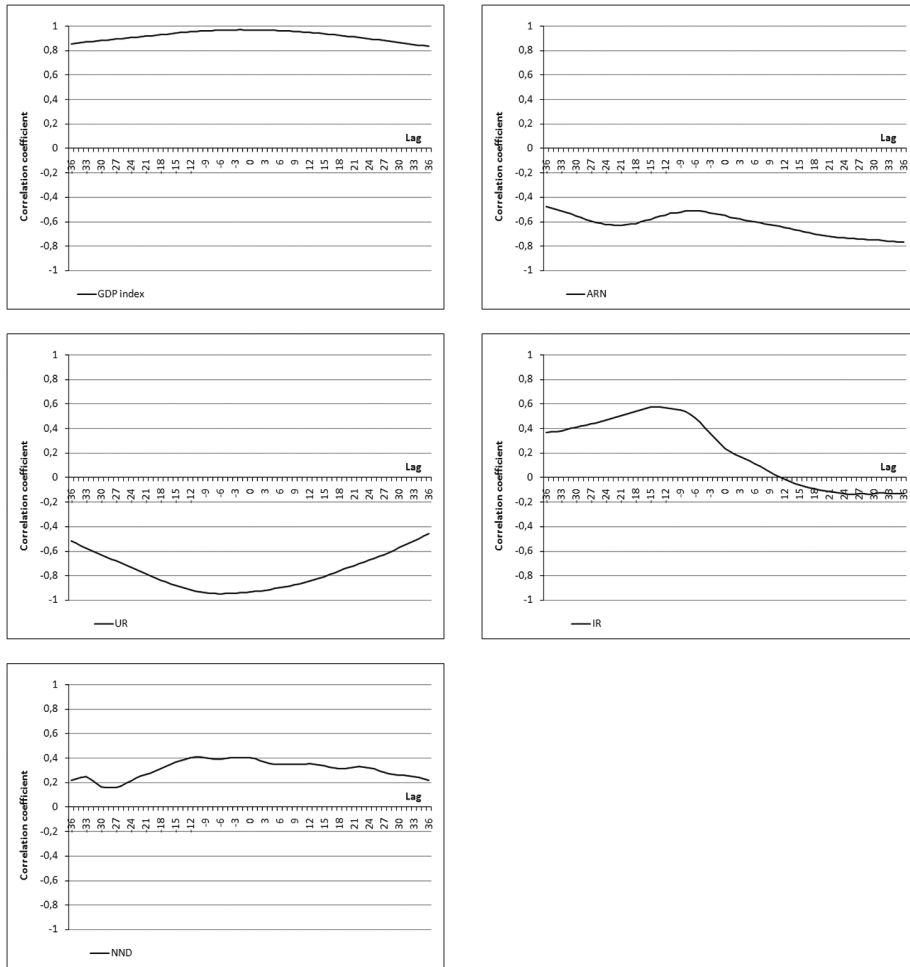
Fig. 4.   Correlation coefficients for different lag values
Source: Own study.

With an increase in lag values, inflation rate is transformed from a variable with a stimulating influence into a variable with a destimulating influence. At the same time, correlation coefficients point to an insignificant dependency between inflation rate and prices. The strongest correlation between inflation and prices was observed for a lag of approximately 15 months. It can, therefore, be assumed that changes in prices precede changes in inflation rate by around 18 months.

The number of new dwellings can be expected to be significantly correlated with transaction prices. Authors' analysis indicate, howevers, that the greater the lag between changes in NND values and property prices, the smaller the variation in prices. Prices can also affect the number of new dwellings, although in this case, we are probably dealing with simultaneous changes.

Casuality on the property market is difficult to investigate due to the complexity of interactions between market elements. Simultaneity analyses of various phenomena, in particular when the values of two variables are compared for different time intervals, support the formulation of hypotheses to explain whether prices respond with a delay to changes in macroeconomic indices or whether indices respond to price changes.

The results of the study supported the development of a new model of correlations between macroeconomic factors and transaction prices. The values of variables were lagged to produce the best fit of the model. Prices were lagged relative to interest rates by 36 months. Unemployment rates were lagged relative to prices by five months, and inflation rates – by 13 months. The values of GDP and NND were not lagged. The modeled results are presented in Table 4.

Table 4. Results of multiple regression analysis for lagged explanatory variables ($R^2 = 0.983$, $R^2_{adj} = 0.982$, F = 901.9, p < 0.0001, Standard error of estimation = 150.28)

Specification	ß	Standard error ß	t	p
Intercept	−15 102.90	1 330.17	−11.35	0.000
GDP	189.08	11.80	16.02	0.000
ARN	27.79	7.43	3.74	0.000
UR	−167.34	11.84	−14.13	0.000
IR	31.87	19.86	1.60	0.113
NND	8.20	2.58	3.18	0.002

R^2 – determination coefficient, R^2_{adj} – adjusted determination coefficient, F- value of F-test, ß – regression coefficients, t – value of Student's test, p – significance.

Source: Own study.

The developed model better explains the variation in transaction prices than the model where variable values are not lagged. The value of Fischer-Snedecor distribution increased from 901.9 to 1,024.1 at a significance level below 0.0001. When control variables were lagged relative to the market state variable, the percentage variation in prices (P), explained by determination coefficient R^2, increased from 97.5 to 98.2%. An increase in significance levels (p) was also reported for selected variables (ARN, IR, NND). The model's standard error decreased significantly from 208.47 to 150.28.

CONCLUSIONS

The results of the experiment validated authors' initial hypothesis. The calculated values of lag in the responsiveness of property prices to selected macronomic indicators in the analyzed time intervals are not identical for all variables. The highest lag was observed for interest rates (ARN) at 36 months and inflation rate (IR) at 13 months. The lag for unemployment rate was calculated at only seven months, which indicates that property prices quickly respond to changes in potential demand for real estate because an increase in unemployment leads to a drop in demand. The results of the experiment also indicate that the stimulating effects of selected variables may be transformed into

destimulating effects, implying that in certain periods a property price may be regarded as an explanatory variable and macroeconomic indices – as explained variables. The results of the experiment demonstrate that the lag between control variables and the market state variable should be taken into account in regression models to obtain a better fit to empirical data.

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WPŁYW CZYNNIKÓW MAKROEKONOMICZNYCH NA ZMIANY CEN NIERUCHOMOŚCI – REAKCJA I INTERAKCJA

Streszczenie. W większości krajów europejskich na rynkach nieruchomości, w ostatniej dekadzie, były obserwowane gwałtowne zmiany cen nieruchomości, zarówno wzrosty, jak i spadki. Przyczyn takich zachowań upatruje się w zmieniających czynnikach ekonomicznych i społecznych w otoczeniu rynku nieruchomości. Celem badań było określenie, w jaki sposób zmieniają się ceny nieruchomości pod wpływem czynników makroekonomicznych.

W celu ilościowego ujęcia związków między przyjętymi w badaniach zmiennymi kontrolnymi a przyjętą zmienną stanu rynku zbudowano model regresji wielorakiej, który następnie ulepszono, uwzględniając obliczone w pracy wielkości opóźnień dla poszczególnych zmiennych. Dodatkowym efektem pracy jest wykazanie, że w okresach niestabilności to rynek nieruchomości staje się przyczyną zmienności otoczenia ekonomicznego i społecznego.

ECONOMIC EFFICIENCY OF WINTER TRITICALE GRAIN PRODUCTION

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Abstract. The aim of this research has been to assess and compare the economic efficiency of production technologies used to grow a semi-dwarf winter triticale cultivar Gniewko. The method based on the standard gross margin (SGM) was used for the economic evaluation of the two production technology differentiated costs level. The analyzed material consisted of results achieved during a three-year field experiment located at the Experimental Station in Bałcyny near Ostróda. Technologies with the highest and lowest average yields were selected for comparisons. The compared technologies differed from each other in the rate of nitrogen fertilization and fungicides. The more intensive winter triticale technology in field trial, the greater the financial values of winter triticale yield as well as direct costs and direct surplus. The direct costs analysis references to the positive verification of the research hypothesis. The increase of the direct surplus value, which accounted 25.2%, was recorded when the intensity of cultivation increased. Increasing inputs for winter triticale production up to the level of intensive technology in trial conditions was economically justifiable.

Key words: direct costs, winter triticale, technology level

INTRODUCTION

Winter triticale belongs to crops distinguishable by a very large potential yielding capacity. In intensive farming, the main objective is to maximize yields and profit, paying little or no attention to possible damage caused by the application of commercial means of production [Kuś 1999]. The social need for the decrease in the chemical use of the agriculture and its environmental impacts is growing [Takăcs-György 2007]. However, high prices of production means and limited financial resources force producers to turn to less intensive technologies, which nonetheless ensure high economic efficiency of production.

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The actual production process on a farm depends on technical and budget conditions, which are the reflection of various combinations of production factors as well as relationships between these factors and the volumes of production they help to achieve [Klepacki 1997, Krasowicz and Kuś 1998, Niezgoda 1998].

Economic efficiency is expressed by the ratio between the value of inputs and the value of the outputs obtained owing to the said inputs. Economic efficiency is closely connected to technical-economic effectiveness, which represents the ratio between quantities of used materials and the amount of produced goods. It is justified to state that production processes have reached an optimal efficiency when they bring about best effects under given conditions in terms of production output and economic results [Kołoszko-Chomentowska 2006]. An economic assessment of the efficiency of the technology applied on a farm enables the farmer to make good decisions [Krasowicz 2004].

The profitability of triticale cultivation depends on the intensity of applied technologies. The latter is conditioned i.a. by the intensity of crop protection [Jaśkiewicz 2009]. Falger and Jaworski [2001] claim that the main purpose of plant protection treatments is to ensure the achievement of yield, which is a product of the genetic potential of a cultivated variety and other factors such as fertilization, cultivation or weather and soil conditions. An application of a plant protection method – its level or selection of a pesticide – is conditioned by the envisioned threats on a given plantation and the financial capacity of the farm.

One of the most important aspects of crop production is the level of fertilization. Quantities of applied fertilizers are directly connected to the efficiency of fertilization. In any farming system, fertilization is an extremely important element of agronomic practice, which to a large extent conditions the production output. Any effort undertaken to improve the efficiency of using fertilizer components is highly valuable and desirable because it can lower the costs while improving the quality of products [Skarżyńska 2006].

According to Jaśkiewicz [2002] and Podolska et al. [2002], nitrogen fertilization is particularly worth attention because this macronutrient has the strongest influence on the level of yields produced by cereals.

The research hypothesis assumes that increasing the level of the means of production, mainly mineral fertilization and fungicides protection, from the lowest to the highest yield technology, achieve a higher grain yield ensures the higher economic effectiveness of land, one of the basic productive factors.

MATERIAL AND METHODS

The analysis was based on three-year field trials with the semi-dwarf winter triticale cultivar called Gniewko. The trial was conducted in 2009–2011 at the Experimental Station in Bałcyny near Ostróda. A two-factorial experiment was established with the split--plot method (4 replications) on proper grey-brown podsolic soil, classified as good wheat complex. The soil tillage treatments were carried out according to the generally accepted agronomic recommendations. The preceding crop was winter oilseed rape. Phosphorus in a dose of 70 kg·ha^{-1} P$_2$O$_5$ as triple superphosphate (46%) and potassium consisting of 90 kg·ha^{-1} K$_2$O as potassium salt (60%) were applied in a single treatment before sowing.

Weed control, in both technologies, comprised a single treatment in autumn, composed of the herbicides Boxer 800 EC 2 l·ha^{-1} (active ingredient *prosulfocarb*), Glean 75 WG 5 g·ha^{-1} (active ingredient *chlorsulfuron*) and Legato 500 SC 0.5 l·ha^{-1} (active ingredient *diflufenican*). The lowest yield technology comprised the following mineral fertilization regime: 30 kg N·ha^{-1} (in the form of ammonium nitrate 34%), seed dressing with Baytan Universal 094 FS (active ingredient *triadimenol + imazalil + fuberidazole*) and top dressing with Input 460 EC (at BBCH 31 phase) in the amount 1 l·ha^{-1} (active ingredient *spiroksamine* 300 g·ha^{-1} + *prothioconazole* 160 g·ha^{-1}). The highest yield

Table 1. Production value and direct costs of the winter triticale production

Specification	The intensity level of technology	
	the lowest yield	the highest yield
Grain yield (t·ha^{-1})	7.33	9.96
Production value (PLN·ha^{-1})	6 304	8 566
Directs costs (PLN·ha^{-1}), including:	1 237	1 788
mineral fertilizers	643	1 105
grain sowing	283	283
plant protection products, including:	312	401
seed dressing	39	39
fungicides	156	245
herbicides	117	117

Table 2. Economic evaluation of the winter triticale production

Specification	The intensity of technology level	
	the lowest yield	the highest yield
Direct surplus (PLN·ha^{-1})	5 066	6 777
Direct surplus of product (PLN·t^{-1})	691.1	680.4
Direct costs per 1 PLN direct surplus (PLN)	0.24	0.26
Direct profitabilty index (–)	5.09	4.79
Direct surplus of production value (%)	80.4	79.1
Crop yield counterbalancing direct costs (t·ha^{-1})	1.43	2.07

Table 3. Structure of the winter triticale direct costs production

Specification	The intensity of technology level (%)	
	the lowest yield	the highest yield
Directs costs, including:	100.0	100.0
mineral fertilizers	51.9	61.8
grain sowing	22.8	15.8
plant protection products, including:	25.3	22.4
seed dressing	3.2	2.2
fungicides	12.6	13.7
herbicides	9.5	6.5

technology included mineral fertilization in the amount of 150 kg N·ha^{-1} (divided into 90 + 60 in the form of ammonium nitrate 34%), seed dressing with Baytan Universal 094 FS (active ingredient *triadimenol + imazalil + fuberidazole*), top dressing with Input 460 EC (at BBCH 31 phase) in the amount of 1 l·ha^{-1} (active ingredient *spiroksamine* 300 g·ha^{-1} + *prothioconazole* 160 g·ha^{-1}) and the preparation Prosaro 250 EC (at BBCH 58 phase) in a dose of 0.6 l·ha^{-1} (active ingredient *tebuconazole* 75 g·ha^{-1} + *prothioconazole* 75 g·ha^{-1}).

The calculations were made on three-year average yields of winter triticale grain. The economic efficiency of winter triticale grain production was assessed for the highest and the lowest yield in the experiment, using a quartile as a statistical instrument.

Many researches [e.g. Harasim 1989, Krasowicz 1999, Jaśkiewicz 2009] turn to a simplified calculation method, broadly used in agriculture economics, to perform an assessment of the economic efficiency of a production technology. This method considers only direct costs calculated from the products of prices of particular materials and applied doses (seeds, mineral fertilizers and pesticides). However, Krasowicz [2007] observes that the profitability of production on a farm level is also dependent on indirect costs, typically disconnected from the level of yields. Costs of commercial means of production (seeds, mineral fertilizers, pesticides) were same as market prices in the first quarter of 2013.

The basic measure of efficiency used in this analysis was value of direct surplus. Among the most important economic assessment components is the obtained the highest value of this index [Ziętara 2002, Artyszak and Kucińska 2005]. Also, a synthetic measure of economic efficiency of production was used, in the meaning of direct profitability index achieved as the ratio of production value to direct costs incurred by generating this production.

As the data were processed electronically, sums of components may differ from the given values. For the sake of clarity, some of the discussed data were rounded up to integers.

RESULTS OF THE ANALYSIS AND DISCUSSION

Under the experimental conditions, the level of winter triticale yields was high, ranging between 7.33 and 9.96 t·ha^{-1}. The highest yield technology ensured a 35.9% higher grain yield than the lowest yield technology (Table 1). However, it also incurred 30.8% higher direct costs. Despite much higher direct costs, direct surplus was 33.8% higher than in the lowest yield technology (Table 2). Contrary results were reported by Grabiński et al. [2008]. From their calculations of direct surplus, it was concluded that the highest direct surplus was achieved when production means applied to production of winter triticale were used modestly (still ensuring a relatively high yield). However, as the production became more intensive, the level of direct surplus declined. Similar results demonstrated Nieróbca et al. [2008]. Higher direct surplus values in winter triticale production in the research were obtained under moderately intensive and economical technologies.

On the other hand, the direct costs per 1 PLN direct surplus, was slightly better (about 8.3%) in the lowest yield technology (0.24). Augustyńska-Grzymek [2007] reported that the best farms which produced winter triticale obtained average 0.31. In our experiment,

the difference between the two technologies in the direct surplus per 1 ton of product and direct surplus in percentage value of production were at a similar level but to the advantage of the lowest yield technology.

Special role is attributed to the relation of the production value to direct costs allocated to its attainment. This relationship is known as the direct profitability index. In our study, this index was high and similar in both technologies (5.09 in the lowest and 4.79 in the highest yield technology). The higher value of this index obtained Nachtman [2009]. Ecological production winter triticale allowed to achived 8.7. Nasalski et al. [2008] calculated an analogous index for winter wheat grown in a conventional system within the range of 1.2 and 1.8. On the other hand, Jaśkiewicz [2006] implies a higher value of this index in a technology with a lower level of nitrogen fertilization.

The return of the direct costs in the lowest yield technology appeared at a unit yield of 1.43 tons. In the highest yield technology, the costs were paid back when the yield of grain reached 2.07 tons.

Having analyzed the structure of direct costs expended on winter triticale production, it should be concluded that mineral fertilization had the highest contribution to costs in both technologies, varying from 51.9 to 61.8% of direct costs (Table 3). Literature verifies that mineral fertilization is the most costly element of agronomic practice and may even exceed 60% of the total production inputs [Dopka 2004]. Domska et al. [2001] claim that the level of fertilization, especially nitrogen nutrition, is a dominant component among production inputs in cultivation of cereal crops. Seeds were the second most expensive item in the category of direct costs. In both technologies, the cost was identical, but its contribution to the costs structure varied from 15.8% in the highest yield technology to 22.8% in the lowest yield technology. Among the plant protection chemicals, fungicides were most expensive.

CONCLUSIONS

Costs are an important element of profitability accounting, and the knowledge of their constituents as well as interactions both between particular costs and within the sphere of income and profit may be useful for the producer to make correct decision. Agricultural practice is continuously searching for new ways to improve the efficiency of production. It is possible either by maximizing the volume of production or minimizing the costs of obtaining a given quantity of produce. Higher yields typically require higher costs, and the key point is to keep the cost increase below or – at the most – equal with the production volume increment. It makes no sense to expend additional inputs which will not be paid off by an adequately high yield. Hence, implementation of new technologies and production means should always be carefully analyzed in the context of costs and gains.

The profitability calculation made for winter triticale has revealed differences in the economic efficiency of the analyzed production technologies. The compared technologies were demonstrably different in direct surplus value. The highest yield technology in field trial was evidently more competitive, where mentioned parameter was 25.2% higher. The index illustrating the direct profitability was similar in both technologies, equal 4.79 and 5.09. For obvious reasons (higher direct production costs), the yield in the

highest yield technology was higher than the lowest yield technology (by 35.9%). The analysis of direct costs clearly shows that mineral fertilization is responsible for the highest share of costs in both technologies.

An increase in yield induced by the more intensive production system completely covered the increase in the total costs. Economically, the intensification of winter triticale is feasible and profitable. An increase in the value of production is higher than the due increase in the costs. However, it is worth remembering that production profitability (apart from volumes of yields achieved) depends on prices for grain and their relationship with the costs of production means.

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EKONOMICZNA EFEKTYWNOŚĆ PRODUKCJI ZIARNA PSZENŻYTA OZIMEGO

Streszczenie. Celem badań była ocena i porównanie sprawności ekonomicznej technologii produkcji półkarłowego pszenżyta ozimego odmiany Gniewko. Do oceny ekonomicznej technologii produkcji pszenżyta ozimego wykorzystano metodę opartą na standardowej nadwyżce bezpośredniej (SGM). Materiał badawczy stanowiły wyniki trzyletniego doświadczenia polowego zlokalizowanego w Zakładzie Produkcyjno-Doświadczalnym w Bałcynach k. Ostródy. Do oceny wytypowano technologie największych i najmniejszych średnich plonów. Porównywane technologie produkcji różniły się wielkością dawki nawożenia azotem oraz poziomem ochrony fungicydowej. Wykazano, że im intensywniejsza technologia produkcji, tym większa wartość produkcji pszenżyta ozimego, wyższe koszty bezpośrednie oraz zysk bezpośredni. Analiza kosztów bezpośrednich wskazuje na pozytywną weryfikację hipotezy badawczej. Wzrost intensywności technologii skutkował większą nadwyżką bezpośrednią (o 25,2%). Wyższe koszty ponoszone na wzrost intensywności technologii produkcji pszenżyta ozimego w warunkach doświadczalnych są ekonomicznie uzasadnione.

Słowa kluczowe: koszty bezpośrednie, pszenżyto ozime, poziom technologii

CHINA'S SHADOW BANKING SECTOR: RECENT DEVELOPMENTS AND SYSTEMIC RISK ASSESSMENT

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Abstract. It is said that the shadow banking system could be one of a variety of sources for the current global financial crisis. This sector also exists in China in a lesser advanced form than in Western economies in terms of instruments, risk measures or regulations. The official definition of China's shadow banking has not been developed yet. The article presents the current stage of China's shadow banking development, the size of this sector, recent studies focus on the role of informal financing in China's economic growth and the risk derives from expanding shadow banking instruments. Due to the lack of risk measuring institutions and lack of data concerning Chinese shadow banking, Western concepts of systemic risk measurement cannot be applied in China. Consequently this paper adopts simple approach to systemic risk assessment.

Key words: shadow banking, informal lending, risk assessment, China's financial system

INTRODUCTION

The shadow has wretched Chinese banking system recently. Among numerous formal financial institutions in Chinese financial system there is a dense web of nonbanking firms that acting similar to formal. These institutions have created shadow banking industry in China. Chinese shadow banking sector development derives from two main reasons. First, this problem has been in the spotlight ever since government began to tighten the monetary policy in 2010 [Hsu and Collier 2013]. The main goal of this policy was raining in credit and cooling inflation. Having limited access to bank loans, enterprises have started to seek alternative methods of financing their operation. As the result, numerous of enterprises have begun to cooperate with cash-rich institutions and borrow in the underground lending market (curbside financial market or shadow credit intermediation). The second reason of shadow banking recent development in the China lies in withdrawal of banks and official financial institutions from the rural areas or more risky lending

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niches (e.g. loans for small and medium sized enterprises – SMEs, sole proprietorship or customers who do not meet collateral requirements). The financial requirement of excluded groups is fulfilled by the underground lending sector [Barclay's Capital 2011]. Additional the negative real deposit interest rates have pushed depositors to seek higher returns, thus spurring underground financial activities. Since these nonbanking services are usually not or barely regulated and non-transparent, the surge in shadow banking activities may pose a serious risk to China's future financial stability.

The article consists of five sections, introduction and conclusions. Firstly, it discusses adopted material and methods. The second section of this paper explains the terms and instruments of shadow banking. The third part presents selected literature on relation between informal finance and economic growth in China. The fourth section provides different estimates of shadow banking industry size in China. The fifth part analyzes systemic risk of shadow banking activity to the financial system in China. The article concludes several policy implications for the future.

MATERIAL AND METHODS

The main purpose of this research is to present the nature of Chinese shadow banking, classify its forms, estimate the size of informal sector and offer risk assessment approach. The method adopted in this paper partly focuses on the assessment of shadow banking size according to the approach recommended by the Financial Stability Board. It states that shadow banking data should cover first all non-bank credit intermediation where shadow banking risks to the official financial system may arise – outside the banking system approach. Although Chinese shadow banking seems to be different from the Western countries informal sector. That's why the definition of shadow banking in China should be broadening by activities specific for this country. It's worth to include into Chinese shadow banking system all activities of banks that are off-balance-sheet (e.g. wealth management products, trusts) – within bank approach. The practical two-step approach may be better, if we want to present informal banking sector in China multidimensionally and the risk derived from this activity. The statistical material is based on the reports of various financial institutions and China's financial authorities.

SHADOW BANKING TERMINOLOGY

The definition of shadow banking varies among international organizations and institutions. According to the World Bank: "Shadow banking comprises a set of activities, markets, contracts, and institutions that operate partially (or fully) outside the traditional commercial banking sector, and, as such, are either lightly regulated or not regulated at all" [The World Bank 2012]. The Financial Stability Board defines shadow banking as "the system of credit intermediation that involves entities and activities outside the regular banking system" [Financial Stability Board 2012]. According to the Staff Report of Federal Reserve Bank of New York, shadow credit intermediation includes all credit intermediation activities that are implicitly enhanced, indirectly enhanced or unenhanced by official guarantees [Pozsar et al. 2010]

The development of informal financial market was the important reason of the global financial crisis. However, Chinese shadow banking represents different form than both American and European shadow banking sectors [Hsu and Li 2009; Hsu et al. 2013]. The shadow banking systems in China and the Western countries differ in terms of composition, players and drivers. For example the U.S. shadow banking system is comprised of securitized loans and obligations, asset-backed commercial paper, repurchase agreements, and money market funds [Kozak 2008; Kozak and Teplova 2010]. China's shadow banking system includes direct credit extension by nonbank financial institutions (especially trust companies and brokerage firms) and informal securitization through the pooling of proceeds from wealth management products provided by banks. China's shadow banking system is simple in structure and is not dominated by complex derivatives. Chinese shadow banking is not driven by market mechanisms (such as securitization). The growth of shadow banking in China is largely lending-driven. It is defined by certain peculiarities of Chinese financial system, including the constrained availability of bank funding, especially for SMEs and higher-risk borrowers, given banks' limited risk pricing capacity; insufficient remuneration on bank deposits and limited financial investment opportunities, which induce private lending amid a search for higher yields; government persuasion directed to banks responsible for the high share of bank credit to domestic state-owned enterprises; regulatory arbitrage, with banks forced to use alternative channels to avoid loan target limits. The most important features of Chinese lending system are relatively high interest rates and short tenures of extended loans [IMF 2012].

Adopting the Chinese Academy of Social Sciences' narrow definition of shadow banking, it only covers banks' wealth management products and trust companies' trust

Table 1. Main channels of China's shadow banking sector

Shadow banking activity	Borrowers	Non-performing loans loss absorption (in practice)	Estimated sector size in 2013[a]	Overall risk
Informal loans	companies and individuals	only lenders	$0.81 trillion	low-medium
BANs (bankers acceptance notes)	companies and individuals	usually banks back company issued BANs and repay if necessary	$1.45 trillion	low-medium
Entrusted loans	companies	usually lenders, but sometimes bank is also involved indirectly	$0.25 trillion	low
Trust products[b]	companies	institutions selling trust products (trust companies and banks) may have to pay losses. Officially, these institutions are not liable for non-performing loans loss	$1.6 trillion	medium-high
Wealth management products[b]	companies	institutions selling wealth management products may have to pay losses. Officially, these institutions are not liable for non-performing loans loss	$1.45 trillion	medium

[a] By People's Bank of China.
[b] Narrow definition of shadow banking.
Source: Author's own study.

products [Zhang 2013]. In practice China's shadow banking contains wider range of forms (activities) of financing which are directed to companies mostly. Some of them have a long history and are deeply-rooted in Chinese tradition. Very popular are inter-personal lending (*minjian jiedai*, sometimes called *guanxi*) [Feng 2006; Nowotny et al. 2012], trade credit (*hangye xinyong*), often illegal usury, moneylenders and loan sharks (*gaolidai*) [Zhen 2013], rotating savings and credit associations (*huzhuhui*, *hehui*, *biao-hui*, *chenghui*, *juhui*) [Tsai 2001, 2004; Nowotny et al. 2012], and rural cooperative foun-dations (*nongcun hezuo jijinhui*) [Ming 2011]. All of mentioned forms can be classified as informal loans, which are usually neither regulated nor controlled and very often illicit. All entrusted loans, trust products and wealth management products (*licai*) are quite new trends in shadow banking sector, but in practice mostly unregulated [Credit Suisse 2011; Refkin and Cray 2012; Cieślik 2013; Goldman Sachs 2013].

If we want to characterize Chinese shadow banking sector briefly, we should consider five points. First, because the informal credit market is illegal and unregulated, a bank-ruptcy of informal banks can have serious consequences and even lead to social unrest. Second, the government has adopted a series of policies to enhance access to bank finance for SMEs, but the financing gap is still substantial. Third, loan contracts between infor-mal banks and private parties will not be enforceable through court, so informal lenders need to collect sufficient proprietary information before the lending decisions to screen out unreliable borrowers. Fourth, informal finance typically carries a higher interest rate than bank finance (among relatives are often interest free). Fifth, informal lenders can use a range of social sanctions ranging from mild disparaging of reputation and exclusion from business and personal relationships up to illegal threats of coercion and actual injury.

SELECTED LITERATURE REVIEW ON INFORAMAL FINANCE AND ECONOMIC GROWTH IN CHINA

The findings of recent search in the literature that deal with informal and formal financ-ing activities and their impact on economic growth are mixed. Many have argued that the private sector has been locked out of access to formal channels of capital in China [Zhang 2008]. Some studies show that informal financing based on relationships or reputation may support the development of the private sector in countries with less well developed legal and financial systems. There are also papers implying that only the development of the formal financing sector has an evident positive impact on companies and economic growth. Yet the most complex studies were carried out by Chong, Lu and Ongena [2012]. The authors tried to prove that informal finance was associated with higher growth for small companies in China, but was insignificant in the case of large firms. It was esti-mated that formal sector finance is associated with faster companies' growth, though informal finance is not. Allen, Qian and Qian [2005] pointed out that alternative financing channels with the governance mechanisms such as those based on reputation and relation-ships support the growth of the private sector generally. Cheng's and Degryse's [2010] research indicated that the development of non-bank financial institutions, which have characteristics of both formal and informal finance, was not correlated with growth. Jia, Heidhues and Zeller [2010] indicated that subsidized credit policies favor local authori-

ties and elites, instead of the targeted poor groups, but informal credit channels are economically significant and can be tied to economic growth. Ayyagari, Demirgüç-Kunt and Maksimovic [2010] made a look at company financing patterns and development using a database of 2,400 Chinese firms. They found that a relatively small percentage of companies in their sample utilize formal bank finance with a much greater reliance on informal sources. Turvey and Kong [2010] studies prove that informal finance among relatives and friends may outcompete formal and semi-formal finance in the Chinese context. Qinghua University studying households in eight provinces in China estimated that 69% of them borrowed money from informal financial institutions [OECD 2010]. Turvey, Kong and Huo [2009] estimated that borrowers most often use informal sources of finance for the costs of consumption (72% of respondents), followed by treatment (68%) and education (61%). They based the research on survey of 730 rural households. A special case of the development of the informal market is the city of Wenzhou in the eastern China, where as many as 89% of the population (over 8 million) and 57% of companies are involved in illegal lending activities targeted primarily to SMEs in the region [Asia Now 2011].

Unfortunately, the current literature almost does not study whether the informal and formal credit markets are segmented in China and whether there are beneficial effects to subgroups of companies that differ in terms of activity. There are also very limited studies concerning the different types of informal financing in China, let alone the influence of each kind of informal financing for regional or social groups' development.

THE SIZE OF SHADOW BANKING IN CHINA

In the past Chinese formal financial institutions directed their services very seldom to SMEs, rural households and people with low creditworthiness. It has been estimated, that only 15% of Chinese SMEs applying for credit would obtain it, because of strict banking regulations and collateral requirements. Simultaneously mentioned potential borrowers would be charge with much higher interest rates than a large corporation, particularly state-owned enterprise which applies for the analogous amount of credit. It is evaluated that the average interest rates paid by SMEs are 20–50% higher than the interest rates burden state-owned enterprises [EconoMonitor 2012].

The shadow banking industry in China has grown considerably in recent years, taking on the role of an alternate funding source for domestic entities. Estimates of the size of the shadow banking system vary considerably, given its highly non-transparent nature and the varied assumptions on the types of activities that it encompasses. Although there are no official data characterized the size of the shadow banking segment in China, we can find a few studies that estimate the shadow banking industry. Estimates at different points of time and based on varied coverage assumptions put shadow banking lending in the range of approximately from 16 to 29% of total bank lending, suggesting that shadow banking is nontrivial for domestic funding. The Chinese institutions' estimations of the shadow banking size are diversified and range from $2 trillion to $3 trillion (mentioned by the Chairman of China Banking Regulatory Commission) to even $4 trillion estimated by Credit Suisse on the low end to almost $18 trillion on the high end. According to the narrow definition, the size of the shadow banking system in China was estimated to be

$2.7 trillion (equivalent to 36% of GDP) as of the end of March 2013. The trust companies' and wealth management products' share in a market was almost the same (Table 3). MarketWatch estimated that 60% of these loans are invested into real estate projects [Oliver 2011]. Only in 2010 governmental State Information Center evaluated that capital flows in shadow banking amounted at least $317 billion and UnionPay pointed out that nonbank lending sector in China has expanded to $2.8 trillion annually (Table 2). Goldman Sachs Research Group estimated that shadow banking activities made up 39% of the increase in total incremental new credit and 27% in incremental M2 aggregate in 2012. Shadow banking activities in 2012 accounted for 24% of total credit to companies and consumers, and 45% of China's GDP [Goldman Sachs 2013].

In 2006 Chinese Academy of Social Sciences estimated the average household in China was burden with loan from informal sector accounted for $165 [IFC 2008]. Guo and He [2005] examine the range of cases of shadow banking in China till 2005. They discovered that form 24% to even 95% of lending in rural areas derived from shadow banking. We can explain it with two reasons. The borrowers in rural areas live far from formal creditors and simply have no access to official financial system. Usually these people are not able to meet collateral requirements and would never obtain credit from bank or other formal lending institution [Turvey and Kong 2008].

In comparison to the Western developed economies, Chinese shadow banking sector is still not very extended. For example, in 2011 the shadow banking assets value in the U.S. was estimated at $23 trillion, in the euro area – $22 trillion, and in the United Kingdom – $9 trillion. It was estimated that in the whole world shadow banking activity amounted to $67 trillion. China's share in the world informal banking was estimated at the level of 4.2% [Financial Stability Board 2014].

Table 2. Estimates of shadow banking size in China in 2010

Source	Estimates
State Information Center	$317 billion of annual capital flows
Barclays Capital	$492 billion of annual capital flows
Bernstein Research	$429 billion; 5% of new loans
Credit Suisse	$635 billion
PBoC	$893.5 billion
Nomura Securities	$1.35 trillion
Financial Times China Confidential	$1.59 trillion
ANZ Bank	$1.59 trillion
Barclays Capital	$1.84 trillion; 22% of new loans
UBS	$1.9 trillion
Roubini Global Economics	$2.0 trillion
Société Générale's	$2.3 trillion
Dragonomics	$2.7 trillion
China UnionPay	$2.8 trillion

Source: Author's own study on the basis of websites and reports of mentioned institutions.

Table 3.   Size of the narrowly defined shadow banking sector in China from 2007 to 2013

Year	Wealth management products	Trust companies	Total	% of GDP
	billion USD			
2007	214.0	153.1	367.1	8.6
2008	154.8	197.3	352.1	7.0
2009	163.7	325.2	488.9	8.9
2010	403.2	49.0	452.3	13.8
2011	806.5	776.0	1 582.4	20.7
2012	1 145.2	1 205.0	2 350.2	28.1
2013	1 450.0	1 600.0	3 050.0	32.4

Source: People's Bank of China.

SYSTEMIC RISK IN CHINA'S SHADOW BANKING – A SIMPLE ASSESSMENT[1]

In China some measures of risk are lacking, especially reliable credit rating firms to assess risk in individual, corporate, and product transactions, widely available and accurate accounting and auditing results, freely functioning markets for a variety of assets and liberalized interest rates that accurately reflect the cost of borrowing and lending. Examination of interlinkages of credit exposure [Allen and Gale 2006], the probability of default [Avesani et al. 2006], conditional value at risk [Adrian and Brunnermeier 2008], systemic expected shortfall [Acharya et al. 2010], valuation of put options written on a portfolio of aggregate bank assets [Hovakimian et al. 2012], network-based systemic risk, coupled stochastic processes [Lorenz et al. 2009], insurance against systemic financial distress [Huang et al. 2011] are useful in risk assessment in developed financial systems. Unfortunately in practice these tools are difficult to apply in China. Then a basic approach in assessing risk might be useful in case of China. In this approach we should answer following questions:
- What is the currency amount under management of shadow banking products?
- What type of income do shadow banking products depend?
- Who absorbs the non-performing loans loss of shadow banking products?
- Is the shadow banking product interconnected with another product?

Shadow banking products associated with the largest assets under management include trusts and wealth management products sold mainly by banks. Each of these currently amounts to around $1.6 trillion and $1.45 trillion respectively (Table 1). Bankers' acceptance notes also comprise a large and increasing component of the shadow banking system in China. Other shadow banking products measure in the billions rather than trillions, including pawn shop loans, interpersonal lending, loan sharks, and various other types of small scale loans. When these heterogeneous private loan categories are added together, private loans comprise about $1 trillion (PBoC – People's Bank of China).

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[1] Some of these aspects were discussed by the author during China-ASEAN Financial Forum 2013, Nanning, China.

Wealth management products are based on a range of underlying assets, including money market products, equities with repurchase agreements, bonds, and trust or entrusted loans. While some income streams are relatively stable and low-risk, others may contain a relatively high risk. The worrisome is that wealth management products are not regulated only should fulfill some marketing requirements. Also trust loans may be problematic since they are almost not regulated to the extent that bank loans are controlled. Although China Banking Regulatory Commission has issued some capital requirements and marketing regulations concerning these instruments. Trust loans to increasingly unproductive entities like local government financing vehicles or real estate developers comprise up to one-third of trust loans, while loans going back into the financial sector itself measure in at around 20% of trust loans (People's Bank of China, CEIC database). These products have been repaid or bailed out by companies or more often local governments. While bankers' acceptance notes are traded on the interbank market, improving their risk pricing mechanism, their use has been increasingly abused by banks to skirt loan regulations. They have been used not as instruments to provide a liquidity cushion, but as the means to extend loans to a variety of customers.

Concerning non-performing loans absorption the wealth management products and trust products very often institutions selling these products may have to repay losses in practice. Although officially, these companies are not liable for non-performing loans loss. This results in serious solvency, liquidity and market risk, especially when we take into consideration the substantial size of these sectors. In case all shadow banking activities connected to category "informal loans" and entrusted loans usually only lenders absorb non-performing loans loss, sometimes also banks if they are involved in the transaction indirectly. Fortunately these sectors of shadow banking are relatively small, so the potential risk derives from these activities is low-medium. Though bankers' acceptance notes share in shadow banking sector is considerable, they bring relatively low-medium risk to the financial system, because banks support companies issuing these instruments and in case of default repay losses.

Interconnectedness among wealth management products, trust loans, and bankers' acceptance notes also presents a serious problem. Wealth management products may include either trust loans or bankers' acceptance notes as underlying assets. Even more generally, unproductive entities such as local government financing vehicles and real estate developers comprise an increasingly large percentage of borrowers for each product category, raising the possibility of interlinked financial failures in the face of an external shock. The good example of this interlinked financial failure is Huaxia Bank default [The Wall Street Journal 2012].

CONCLUSIONS

China's shadow banking system is relatively small (comparing to advanced economies) and straightforward, but its increasing share of Chinese GDP is worrisome (Table 3). Still the use and retailing of any derivative-type products is relatively rare. The PBoC and its branches are continually monitoring risks from the shadow banking system. Steps are under way to collect data on a more regular basis and to develop a regulatory frame-

work that would guide the healthy development of the shadow banking system in China in terms of wealth management products and entrusted loans, financial guarantee companies, pawn shops, and private lending. Shadow banking may affect the stability of Chinese banking system in the future, because China's financial system is still in the phase of moving towards maturity and needs sufficient regulations and appropriate institutions.

In terms of risk, trust and all non-standard debt assets under wealth management products represent a medium threat to the Chinese financial system yet. If these assets can be appropriately priced for risk this would represent very difficult but serious step forward the financial deepening process. Since non-standard debt assets held in wealth management instruments sold by securities companies and often banks do not price appropriately for risk, these should be banned from inclusion in these products marketed to unaware consumers. Some recommendations for further regulation in these specific areas of shadow banking include requiring the establishment of independent regulatory compliance and risk control offices/departments in trust companies, restricting use of bankers' acceptance notes to trade transactions, requiring risk control of entrusted loans, and improving/enforcing information disclosure to wealth management customers of banks and securities companies. Requiring the establishment of independent regulatory compliance and risk control departments in trust companies would help ensure that trust companies comply with regulations. It also would help steer trust companies away from ventures that contain much risk in comparison to returns on investment and toward ventures that provide more balanced risks and returns. Restricting use of bankers' acceptance notes to trade transactions in which borrowers are most likely to repay the amount can also help to reduce rising risk in this area. Finally, further publicizing to wealth management customers that they are assuming the risk of these products would underscore that fact that the government will not bail out wealth management products of banks.

China is already moving forward with a number of financial reforms including moving toward an elimination of Qualified Foreign Institutional Investor and Qualified Domestic Institutional Investor limitations, aiming toward some liberalization of the capital accounts, launching an individual overseas investment schemes, expanding markets for debt product pricing, promoting trading of interbank credit default swaps, and moving toward the creation of a managed currency float. Although the huge concern with these reforms is that major changes will require ongoing regulation and enforcement as financial innovations increases. Although movement toward creation of financial markets will help to price in risk to some extent, some institutions necessary to control and provide accurate information about risk remain lacking. The goal of China's highly skilled policy makers is and should be movement toward a deeper financial system – one in which there are markets for a variety of assets for which risk is controlled and appropriately priced.

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CHIŃSKI SEKTOR BANKOWOŚCI NIEFORMALNEJ: POSTĘPY I OCENA RYZYKA SYSTEMOWEGO

Streszczenie. Bankowość nieformalną (shadow banking) można uznać za jedno z wielu źródeł obecnego globalnego kryzysu finansowego. Sektor ten wykształcił się także w Chinach, ale w mniej zaawansowanej formie niż w krajach rozwiniętych, biorąc pod uwagę instrumenty, sposoby oceny ryzyka i regulacje. Dodatkowo, w Chinach nadal nie opracowano oficjalnej definicji bankowości nieformalnej. W artykule przedstawiono: aktualny stan

rozwoju shadow banking w Chinach, rozmiary tego sektora, ostatnie badania dotyczące roli finansowania nieformalnego w stymulowaniu chińskiego wzrostu gospodarczego oraz ryzyko wynikające z instrumentów bankowości nieformalnej. Ze względu na brak wykształconych instrumentów oceny ryzyka i danych dotyczących chińskiego sektora nieformalnego zachodnie koncepcje pomiaru ryzyka systemowego nie znajdują zastosowania w Państwie Środka. W artykule zastosowano dlatego proste podejście do oceny ryzyka systemowego.

Słowa kluczowe: bankowość nieformalna, nieformalne kredytowanie, ocena ryzyka, chiński system finansowy

LEASE AS FORM OF MARKET LAND RELATIONS IMPLEMENTATION IN AGRARIAN SECTOR OF UKRAINIAN ECONOMICS

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Abstract. The state and dynamics of lease land relations as the most common manifestation of market relations in Ukraine are analyzed. Some aspects of theoretical foundations of these relations and their effectiveness are considered. The results of the comparative characteristics of land relations organization on the basis of private ownership of land and its lease are presented. The influence of the lease form of land relations on the effectiveness of agricultural enterprises functioning is shown. The basic features of modern land use on lease basis in the agrarian sector of Ukraine are pointed out. The results of the analysis of the international experience of the lease relations are provided. Steps as for the improvement of lease land relations aimed at increasing of their effectiveness are grounded.

Key words: market, land, lease, relations, terms, payment

INTRODUCTION

Evaluation of the objectives achievement of land reform in Ukraine is not clear. The planned measures are implemented but in general special increase of agricultural production efficiency is not observed. According to A. Tretiak, "today in Ukraine the most difficult phase of land reform that is denationalization and privatization of lands are held, mainly agricultural and market circulation of land parcels between land owners and land users is introduced" which created "primary market conditions for the effective management on the land" [Tretiak 2009b]. Although the same author states that "current development of land relations and their regulation (...) today is not only unfortunate but also dangerous economically and socially to society because land relations shadowing eliminates opportunities of predicted development of property relations on the land" [Tretiak 2009a].

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The absence of the civilized land market largely impedes the development of the country in the direction of improving the efficiency of the market economy. Thus the agricultural lands market is the organizational, economic and legal environment that should provide citizens, legal entities and the state with civil and legal agreements implementation as for the transfer of ownership right on land parcel or right on its usage [Fedorov 2003] or "set of real interactions between buyers and sellers of land parcels, the shares of the right on them, lease rights as well as institutions and organizations that support and restrict the freedom of such interactions" [Tkachuk 2009].

The only real form of the market character realization of modern land relations in Ukraine is land parcels lease that at least ensures the implementation of all the opportunities of land market relations. In today's conditions the lease has become the most common way to use agricultural lands: lessees who do not have enough money to buy land can develop production on leased lands and most lessors are unable to cultivate their own land due to lack of financial security but by giving the land for lease, they can get profit [Oleksiuk 2008].

As the organizational form of land relations in Western European countries the lease of agricultural lands is quite common. In Belgium 70% of lands are given for the lease, in Germany and France – over 60%, in the Netherlands – 35%. On average in the EU countries 40% of agricultural lands are in lease [Dankevych 2007, Tkachuk 2009] because it is more profitable to lease than buy and the lessee can lease lands twice more per unit of their own land [Antipova 2007]. Although among the developed countries there are also those where the level of lease relations does not have high development as for the number of agricultural lands in such form of use. For example, in Canada it is only 30%, in Japan – 20%, in New Zealand – 14%, in Australia and Argentina – 5% [Larsson 1991, Ferency 2005]. In these countries private and public ownership of land dominates over its lease. For example, 65% of agricultural lands in the Netherlands is owned by the state, which is a major lessor in the country. However, the hallmark of lease relations in this country is the most attractive long-term land lease – even for 99 years (as in Israel). Out of 35% of lands for the lease, 20% is leased in the state, 15% – in private owners. The largest land parcel (farm) that is leased in the Netherlands amounts for 3,000 ha. It is leased from private investment company. The lands in this country is given for lease only for professional farmers who have proven that can run business without restrictions on age and the leased land can be transmitted to the son or daughter [Antipova 2007].

In Western European countries, almost 90% of the agreements are compiled for more than nine years, which ensures the full and medium cycles of crop rotation – payback of main assets, and the minimum lease periods in different countries is regulated by legislation in many ways: in the Netherlands and Italy – 6 and 12 years, in Luxembourg – 6 and 9 years, in France – 9, 18, 25 years, until the end of employment, in Sweden – 10 years, Belgium – 9–18 years, in Portugal (for the use of hired labor) – 10 years [Dankevych 2007, Oleksiuk 2008, Berezianko 2009].

So, in most EU countries it is predicted the minimum period of lease agreement, except Denmark, where there is the restriction of 30 years. The legislation does not allow leasing the land after that period [Antipova 2007].

The size of lease payment in various European countries is also different: from 20 EUR per 1 ha in Lithuania to nearly 400 EUR – in Italy. In Eastern European countries,

the figure fluctuates around 20–25 EUR, in Western ones – 129 EUR (Sweden), West Germany – 261 EUR. It varies regarding the quality and purpose of agricultural lands – for example, lease of 1 ha of arable land costs over 320 EUR, pastures – 230 EUR [Tka-chuk 2009]. In the EU countries land lease payment amounts for 20–25% of the harvest value or 2.5% of the land value [Shebanina 2008]. In Sweden, it is 7–9% of the value of sales, 16–20% of the harvest value depending on the quality of leased land in Denmark [Shebanina 2008]. In France, the cost of lease of land is mainly based on the price of 1 hundredweight of grain, which is determined at the average costs on producing without appropriate fees and charges. Thus, in France, the average lease payment for 1 ha was equal to 600 FRF, or 600 kg of wheat in late 1980s [Shebanina 2008].

Land relations in developed civilized countries strictly regulate the sizes of land parcels in the use. Minimum size of the parcel in the lease amounts for 25 ha and cannot be lesser but one operator can lease not more than 125 ha recorded for one farm, but in the use – not more than two farms. In general, it stimulates the warning of the speculation, too high increase of lease payment and non-market competition [Berezianko 2009]. In China, there is somehow another system which is based on paid land use as the lease. Land parcels are provided for the lease on competitive basis. Costs paid by peasants for the lease are directed to social improvement of residents and maintenance of management [Myloserdov 2009].

In general today land relations of economically developed countries are conducted under conditions of developed land market which covers virtually all operations with the land or regard them. They are the lease as well as purchase-sale of land parcels.

The purpose of this article is the results presentation of research of the state and the possibility of land market relations implementation in the agrarian sector of Ukraine in the form of lease of agricultural land under conditions of the absence of the legalized civilized land market in the country. The analysis results of the available data provide a basis for acceptance as a working hypothesis the idea that in Ukraine lease of agricultural lands will remain virtually the only significant form of market land relations, although currently it is not perfect and needs significant improvements exactly as the conditions for its implementation.

MATERIAL AND METHODS

The research is held on the basis of Ukraine's agricultural production materials and particularly Lviv region. It is used the official data of state bodies of statistics and land management including Main Statistical Office in Lviv region, Main Administration of State Agency of Land Resources in Lviv region.

The methods of sociological questionnaire take quite a significant place in the researches. They cover 125 owners of land shares who are engaged in agriculture in different regions of Lviv region and 80 managers of agricultural enterprises aimed at forming of generalized belief about the positive and negative aspects in the existing land lease relations and opportunities of their improvements. Three focus groups with heads of village councils on their assessment of the level of land relations development in the village in terms of the lease of agricultural lands are also held.

The application of mathematical methods elements, in particular relative values, allowed formalizing the characteristics of certain trends in the phenomena relating to the lease land relations. In the analysis of the ratio of individual groups and the role of each one in the overall summing up, structure of relative values play a significant role. The amount of shares for *m*-groups is equal to:

$$\sum_{1}^{m} d_j = 1 \quad \text{or } 100\% \tag{1}$$

where:
d_j – the share of relative values (%);
j – the number of groups ($j = 1, 2, ..., m$).

When time passes, the share of individual groups vary that indicate structural changes. One can trace the changes in the structure of phenomena by comparing the shares. The difference between the shares of the current and base periods ($d_{j1}d_{j0}$) is measured in percentage points. The intensity of structural changes is estimated using the average linear or the mean square deviation of the shares.

The simplest generalized measure of the intensity of structural changes in the whole totality serves a secondary one of modules of share deviations – linear coefficient of structural changes:

$$\overline{l_d} = \frac{\sum_{1}^{m} d_{\underline{j1}} - d_{j0}}{m} \tag{2}$$

where:
m – number of groups or components on which totality is divided.

The most common method in studies is the application of monographic method that allowed a thorough and comprehensive processing of available scientific literature and the reported data of agricultural enterprises and statistical and accounting structures.

RESULTS AND DISCUSSION

Theoretical aspects of the lease as the form of land relations and its efficiency

Along with capital and labor, the land is a major factor in the implementation of the production process, the other two mentioned factors can not operate without it [Palash 2007]. Land relations in agriculture are objectively related to the land: as to the ownership of it and its use which can be made on the rights of full ownership as well as the lease.

The effectiveness of the lease land relations can be characterized by the degree of optimal lease payment, which will be determined by the level of maximum satisfaction of the parties of market lease relations – lessee and lessor. It is also possible to consider the efficiency of land lease for the appropriate rural area. Therefore, the effectiveness of

the lease for the lessee can logically be expressed by the increase in cash earnings from agricultural activities by expanding its scope, for the lessor – in obtaining a stable income from land lease; for rural areas – in the creation of new jobs.

All the agricultural history of the twentieth century shows that the management effectiveness is not caused by the ownership form but industrial and technical potential of a particular company, its respective specialization, staff and their qualifications, management level, the optimal production concentration, integration into the system of production and supply and sale cooperation and the close connection with the sphere of processing [Makeienko 2001, Oleksiuk 2008]. The rationality of land use still depends more on who hosts on it and how than whose property. But in relation to land use under specific circumstances such as lease terms they can determine its effectiveness only for the period of the lease that is without some perspective on preserving the quality of the land, which can provide only by the land in private ownership. Therefore, it is possible to disagree with other authors who claim that the form of land has no value commodity manufacturer no matter whether he is the owner or lessee must objectively use own and "alien" resources that is land productively and effectively and the lessee has to use then even more efficiently because he pays lease for the land owner and only under these conditions it can successfully compete with those who use their own land (or on free basis) [Melnyk

Table 1. Comparative characteristics of land resources organization on the basis of private ownership on the land and its lease

Characteristic	Forms of land resources organization	
	on the basis of private ownership	lease
Advantages	- provision of productive and rational land use; - provision of economic and financial stability of management; - creating confidence in the future; - opportunity to use as a pledge to get the credit; - easier access to credits; - increase of investment attractiveness of management; - management improvement of land funds use; - preserving land quality by renewing and increasing soil fertility	- efficiency of the mechanism of businesses amalgamation; - forming of granted income of land owners; - possibility of partial realization of ownership rights as for the right of disposal right; - opportunity "to start" in agrarian business with relatively lesser start-up capital
Disadvantages	- complexity of lands consolidation in terms of the moratorium on purchase and sale; - private property does not always ensure the process of maintaining and improving soil fertility – a decline on prices of agricultural products due to unfavorable conjuncture of agrarian market forces many manufacturers to save on costs, which could be used for these purposes	- opportunity of the violation of business integrity of land tracts; - as for short-term lease there is absent the motivation of lessee to invest in land parcel; - the part of lessee's income transit to lessor as his unearned income and practically is removed from the sphere of agriculture. These are great sums in big enterprises

Source: Own development of the author.

2009]. The correctness of these words has meaning only in the short period which is defined as the term of the lease of the land parcel. In the long period the legal basis of the organizational and legal form of management and it means the use of land resources can definitely be purely objective.

Conducted questionnaire and the processed results and interpretation of the obtained data as well as the analysis of existing empirical data allowed forming a diagram of possible comparative positive and negative characteristics of different organizational forms of land relations on the land resources use in agricultural enterprises, which are presented in Table 1.

From the data of Table 1 sit is shown that the absolute advantage has neither one nor the other of the analyzed forms and their application is formed in each case depending on the specific situations. That is, ownership based on private property of small land parcels does not automatically resolve issues of the efficiency of their use.

Characteristic features of modern land use in Ukraine

Today the main problem in the sphere of normative and legal framework of the development of land relations is the absence of strategic documents as to the prospect of further reforming. There is not the program on using of different types of lands; there is ultimately no official concept of further development of land relations. "Obviously, in the sphere of land relations in Ukraine there is no comprehensive strategy of action and weighted methods of reforms and rational infrastructure of management and legislative system space" [Prysiazhniuk 2010]. Law of Ukraine "On Land Market" has been seen once again in the Supreme Council of Ukraine, and the term of this procedure, based on existing experience, can last for years.

"Today not the person who can create a big agricultural enterprise buys the land parcel but the person who solves the problem with alienation, can bypass the moratorium that virtually stimulates the withdrawal of land parcels from the agricultural production and dramatically affect the value of land parcels, stimulates corruption" [Yurchenko et al. 2009]. Calculations show that uncontrolled redistribution of agricultural lands in the shadow market for the recent years has inflicted one-time economic loss to budgets of rural areas, which is estimated nearly 900 billion UAH [Tretiak et al. 2011].

Land parcels allocated to their owners may be subject of agreements of lease, gift, inheritance, exchange and withdrawal for public needs. Of total given transactions one may consider that the market one is only the lease. According to data of State Agency of Land Resources of Ukraine the market share of lease agreements concluded with businesses makes up 54% of all agreements, with farm businesses – 14%, with other entities – 31%. This structure suggests that land lease market of shares in Ukraine remain mainly low competitive, although the conditions for the development of land market of the lease and concentration of land tracts, its level can rise.

Financial levers of land relations efficiency operate ineffectively. Average lease payment per year amounts for 37 USD in 2010 [Duda 2011, Jatciv 2011] and for the period of 2007–2010 – 35 USD which cannot be compared with the lease payment levels in developed countries – 200–500 USD [Andriichuk 2009]. In Ukraine, even in December of the year of 1998 according to President's decree it has been set the lease payment on the land at least not less that 1% of its normative monetary evaluation. According to the

Law of Ukraine "On Land Lease", the lease payment can also be up to 10% of the land value, that is 950 UAH per 1 ha.

In Lviv region in 2011 compared to 2007, the number of lease agreements increased but the share of the natural and labor forms of payment declined while the share of monetary forms of payment increased as to formulas (1) and (2) a linear coefficient of structural changes increased by 6.8 points. During the same period the share of number of agreements with the lease term for the periods of 1–3, 4–5 and more than 10 years declined, but slightly the proportion of the number of agreements with a term of 6–10 years increased (Table 2). Linear coefficient of structural changes shows that on average over this period, the share of number of agreements with these groups of lease terms have changed by 8.7 points.

When the number of 5-year lease agreements increased for 6.7% for the researched period, the area of the leased lands increased only for 2.4%, that is pace of the increasing

Table 2. The characteristics of the leased agricultural lands in Lviv region in 2007–2011

Indicator	2007	2008	2009	2010	2011
Number of lease agreements (thousand)	117.4	119.1	121.8	125.0	125.3
The area of leased lands (thousand ha)	193.5	205.5	202.7	200.6	198.2
Payment forms					
natural	78.2	68	73	65.1	72.3
monetary	16.7	20.6	22.7	31.0	26.9
labour	5.1	11.4	4.3	3.9	0.8
The share of ageements (%) with lease term					
1–3 years	25.6	26.4	22.1	20	21.9
4–5 years	46.1	41.8	43.1	41.7	32.7
6–10 years	20.8	23.9	26.9	31.2	38.2
more than 10 years	7.5	7.9	7.9	7.1	7.2
The average size of lease payment (UAH·ha^{-1})	119.6	136.3	250	270.7	306.4
It is paid at the end of the year of lease payment (%)	99	97	97	69	100
The share of agreements with the size of lease payment (% of general number)					
till 1.5%	27	33.4	8.2	9.3	6.8
1.5–3.0%	64.9	51.5	44.4	49.4	48.5
over 3.0%	8.1	15.1	47.4	41.3	44.7

Source: Data of Main Administration of State Agency of Land Resources in Lviv region.

number of lease agreements are larger in three times than pace of increasing the area of leased lands. In general, from 2008 the area of leased lands has tendency to decline.

The tendency of decreasing the level of contractual obligations is significantly observed in agricultural regions of the researched region. Herewith the share of lease payment in kind increased and it cannot be considered as the negative tendency because in conclusion the payment form is agreed by two parties. Obviously, these parties are not satisfied in the given region because owners of land parcels in the village always need agricultural products as well as certain services. Although for the last 10 years the share of lease payment in the form of services has the tendency to decreasing in the researched region.

The most important structural changes have occurred in the lease payment. In this structure, the share of agreements of lease payments of 1.5 and 1.5–3% declined, and although the share of agreements with the lease payments of 3% increased. Linear coefficient of structural changes shows that on average over this period the share of number of agreements with these groups of lease payment changed for 24.4 points.

The magnitude of the coefficients of structural changes we can make the following general conclusion on the intensity of the process of structural changes in lease relations for the years of 2007–2011: the tendency of share increase of the lease payments for 1.5–3% prevails over the tendency of share increase of the term for 6–10 years and those mentioned tendencies prevail over the displacement tendency of payment forms aside cash payment of leased land. The predominance of natural forms of payment indicates a negative trend of management or dependence of the lessor on conditions of the lessee. Positive phenomenon in lease relations can be considered as increase of the number of agreements with long-term lease and increase of lease payment. Under such conditions (long-term lease) one can talk about improvements in land use, as it is possible to ground land use scientifically (at least in the sphere of crop rotation).

In rural area it is continuously increasing the number of land shares of owners who died and there are no heirs. That is why these lands are used on lease basis free of charge. In the region the sum of lease payment that has not been paid because of mentioned circumstances increased by 124 times and amounted for 372 million UAH for the researched period. Under the absence of land market conditions "the lease largely imitates market relations and is a single quasi-market form of peasants' implementation of acquired ownership right on land" [Zajac 2008].

The result of author's calculations shows that the positive influence of the increase of management efficiency on the level of the lease payment takes place in the researched region. Businesses that operate on the leased lands obtain more profit in 1.5–2.5 times per 100 ha of agricultural lands than businesses that do not have such land and obviously are connected with the dimensions of management.

The results of sociological survey conducted by the author show that land parcels owned by respondents are not limited to the land share because respondents also own or use household plots. More than the half of people, who have been asked, give their land for the lease, so it means that a big part of respondents are pensioners, employees, leaders (58%). Only 12% of such lessors are satisfied with the lease payment which they get and it can be understood taking into account its level. Moreover, oddly enough, the cash payment

for land parcel lease has no absolute preference (34%) – owners of land parcels prefer payment in kind (46%).

In general the land lease agreements in Ukraine are compiled for 1–5 years and the average term is 7–8 years that does not create sufficient stability conditions of management [Zhowniruk 2013]. It is interesting that according to survey results the owners consider the optimal term of giving land for the lease not more than 5 years (74%). Thus lessors insure themselves against non-performance of contractual conditions by lessees and have the right to change the lessee.

Heads of households are primarily interested in increasing the lease terms till 10 years or more, however their desire does not coincide with the actual state of affairs. Most of heads prefer payment in kind among the forms of lease payment.

Virtually none of heads of agricultural enterprises is satisfied with the lease payment as well as land lessees and lessors.

At the stage of current development of land relations among the existing lease types and lease payments the most appropriate one is flexible cash lease which is widespread in Ukraine and prevails in all countries of the world. However, it is worth remembering that type of lease payment as a share of crop production or even livestock, on the one hand is associated with the distribution of risk between the parties to the lease relations and fluctuations of earnings of every party depending on market and production conditions, but on the other hand, under long-term lease conditions, this form of payment can take advantage of unstable economic situation in the country as a whole due to the risk of inflation of money. Moreover, it is also advisable to include the point about relations regulation between lessees and landowners regarding compliance with the first crop rotations required in the use of the land to the text of land lease agreement.

We also consider that improvement of lease relations in the fact that additional conditions concerning the correction of lease payment should be provided in the long-term lease of agricultural lands. For example, if the lease payment will be 5 or more years than significant changes in the legislation and market environment are possible over such considerable period of time.

It is significant that the imperfections of land relations in Ukraine are provided with the opportunities of foreign companies to buy rights of land lease in each other. It is clear that the sales tax does not enter State Budget of Ukraine [Mychailov 2013]. So the bankrupt English company Landkom was purchased by Swedish company Alpcot, the bankrupt French company Agrogeneration was purchased by American company Harmelia.

It should be noted that at present one can state that on the basis of the current situation analysis the lease of land parcels in Ukraine is the only possible way of market land consolidation as even certain normative and legal framework for this is already in operation. Consolidation is a management and agricultural measure playing an important role in rural area development [Dudzinska 2010]. Unfortunately, there is no guidance that land lease should be done in land legislation of Ukraine as to land parcels lease, exclusively aimed at consolidation but not grinding. But the government of the country aimed at attracting foreign investors interested in Ukrainian black soil, decided to buy the land first (consolidate large areas of land) for small amount of money and then sell it for "many thousands of money" to Arabs, Chinese, Americans, Korean [Mychailov 2013].

CONCLUSIONS

The results of native and foreign experience analysis of lease land relations give background aiming at improvement of this land relations form in Ukraine to recommend: to develop land legislation of the country as to lease land relations on the determination of categories of possible lessees of land parcels on the level which is not lower than that of skilled farmer or agricultural enterprise; to set minimum lease terms of land parcels only of 0.5 ha for 1 year and of larger size for 6–99 years depending on the size of those parcels; the lease payment should be lawfully restricted to no less than 4% of normative land estimation however to consider the possibility to reach the agreement between lessor and lessee as to the payment for land lease which is higher than minimum as well as the procedure of implementation of this payment; the optimal solving the problem of lease payment can be the approach when lease payment will be related with the amount of profit per unit of leased land, for example, 10–15%; to consider monetary lease payment as the most progressive and its type – share of profit or gross products per area of land as such type stimulates and attracts more than the flat rate or percentage of land share; the lease payment can be differentiated depending on the quality of land and other factors that determine the value of land as a resource; to consider in the legislature the progressively increasing benefits on landowners' income taxation in proportion to the sizes of land parcels and long-term periods of the lease; to consider in the legislature the possibility to give in inheritance the land parcel in long-term lease that is the lease agreement; to introduce in practice of land relations of lease type the possibility of automated continuation of the term of lease agreement after its finishing if according to conclusions of land commission (determined competent authority), leased land parcel is not worse and there are no obstacles that can worse the condition of one of parties; allow lawfully the establishment of agreements for the lease of land by treaty between the lessee and landowner; landowners and land users should be responsible for preservation of agricultural land and its fertility; according to Article 24 of Law of Ukraine "On the lease of land", lessor has the right to require that the lessee use the land parcel for the intended purpose, compliance with the ecological security of land use and preservation of soils fertility; Article 29 provides for reimbursement of lessee of damages in case of deterioration of useful properties of leased lands whose size is determined by parties of the agreement. However, in order to specify this aspect of land relations in the agreements it would be appropriate to determine a specific list of crops that will be cultivated on this land, and the sequence of their rotation as required according to agro technical crop rotation and minimum doses of introducing organic and mineral fertilizers by years of land use; consider the early termination of the land lease agreement for the initiative of one of parties if either of them can economically prove the possibilities of deterioration of their economic status or condition of land in case of extension of its action; to outline lawfully the regulatory norms and introduce alterations to lease agreements as the obligatory condition as to the conducting 50% lease by monetary costs not later that the first of April during 1 year of the lease; to consider the possibility to view the conditions annually according to the alterations of management conditions and technologies of goods production in long-term lease agreements.

So, main directions of the efficiency increase of land relations of lease form lies in the fact of increasing the average sizes of leased land parcels and terms of lease agreements of the land.

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DZIERŻAWA JAKO FORMA WDRAŻANIA RELACJI NA RYNKU ZIEMI W SEKTORZE ROLNYM UKRAIŃSKIEJ GOSPODARKI

Streszczenie. W pracy przeanalizowano stan i dynamikę relacji w zakresie dzierżawy ziemi rolnej jako najbardziej typowej relacji rynkowej w rolnictwie na Ukrainie. Przedstawione wybrane aspekty teoretycznych podstaw tych zależności oraz ich efektywność. Artykuł prezentuje wyniki analizy porównawczej organizacji zależności na rynku ziemi rolnej na podstawie na podstawie własności prywatnej. Wykazano, że dzierżawa jako nowoczesna forma gospodarowania gruntami ma wpływ na efektywność działalności gospodarczej przedsiębiorstw rolnych. W pracy scharakteryzowano podstawowe cechy współczesnych form gospodarowania nieruchomościami gruntowymi stosowanymi w rolnictwie na Ukrainie, w tym dzierżawy, i porównano te realia z międzynarodowymi. Pozwoliło to autorce artykułu opracować wytyczne do ulepszenie formy dzierżawy do poprawy efektywności działalności gospodarstw rolnych.

Słowa kluczowe: rynek, ziemia rolnicza, dzierżawa, zależności, warunki, płatności

ASSESSMENT OF THE USE OF THE EUROPEAN UNION FUNDS TO SUPPORT INVESTMENTS ON POLISH FARMS IN THE REGIONAL PERSPECTIVE

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Abstract. The purpose of the article is to compare the use of aid funds from operations: Investments in agricultural holdings, Farms adaptation to the EU standards and Modernization of agricultural holdings in Poland analyzed of regions perspective (Polish voivodeships). It was found that the activity of farmers in obtaining EU funds in order to support investments is highly diversified in terms of the region. The tendency of farmers to raise funds for investments is related to the local conditions, the level of production, agricultural practices, area structure, as well as the level of technical and social infrastructure in different regions. On the basis of the obtained data, it must be considered that there is a continuing need to support investment in agriculture under the Common Agricultural Policy (CAP), but it should be devoted to the regional context.

Key words: EU funds for agriculture, SOP-Rol., RDP, investment, cluster analysis

INTRODUCTION

The concepts of investment and investing in agriculture are very broad. Investments are usually spread out over time and involve incurring risk. They are factors of development, because they stimulate the process of structural changes in agriculture through innovations. To a large extent, they determine competitiveness of the agriculture. Usually, they take the form of productive property investments, whose aim is to increase the value of the farm, improve the quality of production and the economic situation of farmers and their families. In addition, investments are used to achieve short-term goals in order to increase revenues [Lorencowicz 2013].

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Since agriculture is the weakest link in the agri-food chain [Czyżewski 2007], many programmes are initiated to provide external support. This support is implemented by the national funds and the EU under the Common Agricultural Policy (CAP). Financial aid allows farmers to develop agricultural activities in a faster and more thorough way. If the public support for investment activities were deficient, very few farmers would decide on the use of commercial loans [Kusz 2013].

Improving the competitiveness of farms by investing in their development, was and still is, a priority of the CAP [Czubak 2012]. In the pre-accession period, Polish farmers received financial support from the SAPARD Programme for adjustment investments on their farms. After Polish accession to the EU, there were funds available for financing investment projects from the following programs: Sectoral Operation Programme for Restructuring and Modernisation of the Food Sector and Rural Development, the so-called SOP-Rol. (measure 1.1: Investments in agricultural holdings), Rural Development Plan 2004–2006 (measure 6: Meeting the EU standards), Rural Development Programme 2007–2013 (measure 121: Modernisation of agricultural holdings).

The direct aim of these measures was improving the competitiveness of farms and also, their modernization and development. Other important priority was the adjustment of agricultural production to the EU requirements and standards. Those investments carried out in farmers households using the aid, had (and still has) the nature of the adjustment to the existing EU legislation, such as the cross-compliance requirements. Its mechanism of linking direct payments forces a number of investments in agriculture, mainly concerning the environment, animal welfare or food safety proved on the market [Kiełbasa 2011].

The main aim of this article is to compare the use of aid funds received from measures: Investments in agricultural holdings, Meeting the EU standards, Modernisation of agricultural holdings in Poland by regions (provinces, Polish voivodeships). Therefore, the following research questions were formulated:

– What is the importance of the space factor (in terms of regions) in forming the activity of farm managers when it comes to obtaining the EU funds for investments in agriculture?
– What are the clusters of provinces based on the similarity of the features defining the support from the EU funds for investments in agriculture?

The stated purpose and answers to the research problems will confirm the hypothesis: the activity of farmers in obtaining EU funds to support investments is highly diversified in terms of the provinces (regions). This demonstrates the significant impact of the level of agricultural development, the structure of the area, as well as historical factors on the level of the fund absorption.

MATERIAL AND METHODS

The analyses were carried out between the years 2004–2013 (data for 30.09.2013). The analytic materials were GUS (Central Statistical Office) data and the data from The Management Information System of Agency of Restructuring and Modernisation of Agriculture (ARMA), concerning mainly the implementation of aid instruments

in Poland from the CAP. There were selected actions supporting investments in agricultural holdings. The data on the number of farms in the provinces, agricultural area, the number of people employed in agriculture, and the average value of a single investment project in the province was used as the reference point. In order to evaluate the use of funds in the regional perspective, the grouping of provinces was made, taking into account selected features, using the cluster analysis. It was used for grouping variables or cases in groups with similar features. Thus, it allows separating the subjects that are similar and also different from one another, which enables their prioritization [Grzelak 2006]. To extract homogeneous regions, hierarchical (agglomeration) cluster analysis of Ward's method was used. Ward's method allows to estimate the distance between the clusters on the basis of the analysis of variance, and thereby, it enables such position of analyzed objects that the degree of theirs relationship with the objects belonging to the same group is the highest, and with objects from other groups is possibly the lowest [Luszniewicz, Słaby 2008]. The selection of the number of clusters has been made on the basis of agglomeration for the studied variables and cases.

RESULTS

The value of all completed projects from the measure Investments in agricultural holdings, from SOP-Rol., exceeded the limit of 8.6%. Increasing the available fund envelope was due to a high interest for this measure. The response to this interest was the movement of the free resources from other activities to the Investments in agricultural holdings measure [Analiza struktury projektów… 2007]. With these funds, such investment projects were financed, which were aimed at improving the organization of production, the competitiveness of farms and also increasing agricultural income [Sektorowy Program Operacyjny…]. Totally, in Poland more than 24 thousand of projects were subsidised, for a total amount of 2.4 billion PLN (Table 1). Most applications were submitted in the the Mazowieckie, the Lubelskie and the Wielkopolskie Provinces (voivodeships), and the least in the Lubuskie, the Silesian, the West-Pomerania and the Podkarpackie Provinces. In the Mazowieckie and the Wielkopolskie was gathered most of the sum, in total more than 30% of the amount allocated for this activity. The smallest envelope of funds was received by farmers in the Lubuskie, the Podkarpackie and the Silesian Provinces.

The second discussed measure is Meeting the EU standards of RDP 2004–2006. As part of this measure there were financed tasks that were designed to help farmers in adapting their production to the EU requirements. This support took the form of an annual payment which covered all costs of the investments that were necessary to achieve the required standards. Farmers allocated the received funds mainly for adaptation of farms to the requirements for the storage of natural fertilizers, adaptation to the veterinary requirements for production of milk and dairy products, modernization of farms producing table eggs [PROW 2004–2006...]. Out of the funds allocated for this purpose more than 72 thousands of projects were carried out, with a total value of 2.4 billion PLN (Table 1), which meant exceeding the assumed limit for this activity by 7% [Ewaluacja ex-post Planu... 2009]. The highest numbers of applications were submitted in the regions of the Wielkopolska, the Mazowsze and the Kujawsko-pomorskie (Table 1). On the other

hands, the lowest number was submitted by farmers from the Lubeskie, the Silesian, the Lower Silesian and the Podkarpackie Provinces. In terms of value, the greatest amount was received by farmers from the central and northern provinces – totally about 60% of the total amount allocated for this action. The lowest numbers of funds were obtained in the regions of the Lower Silesia, the Silesian and the Podkarpackie – totally less than 4% of the total allocated amount (Table 1). The number of submitted applications coincides with the number of farms operating in the province, as well as the marketability of agricultural production. Hence, in the smaller provinces, where there are fewer farms and the rate of the production yield is lower, there were less completed projects, and this in turn, greatly affects the total value of the acquired help.

From the measure Modernisation of agricultural holdings to the end of 2013 farmers could obtain direct help to adjust their holdings to the principles and norms of the EU governance. Investments in agricultural holdings carried out from these funds aimed at increasing the competitiveness of farms, quality of food production, as well as the modernization of farms, for example by replacing machinery [PROW 2007–2013...]. From this activity, until 30.09.2013 farmers received nearly 7.2 billion PLN for the implementation of almost 60 thousands projects (Table 1). In 2013, there was a shift of funds from other RDP measures that were not used and they were directed to the measure Modernisation of agricultural holdings. The purpose of this relocation was to use the available funds in the RDP budget and direct them to the operations that are the most popular among farmers. As shown by data on the absorption of the measures in terms of provinces, most applications were submitted in the Mazowieckie, the Lubelskie and the Wielkopolska Provinces, and their value amounted to more than 40% of total funds. The lowest numbers of applications were submitted in the Lubuskie, the West-Pomerania, the Silesian and the Opolskie Provinces (Table 1). The total value of projects submitted in these four provinces is less than 6.5% of all projects. Regional differentiation in the number of applications and their total value is largely determined by the number of farms operating in the province. There is a large, positive correlation between these two features (R = 0.7).

Agriculture in Poland varies regionally, especially in terms of potential of production, the structure of production and management efficiency. Investment needs will be therefore different in different regions (provinces) of the country. Generally, the level of using the aid and its potential impact on the development of farms in different regions of the country depends primarily on the interest of the beneficiaries in this form of aid. One should, however, take into account the diversity of agriculture in Poland, determined by significant natural conditions and historical determinants [Grzelak 2008]. The Polish area can basically be divided into two regions: the first one with northern, central and west Poland with trade agriculture, and the second one consisting of south-east provinces with the so-called semi-subsistence farms [Kulikowski 2009]. Similar, but not identical, is the situation with the use of funds for activities aimed at the implementation of investments on agricultural farms.

It may be noted that in total (in absolute terms) most of the discussed activities of the RDP went to provinces, where there are good conditions for the development of market agriculture (i.e. with developed processing infrastructure, high level of good agricultural practices, closeness of absorptive markets) and economic results of farms are higher than the average ones in the country. Taking into account the analyzed factors, these were

provinces located in the central part of the country (the Mazowieckie, the Wielkopolskie, the Kujawsko-pomorskie Provinces), and also the eastern Polish regions (the Podlaskie, the Lubelskie Provinces). The Mazowieckie Province acquired more than 17% of the total envelope of measures designed to improve the competitiveness of farms, the Wielkopolskie Province – more than 15%, the Kujawsko-pomorskie Province – 10%, the Podlaskie Province – 9.2% and the Lubelskie Province – 9%. In contrast, the lowest support was obtained in the Lubuskie, Podkarpackie, the Silesian and the Opolskie Provinces (Table 1). In these regions, fewer farms operate due to the smaller surface of these regions and farmers are relatively less active in raising funds for investment activities. Taking into

Table 1. The number and amount of completed applications within the selected programmes: SOP-Rol. 2004–2006, RDP 2004–2006 and RDP 2007–2013 for investments in agriculture in terms of Polish provinces (voivodeships)

Voivodeship	SOP-Rol. 2004–2006 investments in agricultural holdings		RDP 2004–2006 meeting the EU standards		RDP 2007–2013[a] modernisation of agricultural holdings		Total	
	number of completed requests	realized payments (m)	number of completed requests	realized payments (m)	number of completed requests	realized payments (m)	number of completed requests	realized payments (m)
Lower Silesia	756	105.7	661	17.8	2 350	319.2	3 767	442.7
Kujawsko-pomorskie	1 966	196.9	13 097	440.6	4 793	578.7	19 856	1 216.3
Lubelskie	2 998	233.9	3 031	85.5	7 134	777.8	13 163	1 097.1
Lubuskie	264	40.5	566	20.3	787	136.0	1 617	196.9
Łódzkie	2 338	187.4	5 835	172.3	5 660	558.9	13 833	918.7
Malopolskie	1 200	91.0	948	24.6	2 743	257.5	4 891	373.1
Mazowieckie	4 032	365.1	13 791	479.4	10 773	1 245.6	28 596	2 090.2
Opolskie	588	70.0	626	21.9	1 390	184.5	2 604	276.5
Podkarpackie	569	54.4	687	17.9	1 906	160.4	3 162	232.7
Podlaskie	2 020	206.1	6 014	213.8	4 728	690.7	12 762	1 110.7
Pomeranian	841	117.5	4 566	133.9	1 966	298.9	7 373	550.3
Silesian	539	57.2	656	19.8	1 449	170.6	2 644	247.6
Świętokrzyskie	1 686	110.3	1 489	37.0	3468	301.2	6 643	448.6
Warmińsko-mazurskie	805	122.6	4 292	171.0	2636	405.1	7 733	698.7
Wielkopolskie	2 918	376.5	15 090	541.8	6 091	911.3	24 099	1 829.6
West-Pomerania	559	83.2	1 242	39.2	1 156	218.3	2 957	340.8
Total	24 079	2 418.4	72 591	2 437.5	59 030	7 215.0	155 700	12 070.9

[a] As on 30.09.2013.

Source: The Management Information System of ARMA.

account the descriptions, there can be observed a significant concentration of aid in the regions characterised by commodity agriculture.

As it follows from the calculations, the distribution of fund absorption is very diverse. These discrepancies arise from different agricultural practices, management and organization of agricultural production in terms of the region [Crescenzi 2004]. In regions with large farms, the total value of the analyzed aid is distributed on relatively few subjects. On the other hand, in regions characterized by a significant fragmentation of the agrarian land, capacity and motivation of farmers are largely limited due to lower scale and marketability of production.

Thus, the size of farms and area structure to a large extent determine the level of absorption of aid funds for investment in terms of regions [Kusz 2011]. It can be assumed that these are some of the key determinants of differences in the use of aid funds, confirmed by a strong positive correlation between the total sum of the mobilized support for investment (in PLN) or the number of completed projects and: the number of farms in province; the number of people working in agriculture in province; and the surface of agricultural land in province.

In all these cases, the correlation was higher than 0.97. These results indicate a large regional variation in the level of absorption of aid. This also shows a significant concentration of support for investment activities with a relatively higher level of agriculture competitiveness (in the sense of creating productive and economic effects) [Nowak, Kamińska 2013]. The level and rate of absorption of aid measures for the implementation of investment projects in the region is largely influenced by: a farm size and intensity of organization of production. From the national perspective, it can be seen that few beneficiaries received the support funds for investments. The ratio of completed projects to the number of farms amounted to 11.5%[1] (Table 2). The highest percentage was recorded in the Kujawsko-pomorskie, the Wielkopolskie, the Pomeranian and the Warmińsko-mazurskie Provinces, which means that farmers from these regions turned out to be the most active in absorbing external financial funds.

On average, 1 hectare of agricultural land accounted for more than 457 PLN, and for one employee – 5,550 PLN. Taking into account the value of applications, it can be concluded that on average, farmers applied for the amount of more than 117 thousand PLN, while taking into account the distribution of support per farm on average, this amount was approximately 7.8 thousand PLN (Table 2). On average, most projects were implemented by farmers operating in the Lubuskie, the Lower Silesia and the West-Pomerania Provinces, where the average value of a single contract was over 110 thousand PLN. Analyzing the relation of the total amount of support for investment per farm in the province, it can be concluded that the most were acquired in the Kujawsko-pomorskie, the Warmińsko-mazurskie, the Wielkopolskie, the West-Pomerania and the Podlaskie Provinces, where one farm there accounted for 10 thousands PLN. On the other hand, the highest values for one employed in agriculture were recorded in the Kujawsko-pomorskie and Warmińsko--mazurskie Regions, which could result, among others, from a relatively larger scale of production in these regions.

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[1] It should be noted that, in fact, this value is lower because some beneficiaries repeatedly benefited from support under this type of EU support.

Table 2. Selected characterization data of financial assistance from the EU funds for investments in agriculture (for the period form 2004 to 30.09.2013)

Voivodeship	The ratio of completed applications to the number of farms in the ARMA register of agricultural producers	Total amount of financial aid (PLN)				Indicator of marke-ta-bility	The aver-age size of agricultural land on the farm (ha)
		per 1 hectare of agricul-tural land	per 1 agree-ment	per 1 farm by ARMA	per 1 worker on the farm		
Lower Silesia	6.7	457.6	117 525.7	7 852.8	5 550.2	70.6	16.0
Kujawsko--pomorskie	30.4	1 118.6	61 255.9	18 647.1	11 735.6	69.6	15.1
Lubelskie	7.5	774.5	83 353.5	6 215.8	4 258.6	65.5	7.5
Lubuskie	8.1	436.6	121 773.8	9 892.4	6 693.9	73.8	20.8
Łódzkie	11.3	914.7	66 415.1	7 513.3	5 322.3	70.6	7.6
Małopolskie	4.0	562.3	76 281.3	3 081.3	1 639.6	63.1	3.9
Mazowieckie	13.9	1 036.4	73 093.9	10 128.5	7 031.4	72.4	8.5
Opolskie	9.4	533.1	106 208.6	10 021.6	6 419.3	72.6	18.1
Podkarpackie	2.7	335.8	73 610.1	1 996.7	1 187.3	57.5	4.6
Podlaskie	15.8	1 037.7	87 035.2	13 731.9	9 669.6	67.2	12.2
Pomeranian	19.2	681.5	74 644.2	14 333.2	9 227.6	75.4	19.0
Silesian	5.6	544.8	93 668.9	5 230.9	2 932.1	70.6	7.2
Świętokrzyskie	7.8	814.8	67 526.7	5 280.1	3 330.9	64.3	5.5
Warmińsko--mazurskie	17.9	661.9	90 357.0	16 205.5	10 886.2	71.8	22.9
Wielkopolskie	19.9	1 022.2	75 921.5	15 126.3	9 375.7	74.8	13.5
West--Pomerania	10.4	356.8	115 263.2	11 940.6	8 242.6	74.0	30.2
Total	11.5	457.6	117 525.7	7 852.8	5 550.2	70.6	10.4

Source: Own calculations based on data from The Management Information System of ARMA, Agricultu-ral Census 2010 – Agricultural land use CSO, Agricultural Census 2010 – Agricultural land use CSO, Statistical Yearbook of Agriculture 2012 CSO.

In order to determine regional differences and similarities in the use of aid funds, the cluster analysis was performed. For grouping four features were chosen, which were first standardized, and they were (Table 3): the value of financial aid per 1 hectare of agricul-tural land; the value of financial aid for one completed investment project; the value of financial aid per one farm and the value of financial aid per one employee in agriculture.

Cluster analysis allowed the separation of three groups. The first one includes six provinces: Warmińsko-mazurskie, Pomerania, Wielkopolskie, Podlaskie, Mazowieckie and Kujawsko-pomorskie. The second cluster includes also six provinces, and they are: Silesian, Podkarpackie, Małopolskie, Świętokrzyskie, Łódzkie and Lubelskie. The last, third cluster comprises four provinces: West-Pomerania, Opolskie, Lubuskie and Lower Silesia (Fig. 1).
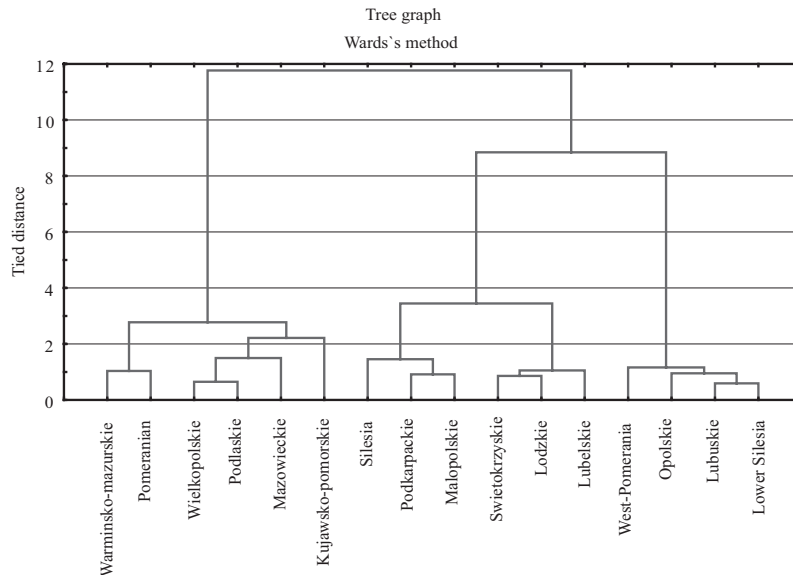
Fig. 1.   Cluster analysis – tree graph of absorption of the EU funds for agricultural investments (see Table 2) in terms of voivodeships (as on 30.09.2013)

Source: Own study based on data from The Management Information System of ARMA using STATISTICA PL 10.

The groups of provinces largely reflect differences in Polish agriculture, which are related to its heterogeneity [Matuszczak 2013]. They form three areas, taking into account the natural characteristics, peculiarities of farms, the level of their competitiveness and their size. The largest area consists of provinces of northern and central Polish voivode-ships. The second cluster includes provinces of the southern and eastern Poland. The third cluster is a group of provinces in the west of the country. Groups 1 and 2 comprise most farms (Table 3) due to the number of provinces (altogether 12) and the size of these areas. Over 50% of all agricultural land was in Group 1. Similarly, the number of beneficiaries and the total of financial aid. More than 92% of the beneficiaries of these aid programmes are in Groups 1 and 2 is, who raised 78% of the total amount of financial assistance for investments. In addition, there is the highest percentage of number of aid beneficiaries in relation to the number of farms (Table 3) in these groups. This demonstrates a great inter-est in this form of aid in regions with favourable agricultural development.

Considering the chosen characteristics in relation to the average for all regions, it can be concluded that Group 1 is the strongest one (in the sense of achieving the highest value of chosen features), because three out of four analyzed features are much higher than the national average. Group 3 is the average one, because all selected features oscillate around an overall mean. Group 2 can be described as the weakest. It covers the south--eastern Polish provinces. In terms of the selected features, averages values obtained in this group are much lower than the overall average (except for the financial assistance per 1 hectare of agricultural land) – Table 3.

Table 3. The results of the cluster analysis using Ward's method for clustering regions

Specification	Group 1 (6 voivodeships) Pomeranian, Warmińsko-mazurskie, Kujawsko-pomorskie, Podlaskie, Mazowieckie, Wielkopolskie	Group 2 (6 voivodeships) Łódzkie, Lubelskie, Świętokrzyskie, Silesian, Małopolskie, Podkarpackie	Group 3 (4 voivodeships) West Pomerania, Lubuskie, Lower Silesia, Opolskie
The number of farms in the register of agricultural producers of ARMA in 2012	554 954	668 749	132 423
Agricultural land in the group in 2010 (ha)	7 827 576	4 782 812	2 892 581
Number of beneficiaries – total in the group	100 419	44 336	10 945
The amount of financial aid – total in the group (million PLN)	7 495.9	3 317.9	1 257.0
The ratio of completed applications to the number of farms in the ARMA register of agricultural producers	18.1	6.6	8.3
Total amount of financial aid (PLN)			
• per 1 hectare of agricultural land [GUS 2010]	926.4	657.8	446.0
• per 1 agreement	77 051.3	76 809.3	115 192.8
• per 1 farm by ARMA	14 695.4	4 886.4	9 926.9
• per 1 worker on the farm [GUS 2010]	9 654.4	3 111.8	6 726.5

Source: Own calculations based on data from The Management Information System of ARMA and CSO 2013 (data on 30.09.2013).

From the regional perspective, the results indicate that the majority of funds went to the provinces in central and northern parts of the country, with a relatively favorable agrarian structure in which agriculture is considered to be well-developed. Farmers in these regions more actively applied for external aid, often carrying out large investments. The average value of the project amounted to over 7.7 thousand PLN. Particularly noteworthy is Group 3, which used little, because only 10% of the total amount of financial support. However, the average value of a single project was the highest among all groups (Table 3), which results from the operation of relatively large farms there. Farmers applied for more funds for investments in order to adapt to the new requirements and improve their competitiveness. Nevertheless, the ratio of beneficiaries to the number of farms in this group was high (8.3%). Analyzing Group 2, it can be noted that due to the agrarian structure, as well as natural conditions and production, the percentage of beneficiaries and the value of support were the lowest.

CONCLUSIONS

1. There is a considerable scope for diversification of farmers activities in the field of gaining support for investments from the EU funds for agriculture in regional terms. The tendency of farmers to raise funds for investments is related to the local conditions, the level of marketability, agricultural culture, structure of agricultural land, as well as the level of technical and social infrastructure in different regions of the country. In western Poland, the investment support is higher per 1 project, and lower per 1 hectare. In the group of Polish provinces of centre and north-east, the situation was reversed. In the first case, we are dealing with the domination of land-absorbing production, i.e. the plant production (mainly cereal), while in the second animal production is relatively more important (pigs in the Wielkopolska and the Kujawsko-pomorskie Provinces, cattle and milk production in Podlaskie Province). Consequently, this influences the descriptions of investment support.

2. Previous trends in obtaining aid for investments may initially indicate to the polarized development of agriculture in spatial terms. The most favorable prospects are shown for farms located in provinces: Pomeranian, Warmińsko-mazurskie, Kujawsko-pomorskie, Podlaskie, Mazowieckie and Wielkopolskie. It is worth noting that in these regions, it is easier to achieve the sustainable development taking into account the environmental context. Agriculture in Polish western provinces is also likely to develop, but more in the paradigm of industrial agriculture. It can be assumed that in other regions, the importance of agriculture will be decreasing.

3. The differences in the level of use of aid funds are the results of the polarization of households, which may be exacerbated. There is a further need for agricultural investment support under the CAP, but in programming related activities (i.e. RDP 2014–2020), the regional context must be taken into consideration with greater concern. Support programs for developed and commodity farms should be continued. For regions where there are a lot of small farms, programs aimed at supporting local production, local markets and niche food production (e.g. organic and regional products, traditional food etc.) should still be available.

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OCENA WYKORZYSTANIA FUNDUSZY UNII EUROPEJSKIEJ WSPIERAJĄCYCH INWESTYCJE W GOSPODARSTWACH ROLNYCH W POLSCE W PRZEKROJU WOJEWÓDZTW

Streszczenie. Celem artykułu jest porównanie wykorzystania środków pomocowych z działań: Inwestycje w gospodarstwach rolnych, Dostosowanie gospodarstw rolnych do standardów UE oraz Modernizacja gospodarstw rolnych, w Polsce w ujęciu regionalnym (województwa). Stwierdzono, że aktywność rolników w pozyskiwaniu funduszy UE na wsparcie inwestycji jest silnie zróżnicowana w ujęciu wojewódzkim. Skłonność rolników do pozyskiwania funduszy na inwestycje jest związana z lokalnymi warunkami, poziomem towarowości, kultury rolnej, strukturą obszarową, a także poziomem technicznej i społecznej infrastruktury w różnych regionach kraju. Na postawie uzyskanych danych należy uznać, iż istnieje dalsza potrzeba wsparcia inwestycyjnego rolnictwa w ramach wspólnej polityki rolnej (WPR), jednakże w przygotowywaniu działań z tym związanych (PROW 2014–2020) należy w większym zakresie uwzględnić kontekst regionalny.

Słowa kluczowe: fundusze EU dla rolnictwa, SPO-Rol., PROW, inwestycje, analiza skupień

CHANGES IN EUROPEAN UNION SUPPORT OF POLISH ORGANIC FRUIT GROWING

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Abstract. This paper presents in its first part the basis of interventionism in agriculture. It presents currently existing system of support for organic orchards in Poland and EU and proposed changes. In the empirical part, the paper presents the economical situation of Polish fruit-growing farms in respect to other farms according to FADN data (Farm Accountancy Data Network). It has been ascertained that agri-environmental payments answer for 32% of those farms' income, which is an amount approximate to other farm types. A proposition of change in organic orchard farms' subsidies has no basis in regard to economical situation of those farms and can cause unfavorable fallout for them and their surroundings. Because of many flaws in the system of these subsidies, it is needful to intensify the control by Agency for Restructuring and Modernisation of Agriculture (ARMA)

Key words: organic fruit farming, payments for production, the RDP 2014–2020

INTRODUCTION

The Common Agricultural Policy (CAP) of the EU is constantly under reforms due to changing social and economical situation in European agriculture. However, questions regarding the cause of existence of interventionism in agriculture and the aims which are to be reached by using it are still valid. Joseph E. Stiglitz shows five reasons for such actions: incompleteness of markets, existence of public goods, imperfection of data, external effects and redistribution of income [Stiglitz 1987]. Jerzy Wilkin, on the other hand, focuses on the fact that agriculture produces a wide array of public and market goods which in some cases are inseparably connected. This fact causes problems with liberalization of trade and separation of farmers' support from production [Wilkin 2003, 2009]. Andrzej Czyżewski presents the subject in a quite different light. Spotting the classical causes of interventionism in agriculture, he turns his attention to the phenomenon of inter-branch flows signifying that agriculture is depreciated in these flows which causes the

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fact that executed production is lower than fabricated. It shows that economical surplus fabricated in agriculture is directed to other sectors (processing, industry). The government's task is to retransfer the part of added value which, because of various reasons, cannot return to agriculture on its own [Czyżewski 2007]. Bazili Czyżewski, on the other hand, starts his considerations from the idea of ground rent and paradigm of sustainable development [Czyżewski 2013]. Furthermore, he ascertains that in balanced agriculture a lot of new usabilities of land factor emerge. It is caused by changes in consumption patterns to pro ecological, pro health, pro environmental. Because they have a character of public goods, they are paid in great part by CAP programs. The payment goes to the landowners. He shows an example of organic agriculture where the rent gained from CAP is a compensation of new land utilities. It raises monetary productivity of productive factors. It has to be pointed out that albeit adequate level of society's wealth subsidies the emergence of institutional realm which realizes paradigm of sustainable development, this process has to start from the grassroots. Polish society does not appear to be ready for that, although thanks to integration with more developed countries, we should reach that level eventually.

It is hard to disagree with that suggestion. Polish society is on a significantly lower level of economic development that the countries of "old Union". This situation is changing, especially in the field of organic agriculture. In the course of last few years a lot of shops which specialize in the sale of organic products have emerged. Also, normal shops including large area shop chains have recognized a growing demand for this kind of food and included it in their offer. Factor which limits the development of this market is a comparatively high price of organic products compared to society's income [Smoluk--Sikorska, Łuczka-Bakuła 2013]. It is caused mainly by completely different technology of producing the organic foods [Gołasa et al. 2012] and even twice or thrice lower yields compared to standard products [Technological and economic aspects… 2010]. However organic agriculture method has significant impact in improving food quality and safety [Kowalska 2011].

Organic production subsidies do not recompense fully loss of crops. From 2004 to 2012 existed in Poland a fixed system of grants for orchard organic production. In February 2013 Minister of Agriculture and Rural Development (MARD) has changed significantly the rules of the system's functioning. Since February 2013 one cannot start a new "organic farming – horticultural and berry cultivation" Package under RDP 2007–2013 (Rural Development Programme 2007–2013) with exception of strawberries and raspberries. Farmers who finished the execution of five-year agri-environmental plan in 2012 also cannot seek the support of subsidies. As a justification, the Ministry stated that:

– The goals set in RDP 2007–2013 have been exceeded in 2012 – 26 thousand of farms were given the subsidies (104% of target value) on a land area of 606.6 thousand ha (121% of target value). It is connected with big financial commitments which move on to 2014–2020 budget reaching the level of 570 million EUR.
– Fast growth of area of organic orchard farms (including apples) which do not translate to production of certified fruit which caused an audit from the European Commission.
– Support from agri-environmental programme according to the additionality rule can not be the only justification of starting ecological production.
– Big misuses by the beneficiaries [Project of Rural Development Programme… 2013].

In the new EU budgetary perspective organic farming significance raises which can be seen in assignation (from the agri-environmental programme) as a separate action in the frames of RPD 2014–2020. However, in case of orchard farms, in project RPD 2014–2020 appeared entries which caused a lot of disputes among the farmers as well as manufacturing plants. The focus of disputes is the change in the degressivity of subsidies according to which they are owed in 100% only to farms up to 10 ha of area. Moreover, payment is owed "only to area on which fruit trees during the fruition and/or shrubs as described in the decree" [Ministry of Agriculture and Rural Development 2013].

The aim of this paper is to describe the influence of changes proposed by the Ministry on the situation of the farms and comparison with other means of support

MATERIAL AND METHODS

Data concerning individual farms for the calculations have been provided by Institute of Agricultural and Food Economics – National Research Institute in the FADN system for the year 2011, coming from 12 thousand farms. In the FADN's observation field there are commercial farms Minimal economical size after which the farm is included on FADN's observation field is set from 2010 fiscal year according to analysis of sums of Standard Production (SO) from the data provided by Central Statistical Office in different classes of economical size. In practice, estimation is made drawn on calculating the cumulated sum of SO from different classes starting from the biggest until reaching approximately 90% of SO from researched population. The lower border of division in which it will happen is the minimal threshold of economical size [The standard results… 2011]. The estimations were made according to the calculation of results in force in FADN.

In the set of individual farms there are 261 farms which possess the certificates of accordance with the rules of organic farming. These farms were not picked purposefully and are not representative statistically for commodity organic farms which are in the Polish FADN's observation field. However, it is one of the biggest sources of data concerning organic farms and allows for drawing conclusions about their economical situation.

Information obtained from direct interviews with workers providing supply for two leading Polish manufacturing companies situated in Podkarpackie Voivodship were also included in this paper.

RESULTS AND DISCUSSION

Currently, organic farming functions in Poland based on UE and national law acts. The most important: Council No 834/2007 of 28 June 2007 on organic production and labeling of organic products (OJ L 189, 20.07.2007, p. 1) and the Act of 25 June 2009 on organic farming (2009, No 116, pos. 975). According to these acts, every farmer who starts an organic farm has to register his activity in a certifying unit. Such a unit controls every year the whole process of production on the farm. In case of fulfillment of all prerequisites of organic farming, the farmer receives his certificate and can sell his products labelled with UE sign of organic foods.

In case of starting organic production in the years 2007–2013, the farmer could attempt to obtain additional payments concerned with realizing the agro-environmental programme – Package 2. Organic Farming. The condition to get it was undertaking a five-year agri-environmental commitment. Its essential element was preparing with an advisor a plan of agri-environmental activity in which all the prerequisites and recommendations that the farmer should subordinate to were determined. The submission itself was put on the same form on which the submissions for ranged payments were put. The amount of payments in the Package 2 in 2012 is shown in Table 1.

Table 1.   The amount of payments under Package 2. Organic farming in Poland [EUR·ha^{-1}]

Specification	Conversion		
	Year 1–2	Year 3–5	Maintenance
Agricultural crops	202	190	190
Permanent grasslands	79	63	63
Vegetable crops	373	313	313
Fruit crops including berries	433	371	371
Others fruit crops including berries	193	156	156

Source: Own calculations based on Decree of the Minister of Agriculture and Rural Development dated 26 February 2009 on the detailed conditions and procedures for the granting financial assistance under the measure "Agri-environmental programme" under the Rural Development Programme for 2007–2013 (1 EUR = 4.1551 PLN).

The amount of payment is shown in EUR for comparison with other EU countries. In case of orchard farms, there is a three-year time of conversion. In that period although all the prerequisites are met, farmer cannot sell his products as organic. However, he has the right to higher production support. As a part of fruit-growing farms, a group has been distincted – Other fruit crops including berries. This group includes growths which are low-cost, such as chokeberry. These growths get lower subsidies than all the others. Table 2 shows, on the other hand, the amount of support for organic fruit-growing in chosen EU countries.

Table 2.   The amount of payment for environmental fruit growing in selected EU countries

Country	Parennials, orchards, fruits (EUR·ha^{-1})	Comments
1	2	3
Austria	450–750	–
Bulgaria	470	–
Cyprus	1 000	–
Czech Republic	510–849	Permament culture (vineyards, orchards, hops) 849 EUR·ha^{-1}, extensive orchards 510 EUR·ha^{-1}
Denmark	165	Payment includes 101 EUR·ha^{-1} maintenance support from the Environmental Farming Support scheme during the conversion period

Table 2 cont.

1	2	3
Germany	308–1 080	Bavaria and Baden-Württemberg: max. 40,000 EUR per farm and year
Italy	307–900	–
Slovakia	555	In addition, payments for hops and tree nurseries of 579 EUR·ha^{-1}
Poland	156–433	

Source: Own studies based on [Sanders et al. 2011], p. 57 (1 EUR = 4 PLN).

As it can be noticed, the level of subsidies in these countries is on a slightly higher level than in Poland, nonetheless direct comparison is hard because of specific norms in mentioned countries. They can influence the level of support in a significant way (e.g. in Italy that level is dependent on region).

In Table 3 chosen amounts characterizing the situation of organic farms were presented. Orchard farms (Permanent crops in FADN nomenclature) against a background of other farms are characterized by low area of arable land and the biggest economical size among other types.

Table 3. Economical situation of ecological fruit-growing farms against a background of all of the other ecological farms

Specification	Field crops	Permanent crops	Milk	Grazing livestock	Mixed
Sample farms	35	18	53	56	99
Economic size (EUR)	25 335.2	31 508.1	24 165.7	23 390.9	13 870.7
Total Agricultural Area (ha)	78.5	24.8	25	41.9	19.4
Total output (PLN)	113 186	85 649	87 690	52 401	71 787
Total inputs (PLN)	125 414	56 543	72 666	63 269	60 501
Total subsidies – exluding on investments (PLN)	126 772	61 320	51 119	76 280	39 693
(including) Enviromental subsidies (PLN)	43 136	29 621	21 001	26 479	12 467
Family Farm Income (PLN)	111 584	93 233	65 694	63 829	50 315

Source: Own calculations based on FADN Standard results 2011 obtained by the organic farms participating in the Polish FADN. Part I. The standard results. Warsaw, 2013.

It means that the production conducted on those farms is extremely intensive, yet still income from a family farm is the highest for the type Field crops (due to high Total subsidies – excluding on investment). For comparison, the average payment for the FADN farm averages 18,408 PLN [Marcysiak, Marcysiak 2013] The question of the share of agri-environmental payments in the farm's income is also interesting.

That share in Permanent crops farms amounts to 32% and except for Mixed type is on the lowest level of all farms (Fig. 1). It means that these farms do not get such a big support from the fact of being in the argi-environmental programme. A wider view showing a general balance of subsidies and taxes (Balance current subsidies and taxes and Balance subsidies and taxes on investment) affirms that Permanent crops farms are not really privileged (Fig. 2).
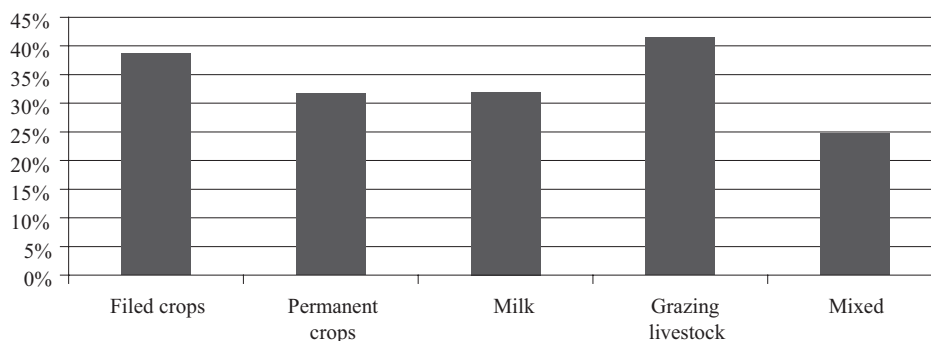
Fig. 1.   Participation of enviromental subsidies in Family Farm Income

Source: Own calulations based on FADN The standard results 2011 received by organic farms participating
           in the Polish FADN. Part I. The standard results. Warsaw, 2013.
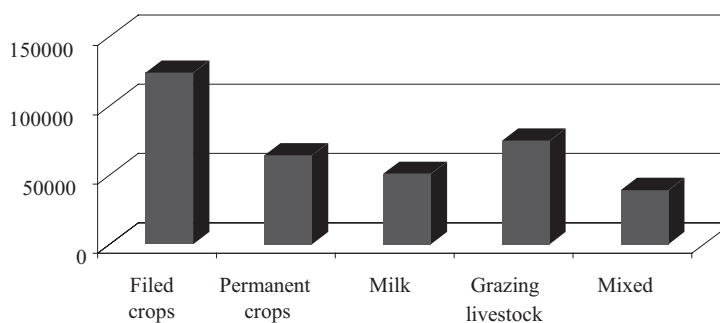

Fig. 2.   Balance of taxes and subsidies in agriculture (PLN)

Source: Own calculations based on FADN standard results 2011 received by organic farms participating in
           the Polish FADN. Part I. The standard results. Warsaw, 2013.

The biggest benefits from the subsidies and taxes system is part of Field crops farms which received 123,812 PLN in the year 2011. In case of Permanent farms the balance is twice lower and amounts to only 64,128 PLN.

Bearing in mind aforementioned data it is worth to look again on the propositions enclosed in the RDP 2014–2020 project. Decreasing the area of arable land to 10 ha seems to be mainly the answer of the MARD to accusations of artificial rise in area of orchards without any rise in production. The process of wheedling the ecological grants was most profound in the years 2005–2008 in case of walnut [Information about the results… 2010]. Supreme Audit Office has shown that until 28 February 2008 there were no legal regulations delimiting the requirements considering care of trees and bushes, minimal amount of plants or their quality on organic farms. However, that situation has changed after amendments detailing conditions and procedures of granting the payments were established as a part of "Environmental programme" included in RDP 2007–2013. Also a special control campaign launched in 2013 has shown that there are

serious misuses in organic fruit-growing. Of 1/4 of all organic orchards controlled, in 30% there were irregularities which prohibit the owners from getting the grants were found. In particular, there were not enough trees, bushes per 1 ha and significant over-growth with weeds.

Limiting the ecological subsidies to orchards not bigger than 10 ha is supposed to limit the tendency to establish large area farms only to get the grants. A question arises if such actions are meritoriously justified and what the effects may be. Firstly, it may cause an artificial parcellation of bigger farms which may allow for using the grants fully. Secondly, it will surely influence negatively on economical situation of orchard farms. As presented earlier, despite high subsidies for a hectare, these subsidies do not account for a big share in the farm's income. Bearing in mind the whole system of grants and taxes, these farms achieve significantly lower benefits than farms of Filed crops or farm Grazing livestock. Also, the argument that the payments only cannot be the basis for starting such activity does not seem very accurate, especially bearing in mind that in other EU countries such support exists. Polish orchard owners do not have big chances in competition with orchard owners from EU that are supported in full amount. Also, proposed record concerning obligation to leave the trees for 5 years after closing the commitment will not influence the ecological fruit-growing in a good way. Along with a five-year period of re-alization of organic farming, it amounts to 10 years of supporting a defined type of plants. It is an extremely long commitment which significantly raises the risk of such activity and their justification is difficult to explain

One has to look at the problem from a perspective which is a bit broader from the point of view of organic manufacturing plants, which amount is still rising – in the year 2012 there were 312 [Number of organic producers… 2013] of them. In their opinion, obtained from direct interviews, a large fragmentation of organic farmers is a serious problem. It causes:
– lack of big, homogenous batches of goods,
– high costs of stock's examination (600 to 1,000 PLN for a single sample),
– logistic problems – transport costs, supplying adequate packaging, lack of storage space on farms.

Area limitations will not encourage the farmers to invest and increase the scale of production. Still, there is the problem of orchards established only for subsidies. It seems that the actions of ARMA that aim to intensify control over the organic fruit-growing are pointed in the right direction. ARMA may decrease the payment by 100% in case of not conducting farm production as delimited in organic farming regulations. Strictly exacting the norms of organic orchards maintenance demand high expenditure and thus "farming the subsidies" becomes simply unprofitable.

CONCLUSIONS

1. The share of payments from the environmental programme in the income of organic orchard farms compared with other types of farms is not high.
2. It is similar for the balance of payments and subsidies. It means that orchard farms do not benefit highly from such a system.

3. Published proposals of MARD which limit the payments for organic fruit-growing production have no support in economical data for these farms.
4. Said propositions may cause unfavorable fallout for the fruit-growing farms as well as manufacturing plants which cooperate with them.
5. Increase in control is the action which is necessary to get rid of the irregularities, not punishing the farmers who comply to the existing rules.

The balanced development paradigm and CAP which fulfills it as a part of organic farming in the last few years has bigger and bigger significance. It is a chance for Polish farming which is producing in a healthier and closer to nature way than "old UE" agriculture. However, it demands a well thought out support from the instruments that allow for a competitive activity.

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ZNACZENIE DOPŁAT DLA PRODUKCJI SADOWNICZEJ W POLSCE

Streszczenie. W artykule przedstawiono w części pierwszej podstawy interwencjonizmu w rolnictwie. Zaprezentowano obecnie istniejący system wsparcia ekologicznej produkcji sadowniczej w Polsce i UE oraz proponowane zmiany. W części empirycznej na podstawie danych FADN (Farm Accountancy Data Network) pokazano sytuację ekonomiczną

sadowniczych gospodarstw ekologicznych na tle pozostałych gospodarstw. Stwierdzono, iż dopłaty rolnośrodowiskowe odpowiadają za 32% dochodu tych gospodarstw, co jest wartością zbliżoną do innych typów. Propozycje zmian w systemie dopłat dla sadownictwa ekologicznego nie mają podstaw w sytuacji ekonomicznej tych gospodarstw, a mogą spowodować niekorzystne dla nich i ich otoczenia skutki. Z racji istnienia wielu nieprawidłowości w systemie tych dopłat niezbędne jest zintensyfikowanie kontroli przez ARiMR.

DOES NATURAL HEDGE ACTUALLY WORK FOR FARMERS?

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Abstract. The paper presents an analysis of the relation between yields and prices for major crop plants in Poland. The main objective of the paper was to examine the presence of natural hedging. For that purpose, yield value variances were calculated and compared with the theoretical variations of independent price and yield product. It was revealed that for sugar beet and rape a natural hedge could be observed, which leads to a 53% reduction in yield value variance. In case of wheat and barley, no natural hedge effect was observed. Practical implications of the conducted analysis are such that the tendency to consider production and price risk separately, could be very misleading in assessing the income risk of specific crop plants. It was also found that the negative correlation coefficient, commonly considered as being equivalent of a natural hedge effect, can be used only as a very rough measure of natural hedge strength.

Key words: natural hedge, income risk, agriculture, aggregation bias, price – yield correlation

INTRODUCTION

Price risk and yield risk are the most significant risks in the agricultural sector. Although it is generally believed that there exists a negative relation between the yield and price of crop plants. If this were true, it would work like a natural hedging mechanism. In years with lower yields, prices would increase and in years with higher yields, prices would decrease. Hence, the variability of their product, i.e., crop values would be lower than in case of unrelated, independent movements of yield and price[1]. Lower variance

[1] The probabilistic mechanism behind this so-called natural hedging [Finger 2012] is presented in the appendix.

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of crop value means lower income risk, and by the same token, lower demand for crop insurance. The proper assessment of crop plant specific income risk can help explain very low demand for crop insurance in Poland.

In many cases analysis of yield – price dependency is carried out with data aggregated on the national level. Using this kind of data may lead to serious overestimation of the correlation strength. In research by Coble et al. [2007] it was shown that the yield – price correlation for corn and soybeans in the USA are –0.381 and –0.386 when calculated on national level, and they drop to –0.064 and –0.096 when calculated on the farm level. According to Harwood et al. [1999], the strength of the negative correlation between corn yield and price estimated at farm level varies considerably across the counties in the United States. The strongest correlation is observed in counties that form part of the Corn Belt, while it is much weaker in the remaining counties. This could be explained by the fact that the Corn Belt supplies over half of total corn production in the USA and consequently, low yields in that part of the USA would seriously downsize the total supply of corn and cause an price increase. But even in counties from the Corn Belt, the average correlation at farm level is lower than the correlation at national the level.

The author's earlier work [Kobus 2011], which dealt with the influence of data aggregation levels on the variability of yields and prices of major crop plants also in Poland, showed that aggregation has a reducing effect on variability, although the degree of variability reduction was crop plant specific and in most cases bigger for yields than for prices. This suggests that the way in which aggregation affects the correlation should also be crop plant specific. Furthermore, the results from Harwood et al. [1999] imply that the strength of this correlation, even at the highest level of data aggregation, should vary in Poland. It is expected that the correlation should be low for those crop plants which for various reasons are easy to import to Poland and high in opposite cases.

The main objective of this paper is to examine the presence of the natural hedging mechanism for major crop plants in Poland. The secondary objective is to find whether it is justified to use the correlation between crop plant yields and their prices as an indicator of crop value variability reduction.

MATERIAL AND METHODS

Data

Two data sources were used in this analysis: the Central Statistical Office of Poland (CSO) and the Polish Farm Accountancy Data Network (FADN). The CSO data presented in Table 1 was used for assessing the strength of the natural hedging mechanism on the national level, however, the nominal prices shown in Table 1 were deflated using consumer goods and services price indices (CPI). The yields were not adjusted in any way, even though detrending had been recommended in the author's other paper [Kobus 2010]. The reason for this was the small length of time series, which involved a risk of serious overfitting.

Table 1.   Yields and prices for major crop plants in Poland in period 2005–2011

Year	Winter wheat		Barley		Rape		Sugar beet	
	yield (dt)	price (zł)	yield (dt)	price (zł)	yield (dt)	price (zł)	yield (dt)	price (zł)
2005	39.5	36.69	32.2	37.34	26.3	77.33	416	17.57
2006	32.4	44.76	25.9	40.24	26.5	93.44	438	12.88
2007	39.4	70.68	32.5	64.11	26.7	95.66	513	10.83
2008	40.7	64.24	30.0	64.37	27.3	126.77	465	10.37
2009	41.7	48.26	34.4	40.80	30.8	108.24	543	11.57
2010	43.9	59.84	34.9	48.98	23.6	127.76	483	11.31
2011	41.3	81.99	32.7	75.38	22.4	183.91	574	14.40

Source: CSO, Local Data Bank.

As mentioned in the introduction, the author expects the level of data aggregation to have a significant influence on the strength of natural hedging. To examine this aspect of the problem, farm level data from the FADN sample were used. The process of data selection was as follows: samples from 2005–2011 were screened for farms which were present in the samples in all the years, and next, a separate selection was carried out for each crop from that pool. The selection criterion was availability of yield and transaction data for at least 6 years. Due to this, the sample sizes presented in Table 2 differ.

Table 2.   The sizes of samples for each plant researched

Crop plant	Sample size
Winter wheat	1 647
Barley	512
Rape (with turnip rape)	858
Sugar beet	782

Source: Own calculations.

Obtaining crop plant yields is fairly straightforward, but prices need some clarification. Ideally, these should be transaction prices in-between harvests, but such data was not available. Hence, the average transaction prices for calendar years were used. In case of such crop plants like sugar beet or oil rape, when all production is sold directly after harvest, use of calendar years is totally justified. For cereals though, it could obscure the relation between yields and prices, in proportion to the amount of production sold next year following harvest.

The transaction prices on the farm level had been deflated with CPI, just like in the CSO national data case.

METHODS APPLIED

Let us denote crop yield by X and price by Y. The problem is to assess the relation of their product, i.e., the XY variance to the dependence between variables X and Y. An explanation of the random variables sum variance can be easily found in any introduction to probability textbook. However, the product variance is not only more complicated, but also less often found in books on probability. For this reason, the appendix contains the formal derivation for the variance of the random variables product. In this text, only the final formulas will be presented. The independence variance of product can be calculated using the formula (1):

$$D^2(XY) = D^2(X)D^2(Y) + D^2(X)E(Y)^2 + E(X)^2 D^2(Y) \tag{1}$$

where: $D^2(X)$, $D^2(Y)$, $E(X)$, $E(Y)$ – variances and expected values of variables X and Y, respectively.

When variables X and Y are dependent, the product variance should be calculated using the formula (2):

$$D^2(XY) = D^2(X)D^2(Y) + D^2(X)E(Y)^2 + E(X)^2 D^2(Y) +$$
$$+ C(X^2, Y^2) - C(X, Y)^2 - 2C(X, Y)E(X)E(Y) \tag{2}$$

where: $C(X, Y)$ and $C(X^2, Y^2)$ are covariances of variables X and Y and their squares.

In case of a bivariate normal distribution, $C(X^2, Y^2) = 2C(X, Y)^2 + 4C(X, Y) E(X) E(Y)$, so formula (2) becomes reduced to:

$$D^2(XY) = D^2(X)D^2(Y) + D^2(X)E(Y)^2 + E(X)^2 D^2(Y) +$$
$$+ C(X,Y)^2 + 2C(X,Y)E(X)E(Y) \tag{3}$$

This last formula could be treated as a quadratic function of the correlation – see Figure 1.

The position of the parabola vertex on Figure 1 depends on values of variation coefficients V_x and V_y, and if their product is outside of the <–1, 1> range, the parabola vertex is located within the range of values possible for the correlation coefficient (see solid line). Otherwise, the parabola vertex cannot be observed in that range (see dashed line). In fact, the product of variation coefficients is usually below 0.05 for yields and prices of crops, and consequently, the relation between the correlation coefficient and price-yield product is straightforward – the lower the correlation, the lower the variance.

The following procedure has been adopted for evaluation of the natural hedging mechanism strength on the national level:
1. Calculation of the observed variance of yield – price product;
2. Calculation of the hypothetical variance of yield – price product assuming independency, according to formula (1);
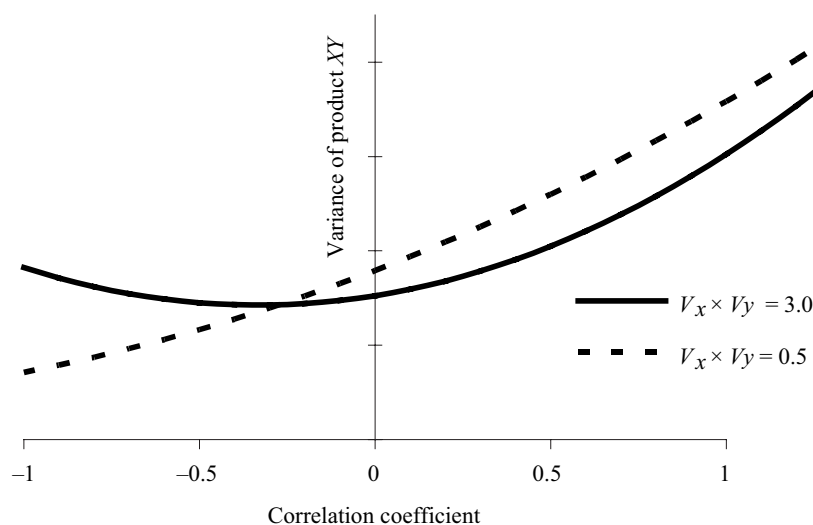
Fig. 1.   Example random variables product variance as a function of correlation coefficient
Source: Own calculations

3. Calculation of the reduction of yield – price product variance (point 1) in comparison
   to the case of independency (point 2).

   In order also to address the suitability of using the correlation coefficient as a proxy
for assessing natural hedge strength, a similar procedure was used, whereby the observed
variance of yield – price product was replaced by the hypothetical variance of yield –
price product, assuming a bivariate normal distribution as in formula (3).

   As mentioned in the introduction, it is self-evident that the yield – price dependency is
stronger at higher aggregation levels. A single farmer is a price taker, only the aggregate
supply of crop can affect price. Still, there are some open questions: how strong is the
effect of this aggregation and which crops are affected more strongly. In this paper, six
data aggregation levels are examined, i.e.: farm, gmina[2], powiat, voivodship, region and
country.

   The described above procedures for assessing strength of natural hedge were per-
formed on each level of aggregation, the only difference being that instead of directly
calculating the reduction of variability for each organization unit in point 3, the variances
were first averaged across all units using the production area as weights, and then used
for calculating the mean variability reduction.

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[2] According to nomenclature of territorial units for statistics (http://epp.eurostat.ec.europa.eu/portal/
page/portal/nuts_nomenclature/correspondence_tables/national_structures_eu) gmina is the lower
level of Local Administrative Units (LAU2), while powiat is the upper level (LAU1) in Poland.

RESULTS

As mentioned earlier the characteristics of crop yields and prices probability distribution on farm level differ from those obtained at the country level of data aggregation. This is especially true for crop yields, due to the lower spatial autocorrelation in comparison to prices. The direction of divergence is quite clear, average variances are higher and correlations are lower on the farm level. Nevertheless, even the data aggregated at the country level could show which crop plant yield value variability is affected more strongly by the yield – price dependence.

Table 3. Strength of natural hedge effect for major crop plants in Poland on national level in period 2005–2011

Crop plant	Correlation of yield and price (–)	Observed variation of yield value (–)	Theoretical variation of yield value in case of independency	Observed reduction of variation (%)	Theoretical reduction of variation in case of bivariate normal distribution of yields and prices (%)
Winter wheat	0.26	282 118	250 453	–12.6	–17.1
Barley	0.00	144 770	148 996	2.8	0.0
Rape	–0.59	206 955	440 545	53.0	42.9
Sugar beet	–0.52	939 918	2 002 721	53.1	40.6

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

The correlation coefficients in Table 3 are quite diverse. For sugar beet and rape, the correlations are negative and fairly strong, but for barley, it is almost exactly zero and for wheat, the correlation is even positive, although rather weak. These differences in correlation values can be attributed to several reasons, but three of them seem to be the most important ones: share of production in the global market, transport costs and possibility for safe and cheap storage. With respect to the production of the four crops being examined, in 2011 Poland had 16th place for wheat, 12th for barley, 8th for rape and 7th for sugar beet global production shares: 1.33, 2.5, 2.98 and 4.27% respectively. What is more, cereals can be easily stored even by farmers on their own, while rapeseeds and sugar beet roots must be sold by farmers immediately after harvesting. Consequently, we can observe quite a high negative correlation only in case of rape and sugar beet, whereas there is no correlation in case of cereals or it can in fact even be positive. It must also be noted that sugar beet is a special case because of the contracts signed by farmers with the sugar factories and any production above quota levels collects much lower prices.

Comparing the observed variation of yield value with the theoretical one, that has been calculated assuming independence, we are able to see that very roughly speaking, the reduction expressed in percentage value is equal to a correlation coefficient value multiplied by –100%. For example for rape, the correlation is –0.59 and for sugar beet it is –0.52, while at the same time, the variability reduction is nearly 53% for both of them. Given the positive correlation for wheat, it is not surprising that in case of this crop we do not observe a natural hedge effect and the variation of the observed yield value is higher than it would be in case of yield and price independence.

Although the correlation coefficient seems to approximate quite well the strength of the natural hedge effect, it by no means proves bivariate normality. In fact, the natural hedge effect is actually stronger than it should be if yield and price were to follow a bivariate normal distribution. As mentioned earlier in the paper, the variance of random variables product is just a function of correlation coefficient only in case of a bivariate normal distribution and even then this function's coefficients depend on variances and the expected values of price and yield. Therefore, one must remember that the correlation coefficient value is a very rough indicator of natural hedge strength.

So far, all considerations have been based on data aggregated on the national level by CSO. Since according to the author's previous work [Kobus 2011], the aggregation levels strongly influence the variances of yields and crop prices, therefore it should be expected that also the correlation and strength of a natural hedge effect shall be affected by the level of aggregation.

Table 4. Strength of natural hedge effect on various levels of data aggregation in period 2005–2011

Aggregation level	Mean unit area (ha)	Mean R (–)	Reduction of variability (%)	Mean unit area (ha)	Mean R (–)	Reduction of variability (%)
	Wheat			Barley		
Farm	15	0.048	–4.0	11	–0.102	13.1
District	31	0.056	–3.8	14	–0.118	14.3
Powiat	91	0.065	–2.3	25	–0.133	16.0
Voivodship	1 478	0.086	–3.9	309	–0.113	17.1
Region	5 912	0.079	–5.9	1 235	–0.140	15.7
Country	23 648	0.105	–5.0	4 938	–0.283	18.2
	Rape (with turnip rape)			Sugar beet		
Farm	15	–0.339	36.2	5	–0.374	47.8
District	28	–0.416	42.1	11	–0.463	51.0
Powiat	68	–0.492	51.3	31	–0.559	55.0
Voivodship	764	–0.654	65.0	263	–0.656	58.8
Region	3 055	–0.768	72.7	986	–0.700	60.4
Country	12 221	–0.823	74.2	3 943	–0.706	60.6

Source: Own calculations, based on FADN data.

There are notable differences on the national level of data aggregation between results from CSO and FADN, with generally the strength of the natural hedge effect being greater for the FADN data, in case of rape the increase is above 20%. The reason for those differences is such that while CSO data represents all farms in Poland, FADN data is only a sample, and what is more, it is representative only for farms of the economic size of at least 2 ESU.

Similarly to the calculation based on CSO data also the results from Table 4 show that the biggest reduction in variation is observed in case of rape and sugar beet. What could be surprising at first, is that the relation between the correlation coefficient values and reduction of variability is different for each crop plant, for example, on the level of voivodeship, the correlation coefficient takes the value of –0.65 for both rape and sugar beet, while the reduction of variability differs by 6 percent points. However, according to formula (2), the part of random variables product variance, which changes because of the dependence between variables, i.e.:

$$C(X^2, Y^2) - C(X,Y)^2 - 2C(X,Y)E(X)E(Y) \tag{4}$$

consists of three elements and can take on a totally different value for the same correlation coefficient.

Generally, the strength of the natural hedge effect diminishes at the farm level of data aggregation, but for obvious reasons, the degree of this decline is worth mentioning only when it has a fairly strong effect on the national level. In case of rape, the effect on the farm level is about 50% of that on the national level, while in case of sugar beet, it is about 75%.

It was shown earlier that natural hedge strength varies greatly between crop plants and that it is not a simple function of the correlation between yields and prices. But what are the practical implications of these findings?

The risk of any economic activity is usually measured by standard deviation or variation coefficient of income, and the lower variation coefficient, the less risky the activity. In case of crop plants, there is a tendency to consider production and price risk separately and if yields and prices were actually independent of one another, this would not be a problem. However, because of their dependency, this could be misleading.

Table 5. Variation coefficients for price, yield and yield value in period 2005–2011

Crop plant	Price	Yield	Yield value
	%		
Winter wheat	8.4	22.0	24.9
Barley	8.9	23.2	24.5
Rape (with turnip rape)	9.5	21.8	16.6
Sugar beet	10.7	21.8	16.9

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

Yield variation coefficients are almost the same for all crops (Table 5). However, in case of prices, variation coefficients for rape and sugar beet are considerably higher, so therefore it would be possible to conclude that rape and sugar beet are the most risky crop plants. But if we look at the variation coefficients for yield value (Table 5), we will see that the situation is in fact completely the opposite, with the risk for rape and sugar beet being two-thirds of that for cereals.

CONCLUSIONS

1. The existence and strength of the natural hedge effect depends on the crop plant species. Generally, the effect is stronger in case of those crop plants, the use or consumption of which is more limited by area and time.
2. The correlation coefficient can be used only as a very rough measure of natural hedge strength and cannot be treated as being equivalent of a natural hedge effect.
3. The lower the aggregation level, the weaker the natural hedge effect. On average, the strength on farm level is two-thirds of the strength on the national level of data aggregation.
4. Omission of the natural hedge effect leads to invalid estimations of income risk for specific crop plants.

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CZY NATURALNE ZABEZPIECZENIE RZECZYWIŚCIE CHRONI ROLNIKÓW?

Streszczenie. W pracy przedstawiono analizę relacji między plonami i cenami podstawowych roślin uprawnych w Polsce. Głównym celem pracy było sprawdzanie występowania efektu naturalnego zabezpieczenia. Dla wybranych roślin uprawnych obliczono wariancje wartości plonów jednostkowych i porównano z teoretyczną wariancją iloczynu ceny i plonu, przy założeniu niezależności. Wykazano, że wśród rozpatrywanych roślin tylko w przypadku rzepaku i buraków cukrowych można mówić o występowaniu efektu naturalnego zabezpieczenia. W wyniku negatywnej relacji między cenami i plonami dla obydwu roślin zaobserwowano redukcję zmienności wartości plonu o 53%. Praktyczną

konsekwencją przeprowadzonej analizy jest stwierdzenie, że tendencja rozłącznej analizy cenowego i produkcyjnego ryzyka może prowadzić do całkowicie błędnej oceny ryzyka dochodowego, które z punktu widzenia rolnika jest najważniejsze. Wykazano również, że ujemna korelacja, popularnie utożsamiana z efektem naturalnego zabezpieczenia, może być tylko nieprecyzyjnym przybliżeniem siły efektu naturalnego zabezpieczenia.

Słowa kluczowe: naturalne zabezpieczenie, ryzyko dochodowe, rolnictwo, błąd agregacji, korelacja plonu i ceny

Appendix: Derivation of the expected value and variance of the random variables product

Let *X* and *Y* be a pair of jointly distributed random variables, with expected values *EX* and *EY*, variances D^2X and D^2Y, and covariance *C*(*X*, *Y*). The expected value of the *XY* product can be calculated relatively easily using the formula:

$$E(XY) = E(X)E(Y) + C(X, Y) \tag{A.1}$$

where covariance *C*(*X*, *Y*) is given by formula:

$$C(X, Y) = E(XY) - E(X)E(Y) \tag{A.2}$$

The formula for variance is more difficult to derive. When applying directly the definition variance, we get:

$$D^2(X, Y) = E\big[XY - E(XY)\big]^2 \tag{A.3}$$

Bohrnstedt and Goldberger [1969] proposed first to decompose variables into centred variables and expected values, such as (Δ*X* + *EX*) instead of *X*, where Δ*X* = *X* − *EX*. Frishman [1975] used the following property of variance as the starting point:

$$D^2(X) = E(X^2) - [EX]^2 \tag{A.4}$$

but applied it to product *XY*:

$$D^2(XY) = E(X^2Y^2) - \big[E(XY)\big]^2 \tag{A.5}$$

Using formulas (A.1), (A.2) and (A.5), Frishman showed that:

$$D^2(X, Y) = \big[E(X^2)E(Y^2) + C(X^2Y^2)\big] - \big[E(X)E(Y) + C(X, Y)\big]^2 \tag{A.6}$$

By expanding formula (A.6), we arrive at:

$$D^2(XY) = \left\{ \left[D^2(X) + E(X)^2 \right]\left[D^2(Y) + E(Y)^2 \right] + C(X^2, Y^2) \right\} -$$
$$- \left[E(X)^2 E(Y)^2 + 2C(X,Y)E(X)E(Y) + C(X,Y)^2 \right] =$$
$$= \left[D^2(X)D^2(Y) + D^2(X)E(Y)^2 + E(X)^2 D^2(Y) + E(X)^2 E(Y)^2 + C(X^2, Y^2) \right] - \qquad (A.7)$$
$$- \left[E(X)^2 E(Y)^2 + 2C(X,Y)E(X)E(Y) + C(X,Y)^2 \right]$$

Simplifying formula (A.7) results in:

$$D^2(XY) = D^2(X)D^2(Y) + D^2(X)E(Y)^2 + E(X)^2 D^2(Y) +$$
$$+ C(X^2, Y^2) - C(X,Y)^2 - 2C(X,Y)E(X)E(Y) \qquad (A.8)$$

In case of the bivariate normal distribution $C(X^2, Y^2) = 2C(X,Y)^2 + 4C(X,Y)E(X)E(Y)$ and formula (A.8) becomes reduced to:

$$D^2(XY) = D^2(X)D^2(Y) + D^2(X)E(Y)^2 + E(X)^2 D^2(Y) +$$
$$+ C(X,Y)^2 + 2C(X,Y)E(X)E(Y) \qquad (A.9)$$
.

Both formulas for the expected value (A.1) and for variance (A.8) of the random variables product become considerably simplified in the case of independence:

$$E(XY) = E(X)E(Y) \qquad (A.10)$$

$$D^2(XY) = D^2(X)D^2(Y) + D^2(X)E(Y)^2 + E(X)^2 D^2(Y) \qquad (A.11)$$

DOES CONSOLIDATION AFFECT THE NUMBER OF BANK EMPLOYEES – AN EXAMPLE OF POLAND IN 1997–2013

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Abstract. The paper examines the impact of consolidation of the banking sector on the number of bank employees in Poland in the years 1997–2013. Using the quarterly banking and macroeconomic data and the multivariable regression model, it was proved that banks cut the number of their employees with growing concentration of the banking sector. The process is accelerated with the improvements of the macroeconomic conditions and increasing the level of technology applied in the banking operations. Banks reduced their employment with the growing value of their assets. Additionally, raising competition in the lending and deposit markets force banks to expand their employment.

Key words: employment in banks, consolidation, banking sector, Poland

INTRODUCTION

The recent growing consolidation of the banking sector raises questions about the extent of changes in the number of employees. On the one hand, banks opt for a merger expecting to reduce the unit operating cost, what usually is done by reducing the number of employees. On the other hand, the experience presented in the literature indicates that consolidation does not necessarily lead to downsizing of the employment. In addition, the rate of change in the number of employees depends on the size of banks, the level of development of the banking sector and the state of the macroeconomic environment in which they are operating.

The aim of this paper is to present the analysis of changes in the number of employees in the banking sector in Poland in the years 1997–2013 and the relationship between the number of banks' staff and the banking sector concentration, as well as other sectoral and macroeconomic variables. This study fills a gap that exists in the literature on changes in the level of employment in banks resulting from the process of the banking sector consolidation.

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The remaining part of the paper is structured as follows. The next section presents sources of data and the methodology of the research, followed by the literature review on the changes in the bank employment in the context of the consolidation, presentation of the changes in the banking sector in Poland, and the results of the current research results. The whole analysis is summarized in the conclusions.

MATERIAL AND METHODS

The study covers developments which took place in the banking sector in Poland in the period 1997–2013. The data on the banking sector come from the National Bank of Poland (NBP) and the Polish Financial Supervision Authority (PFSA). The macroeconomic data come from the Central Statistical Office (GUS).

A multivariate regression model (Ordinary Least Squares Method, OLS) was used to analyze the relationship between the number of bank employees and banking and macroeconomic variables. The calculations were performed with the statistical software STATA version 11.

CONSOLIDATION AND EMPLOYMENT – THE LITERATURE REVIEW

The consolidation of the banking sector is generally motivated by the need to improve operating efficiency and achieve the economy of scale and the economy of scope. This process is carried out continuously, and the rate of its dynamics depends, among others, on the banking regulations, technological developments, changes in the system of operation of the banking sector. Consolidation is usually associated with a drop in the number of employees. In particular, in Europe the banking sector consolidation was impacted by the regulatory changes implemented by the Second Banking Directive[1], which established the common pan-European financial system in 1993. In 1994 the common banking area was extended on the EFTA countries[2]. The next stimulus of consolidation came from the establishment the euro zone in 1999. Important examples of the intensive consolidation were banking sectors of Germany, France and the Netherlands. Between 1990 and 1997, the number of banks in these countries fell from, respectively, 4,720, 2,027 and 111, to respectively, 3,578, 1,299 and 90. At the same time, the number of bank employees

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[1] The Second Banking Directive provided a legal basis for the creation of a single EU banking system, in which each credit institution registered in any Member State has the right to perform banking activities across the EU. Also it allowed banks to sell insurance services; "Second Council Directive 89/646/EEC of 15 December 1989 on the coordination of laws, regulations and administrative provisions relating to the taking up and pursuit of the business of credit institutions and amending Directive 77/780/EEC" [OJ L 386, 30/12/1989, p. 1].

[2] The agreement between the European Union and the European Free Trade Association forming from 1 January 1994 the European Economic Area (EEA) has extended the area of the single banking system to countries of the European Free Trade Association (EFTA), namely Iceland, Liechtenstein and Norway; "Agreement on the European Economic Area of 17 March 1993" [OJ L 1, 03/01/1994, p. 572].

decreased from, respectively, 888, 473 and 126 thousand to, respectively, 751, 427 and 115 thousand [ECB 1999].

Weber [2000] indicates the employment reduction by mergers and acquisitions of banks. Based on the survey conducted by the European Trade Union Federation (UNI--Europa), she states that only due to the mergers conducted in the 1990s the banking sector closed down about 130 thousand jobs. She further notes that mergers often led to increased pressure on the remaining staff, whilst expecting to increase their operational flexibility, and extending the number of working hours.

The reduction in the number of bank employees in the 1990s in Europe is emphasized by the report of the International Labor Organization [ILO 2001]. One of the significant examples was Denmark where, between years 1990 and 1995, the number of bank employees fell from 51 to 43 thousand. Similar changes took place in the Czech Republic, where between years 1994 and 1999 the overall employment in banks fell from 59 to 49 thousand, what contributed to a reduction in the average number of employees per bank from 3,467 to 2,006. This was done, among others, through privatization and takeover of state-owned banks by foreign investors and technological development in the banking operations. Employment restructuring was based largely on the centralization of such operations as cash management, processing checks, and call-center services [ILO 2001, pp. 45–51].

Heiney [2009], analyzing changes in the number of bank employees in the USA in 1992–2004, shows that the abolition of barriers to interstate banking introduced by the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994[3] contributed to the gradual reduction in the number of banks from 11,463 in 1992 to 7,630 in 2004. On the other hand, throughout this period the number of bank employees gradually increased from about 1.5 to 1.8 million. The upward trend in the number of employees resulted, among others, from the development of the branch network organized accordance to the banks' strategy of approaching customers[4]. Heiney also indicates the existence of differences in rates the employment growth in the consolidating banking sector. The largest increases in employment were recorded in the group of the largest banks and moderate in the medium banks, but in the smallest banks the number of employees decreased.

The complexity of nature of the relationship between the number of employees and the banking consolidation is also manifested in the geographical and timing dependence. Amel et al. [2002] argue that these changes depend on the country and the period when the significant consolidation occurs. Additionally, Heiney [2008] shows that these changes depend on the size of merging banks. In Western Europe during the consolidation of 1990–1996, in some countries the increase in the number of bank employees followed the increase in the number of bank branches. However, in subsequent years the number of employees declined, despite an increase in the number of branches [ILO 2001, p. 65]. Such directions in the changes of bank employment resulted from the reorganization of the system of banking operations and the increase the use of outsourcing. Some banking activities were transferred to non-bank financial institutions such as investment companies, brokerage firms, real estate brokerage companies [ILO 2001, p. 72].

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[3] The Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 authorized, from June 1995 to take over the banks domiciled in another state than the bank initiating takeover.
[4] Between 1992 and 2004 the number of bank branches increased from 51.6 to 70.3 thousand [Federal Deposit Insurance Corporation website, www.fdic.gov].

Another factor affecting the level of employment during banks' consolidation is the relationships between bank employees and customers, and the added value stemming from the long-term cooperation between them. In such circumstances, the liquidation of jobs directly serving customers introduces the risk of losing customers and with them a substantial amount of "soft" business information. Therefore, in the course of consolidation, particularly in periods of expansion, these groups off employees were not a subject of restructuring [Amel et al. 2002].

An important aspect of consolidation is the reduction of operating costs, especially the labor costs which account for their largest share. In the 1980s in the USA merging banks used consolidation to reduce costs through the elimination of the highly paid positions and replacing them with low-paid ones [Amel et al. 2002].

STRUCTURAL CHANGES OF THE BANKING SECTOR IN POLAND IN 1997–2013

In the development of the Polish banking sector the period between 1997 and 2013 could be divided into two stages: preparation for Poland's entrance to the EU in 1997––2003, and integration with the single EU banking system 2004–2013.

The first period was distinguished by the privatization of most of state-owned banks, followed by the strong consolidation wave. Several majority foreign investors, who controlled more than one subsidiary in Poland, consolidated their operations within large universal banks, which they already acquired during the privatization process[5]. Such decisions were taken to exploit economy of scale and improve efficiency of the entire banking group operating in Poland.

Consolidation took also place within the group of cooperative banks. In the pre-accession period cooperative banks were required to raise equity to 300 thousand EUR by the end of 2001[6]. Large group of small banks was unable to fulfill this requirement, what resulted in approximately 600 bank mergers [NBP 2006]. As in the case of commercial banks, this consolidation process has not reduced the number of branches and the number of employees. At that time, numerous mergers in the banking sector led to an increase in its concentration (Fig. 1).

However the significant reduction in the number of operating banks was accompanied with the increase in the number of branches and bank employees. Another feature of this period was relatively low GDP growth and the high, albeit declining value of interest rates. After Poland's accession to the EU, development of the banking sector significantly accelerated. Important factors of this process included the strong economic growth, the inflow of the EU aid funds and on the real estate boom. The growing importance of medium-sized banks offering housing loans contributed to a gradual downward trend in the level of the banking sector concentration.

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[5] Consolidation carried out within capital groups include: ING Bank Śląski, Citi Bank Handlowy, Bank Zachodni WBK, Bank Millennium (see annual synthesis on the financial situation of banks – the Polish Financial Supervision Authority http://www.knf.gov.pl/en/index.html).
[6] The requirement was imposed by the Act of 7 December 2000 on the functioning of cooperative banks, their associations and associated banks (Journal of Laws of 2000 No 119, item 1252).
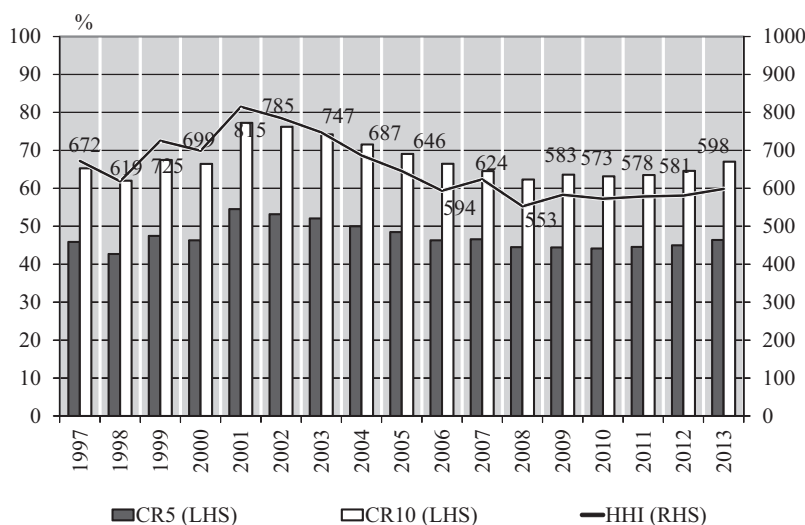
Fig. 1.   Concentration of the banking sector in Poland in 1997–2013
Source: Own calculations based on the data from PFSA and NBP.

The outbreak of the financial crisis of 2008 reshaped development strategies of banks. The stagnation in the real estate market and low demand for loans significantly contributed to the reduction of branch networks, as well as the drop in the number of employees. At the same time banks focused their attention on the technological improvements. They increased the number of accounts operated via the Internet and mobile phones. Implementation of such strategies caused reorganization of banks' business models and shifted activities previously performed by employees in branches to the Internet, where customers completed them by themselves [NBP 2012, p. 77].

Additionally, the crisis impacted the demand and the supply sides of the banking business. Large corporations, small and medium sized enterprises (SME) and households refrained from taking loans, while banks restrict their lending policies based on the uncertainty of the further economic developments. The shortage of funds on the interbank market put pressure on competition for the households' deposits. These factors raised labor input to the deposit and lending operations.

RESULTS

To examine the impact of consolidation and the size of banks on the number of employees the multivariate regression model was applied. The number of employees is a dependent variable and explanatory variables in the model are:
*   concentration – represented by the indicators: CR_{10} (the share of 10 largest banks in the banking sector assets) and HHI (the sum of squares of banks' shares of in the banking sector assets). The concentration is expected to impact the number of employees

in deferent ways. On the one hand, in a more concentrated sector a small group of large banks could exploit economy of scale and reduce the number of employees: expected negative sign of the variable coefficient (–). On the other hand, the increasing concentration contributes to a reduction in competition and efficiency of banks, raising the number of employees (+);
- assets (natural logarithm) – an increase of size of the banking sector, among others, due to its expansion, requires more employees (+). However, the relationship do not have to be such straightforward when banks dedicate their attention to the Internet banking;
- loan-to-deposits – the ratio of loans to deposits of the non-financial sector represents the structure of funding of the lending operation and the level of financial liquidity. An increase in this ratio reflects banks' expansion in lending, what requires larger labor forces (+);
- rate of branches' number growth (annual) – development of the branch network may differently affect the level of employment in banks. Traditionally, banks provide services through employees at branches, and with the network extension the number of employees should raise (+). However recently, banks follow the strategy of small outlets located in the shopping malls, and gradually replace the large branches. In such circumstances the increase in the number of outlets, does not necessarily raises the number of employees;
- GDP growth (annual rate) – the increasing rate of the economic conditions is usually associated with the technological development enabling banks to replace a large number of labor intensive positions with a lower number of more technologically advanced ones (–). On the other hand, the economic growth raises demand for more complex and higher quality banking services, what mostly requires more employees (+);
- NBP lombard rate – represents the level of interest rates in the banking sector and is expected to raise the number of employees. The level of interest rates generally tend to rise during the expansion of the banking sector, what requires an increase in employment, while during periods of economic downturn the relationship is reverse (+).

Quarterly data were used in the research. In case of the GDP growth a 2-quarter lag was applied, as the macroeconomic impulses impact the banking sector mostly with some delay. Similarly, in case of the NBP lombard rate a 1-quarter lag was applied, as it takes commercial banks approximately one quarter to adapt their interest rates to the interest rates change made by the central bank. The distributions of the variables used in the multivariate regression model are shown in Table 1.

As the Poland's entry into the EU significantly impacted the way of banking sector development, the relationship between the number of workers and the explanatory variables was analyzed in three options, namely for: the entire analyzed period, 1997–2013; 1997–2003 and 2004–2013. Additionally, to double-check the results two sets of calculations were carried out using two measures of the degree of concentration – CR_{10} and HHI. The results of calculation are presented in Table 2.

Table 1.   Polish banking sector and economy characteristics – descriptive statistics

Specification	Mean value	Standard deviation	Minimum	Maximum
Number of employees (person)	167 676	19 299	149 802	186 955
Asset – natural logarithm (bn PLN)	6.69	0.38	6.13	7.43
HHI (–)	660.21	84.01	541.95	814.76
CR_{10} (%)	67.47	4.59	61.37	77.28
Branches growth rate (%)	0.67	6.9	–21.10	31.8
Loans-to-deposits (%)	83.38	16.33	65.83	109.49
GDP growth (%)	104.05	2.12	100.36	107.70
NBP interest rate (%)	11.31	7.54	4.50	27.00

Source:　Own calculation based on the data from GUS and NBP.

Table 2.   Relationship between the number of bank employees and the banking and macroeconomic variables in Poland in 1997–2013

Specification	1997–2003		1997–2013		2004–2013	
	CR_{10}	HHI	CR_{10}	HHI	CR_{10}	HHI
Assets (logarithm)	–5 347.02 (–1.25)	–4 500.29 (–1.08)	31 600.96[b] (0.04)	4 403.73 (0.31)	–5 893.59[a] (-3.22)	–5 833.98[b] (–2.68)
CR_{10}	24.47 (0.17)	–	–538.46[b] (0.04)	–	–618.14[a] (–5.35)	–
HHI	–	18.11 (1.67)	–	10.49 (0.58)	–	–29.86[a] (–3.44)
Loans-to--deposits	904.01[a] (8.96)	931.59[a] (9.8)	–1 088.85 (0.12)	–250.52 (–0.61)	763.88[a] (14.74)	813.96[a] (13.74)
Branches growth rate	3 486.75 (0.61)	6 209.79 (1.12)	12 6715.80[a] (4.78)	16 3387.60[a] (3.92)	–339.21 (–0.22)	–1 280.46 (–0.49)
GDP growth	–954.48[a] (–3.29)	–702.99[b] (–2.52)	129.63 (0.75)	–151.08 (–0.33)	–79.21 (–0.74)	–218.51 (–0.50)
NBP interest rate	1 784.63[a] (9.70)	1 611.77[a] (8.37)	373.31 (0.21)	761.58[b] (2.49)	–322.14 (–0.16)	–67.1577 (–0.13)
Constant	205 540.80[a] (4.61)	162 763.80[a] (3.92)	57 979.59 (0.55)	149 903.50 (1.42)	186 888.40[a] (5.56)	171 916.20[a] (4.27)
Number	66	66	30	30	36	36
F-statistic	88.06	95.5	30.11	25.09	580.42	410.17
R-square	0.90	0.91	0.89	0.87	0.99	0.99

a, b, c – means the degree of significance at the level of 1, 5 and 10% respectively; the number in parentheses represents t-statistic.
Source:　Own calculation based on the data from GUS and NBP.

The results of the research indicate that the increase of the value of assets affects the number of the bank employees in different ways. Before Poland's entrance to the EU to grow operations banks had to extend their networks of branches and hire more employees. The system of supply of banking services was more labor intensive in that period of time. On the other hand, the negative sign of the coefficient responsible for banks' assets could be explained with the increasing importance of information and telecommunication technology in the banking operations.

The negative sign of the concentration coefficient indicates that the decrease in concentration, and thus improvement of the conditions for competition, is associated with an increase in employment in banks. The direction of this relationship is valid for both analyzed periods, it means, before and after Poland's accession to the EU. Such relationship could be explained by the fact that the increasing competition forces banks to improve the way of the customer service, what means, among others, much extended range of services, improvement in the service quality or reduction of the time necessary for provision of the service to customers. After 2004, banks experienced raising competition in the markets of housing and consumer loans, and non-financial sector deposits. They were forced to dedicate more staff to perform these services. The achieved results of the concentration – employment relationship were confirmed with application of both concentration indicators – CR_{10} and HHI.

The positive sign of the loans-to-deposits coefficient indicates that the number of employees increases with the lending expansion of banks. The relationship is particularly relevant in the second part of the analyzed period which covers the real estate boom. The higher amount of granted loans and increasing competition in the housing loans market required an increase in the staff responsible for granting loans, and also for monitoring their repayment schedule and the value of collateral.

The positive impact of the increasing rate of the growth of the branch network on the number of bank employees was particularly noticeable in the period before Poland's accession to the EU. This could be attributed to the difference in the way of the banking sector operation in both analyzed sub-periods. At the turn of the 1990s and 2000s banks served their customers mainly at their locations. Therefore the expansion of the branch network required hiring of additional employees.

The reason why the acceleration in the economic growth results in the reduction of the number of bank employees could be associated with the fact that the higher pace of the economic development usually goes alone with the technological development. High technology allows banks gradually automate performance of the banking operations and shift location of their execution from branches to households and enterprises. Important channels of this transmission became the Internet and the mobile telecommunication. Since 2008 this process in the Polish banking sector has gained much attention for individuals and the SME sector.

The positive relationship between the number of employees and the level of interest rates in the banking sector particularly manifested itself in the first analyzed period. This may be associated with low economic growth, higher credit risk of businesses and the need to apply higher risk premiums. At the same time the low technological development of banks and greater labor intensity of the banking operations required higher number of employees.

CONCLUSIONS

The results of the research prove that the consolidation of banks significantly impacts the number of bank employees. Banks raise the number of their staff when the level of the sector concentration falls and the competition in the banking sector increases. This relationship is especially noticeable in the period 2004–2013, when banks were forced to compete in the lending and deposit markets and to increase the employment to satisfy customers.

The negative impact of the growing value of banks' assets on the number of banking employees confirmed the tendency of reducing banking staff with the growing consolidation. Especially after the EU accession growing banks equipped with high technology devices cut the number of their staff.

Additionally, consolidation impacts conditions for the banking competition. The raising competition in the lending market forces banks to increase the number of employees and improve the quality of the banking services.

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CZY KONSOLIDACJA WPŁYWA NA LICZBĘ PRACOWNIKÓW W BANKACH – PRZYPADEK POLSKI W LATACH 1997–2013

Streszczenie. Opracowanie analizuje wpływ konsolidacji sektora bankowego na liczbę pracowników banków w Polsce w latach 1997–2013. Stosując kwartalne dane bankowe i makroekonomiczne oraz model regresji liniowej z wieloma zmiennymi objaśniającymi,

wykazano, że banki zmniejszają poziom swojego zatrudnienia wraz ze wzrostem koncentracji sektora bankowego. Proces ten intensyfikuje się wraz z poprawą sytuacji makroekonomicznej i poziomem technologicznym stosowanym w działalności operacyjnej banków. Wzrost wartości aktywów banków wpływa na zmniejszenie liczby zatrudnionych pracowników. Ponadto podnosząca się konkurencja na rynku kredytów i depozytów wymusza na bankach wzrost zatrudnienia.

Słowa kluczowe: zatrudnienie w bankach, konsolidacja, sektor bankowy, Polska

A MODEL VALUATION OF ECONOMIC AND SOCIAL EFFECTS – A CASE STUDY OF THE OLSZTYN RING ROAD CONSTRUCTION

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Abstract. This article raises the question of transport infrastructure as a principal component of the social and economic system in any region of the world. Development of transport infrastructure leads to the so-called accumulation of effects obtained through various channels, e.g. upgraded communication and transportation technologies, shorter transit time, lower transport costs, improved safety and better long-term economic output in a given community. This paper presents a model valuation of economic and social effects of an investment made into road transport infrastructure based on a case study of the ring road designed to be constructed around Olsztyn. Analysis of the effects was based on the CBA (cost and benefit analysis) methodology, which is for example employed to evaluate the EU co-financed projects. The method presented herein will ensure more precise valuation of effects generated by planned investment projects and will be a tool supporting the decision-making process.

Key words: transport infrastructure, valuation model, dual prices

INTRODUCTION

Road infrastructure is a major element of the broadly understood technical infrastructure which, by being responsible for spatial transport of people and cargos, is "the blood circulatory system" in any economy. Development of road infrastructure accelerates cargo and passenger flows; it also helps to create new companies and develop the infrastructure in the public sector [Kamińska 1999]. Road transport is the most popular option for transporting people and goods. In Poland, there are 240,000 trucking companies, which make up 7% of all Polish enterprises. The contribution of road transport companies to Poland's GDP equals ca. 10% and their turnover was 64 billion PLN in 2013. In total, Polish road transport companies carried about 1.6 billion tons of goods in 2013. In Poland, like in

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other larger EU countries, nearly 90% of all road cargo transport falls on domestic freight transport. In order to take full advantage of the road transport potential, it is necessary to build new roads and modernize the existing ones. On a global scale, the road transport infrastructure covers 100 million ha, which corresponds to 2/3 of the global land development for transportation [Mazur 1992, Lesiak 2013]. National highways are the roads whose role in economy, defence and tourism encompasses a whole state. They also play a strategic role in the economic development of particular regions of a country by helping to maintain constant contact between capital cities and local economic centres [Wrona, Rek 2001]. An inadequate access to a national and international road network as well as the lack of good road connections with economic and political centres of the European Union are the principal reason why certain regions remain peripheral and experience more difficulties in their economic and social growth. For the authorities of the provinces located in Eastern Poland, development of road transportation is an obvious priority.

MATERIAL AND METHODS

Research methodology

The objective of this paper has been to demonstrate a model for valuation of economic and social effects of investments into road transportation. A ring road around the town of Olsztyn, currently at the stage of being defined and planned, served as the object of the study. Level of horizon of analysis of benefit has been defined Olsztyn for region.

The research methods consisted of:
- A project method – classification of effects generated by road infrastructure projects has been worked out for the purpose of this study. It process effects in foothold about directions of European funds for regional development EFRR and fund of cohesion. Directions (guidelines) are assigned for institution of manager, which (who) commission composition of analysis of cost and benefits, or they compose her (it) independently[1].
- The CBA method (cost and benefit analysis) – a method applied to evaluate economic and social effects which is for example applied to assess projects co-financed from EU funds. Purpose of analysis of cost and it is benefit advisable < indication > and conversion on all money value of possible areas so that determination of cost was possible and benefits of projects; gotten results will be summed benefits net, decision will be taken that on this base for it, if project is wanted and worth realization. Cost and benefits should be evaluated in foothold about principle of increase, through taking into consideration difference between option setting up (bet; found) realization project but without project alternative options [Mischan 1992].

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[1] Directions concerning methodology translation analysis cost and benefits. Commission for Affairs Regional Policy. General Board of Management. UE, Brussels 2006.

CLASSIFICATION OF THE EFFECTS OF CONSTRUCTING A ROAD INFRASTRUCTURE COMPONENT

Each investment into the road transportation infrastructure generates direct and indirect effects. Direct effects are connected with the road's immediate surroundings and occur in relatively short time [Domańska 2006]. Indirect effects appear in further surroundings and in a longer time perspective. The valuation model presented in this paper involves assessment of economic, social and environmental effects. The further in time or space such effects of road network investment projects occur, the more difficult is their quantification or valuation. However, an effort should be taken to achieve possibly the most complete valuation of all direct and indirect effects so as to perform a reliable and truthful analysis of costs and benefits, whose results will prove whether a given investment project is a rational one to implement. Economic effects are closely connected with the achievement of measurable benefits like improved profitability, value, productivity or efficiency demonstrated by users of analyzed infrastructure facilities, resulting from improved accessibility of transport infrastructure.

The basic effects generated by a road investment project are: time savings, lower transit costs, lower costs incurred by traffic accidents, higher prices of real estate etc. (Fig. 1).
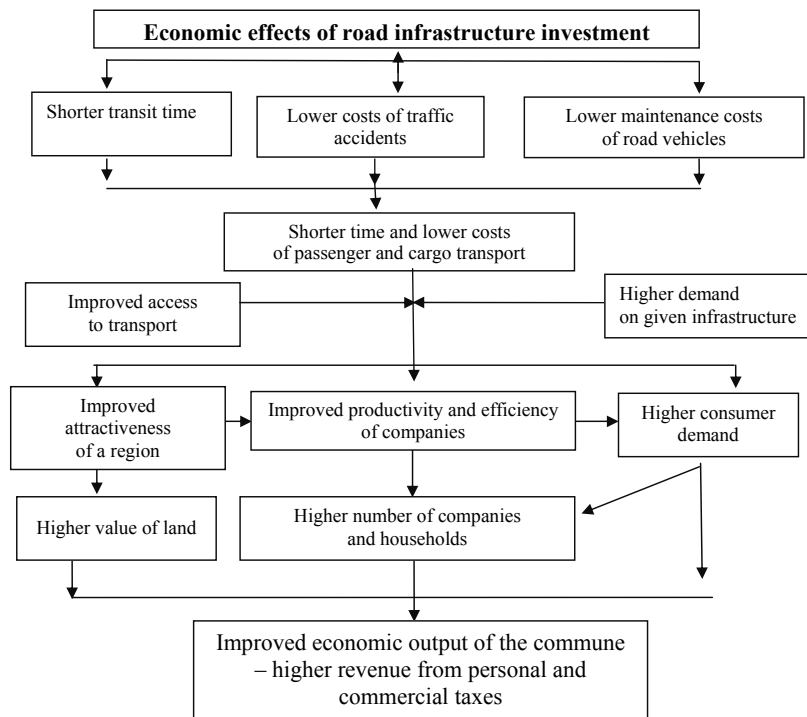

Fig. 1.   Economic effects of road transport investment

Source: Own elaboration.

Economic effects generated by road infrastructure investment can be divided into direct and indirect ones.

Direct effects include: lower maintenance costs of road vehicles – lower fuel consumption; shorter transit time (value time transport saving index – VTTS); lower costs of road accidents.

Direct effects induce indirect effects, which appear around modernized infrastructure, with some delay, mainly due to certain administrative procedures and market conditions. Evaluation of indirect effects is certainly a big challenge for researchers. Among major indirect effects (delayed in time) are [Kozłowski 2012]: higher investments on land around the upgraded road infrastructure; higher real estate prices; and higher revenue of communes from fees; personal and commercial taxes in years to come.

Social effects pertain to broadly understood improvement of the quality of life and social welfare. The basic effects created by road infrastructure investments are: increased number of employment opportunities, both in companies involved in the road construction and in new companies which open along a new road; improved road safety, owing to fewer road accidents; and higher mobility of local communities owing to better access to roads and lower costs of transport (Fig. 2).
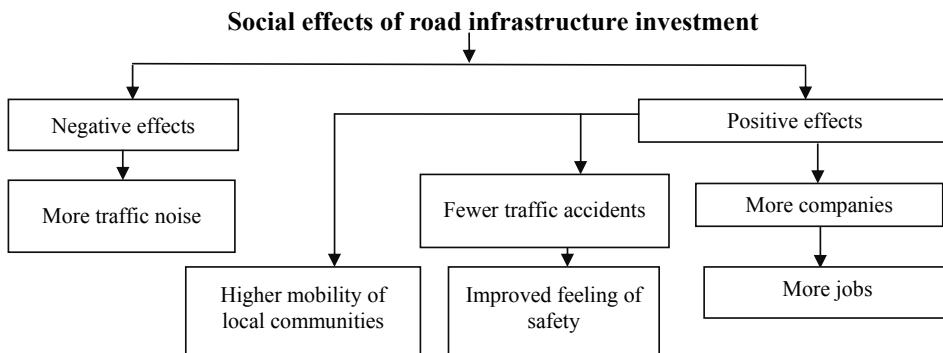

Fig. 2.   Social effects of road infrastructure investment
Source: Own elaboration.

Among the negative effects caused by road transport investments is increased noise caused by traffic, which today can be eliminated by raising acoustic barriers [Łaguna 2010].

Valuation of effects of investment into road transport infrastructure

A substantial methodological challenge encountered in both practical and theoretical considerations is the valuation of the economic and social effects in monetary units. Such calculations, however, enable more precise determination of the economic profitability of a given project, thus facilitating right decisions and more effective strategic planning with respect to the distribution of transport corridors. A tool which enables

one to evaluate particular economic, social and environmental effects is the well-known method of analyzing costs and benefits – the CBA [Ray 1990]. It is particularly useful for major public projects because it includes evaluation of non-financial aspects, such as quality of life of residents, new jobs, higher consumer demand, improved safety, superior health care etc. With this method, it is possible to compare financial costs and benefits of completing an investment project with the costs and benefits which are not often expressed in monetary units but whose value is an essential component for analysis of the profitability of a whole project.

The importance of social and economic costs and benefits is appreciated by the EU institutions engaged in financing investment projects, whose application procedures specify such an analysis as one of the prerequisites.

The objective of the cost and benefit analysis is to demonstrate whether a given project will lead to an increase in the welfare of the community occupying the area covered by the analyzed infrastructure investment. The key assumptions are that there are alternative costs, derived from the variable marginal costs curve, and that the variable marginal costs curve assumes an incremental character beyond its climax, which corresponds to the supply curve. The basic measure for valuation of economic and social costs and benefits generated by infrastructural investment projects is the dual prices, understood as an indicator of costs and benefits of a project in terms of the whole national economy [Prud'homme 2005].

The methodology associated with appreciation of dual prices for a given country, region or commune is a rather complex process as it requires accumulation and processing an extremely large amount of data concerning the analyzed phenomenon and the need to express them numerically.

CASE STUDY – CONSTRUCTION OF A RING ROAD AROUND OLSZTYN

Description of the construction project

Olsztyn is the capital city of the Province of Warmia and Mazury. Its area is 88 km^2. The city is cut through by an international road connecting Warsaw and Kaliningrad in Russia. Olsztyn has numerous landscape and environmental assets, for example 11 lakes lying within the urban administrative borders, which altogether make up 9.9% of the town's area. There are also forests which cover 1,200 ha, i.e. 21.2% of the municipality, of which 1,050 ha are used for recreational and relaxation functions. Unfortunately, the street network in the town of Olsztyn is far from being satisfactory, mainly because the existing solutions respond inadequately to today's needs, the technical condition of streets and street engineering facilities is poor and connections with European transport corridors is weak. All major corridors and motorways circumvent Olsztyn and the whole province, except for the Riga – Kaliningrad – Gdańsk route, which runs very close to the province. At present, however, roads which belong to this corridor pass through the town of Olsztyn, including its centre and densely built housing estates. As Olsztyn lacks a ring road, all transit traffic flows through the town's streets, unsuitable for such heavy traffic either in terms of their geometrical characteristics (streets, junctions and crossroads) or with respect to the road surface. This transit traffic raises maintenance costs (road repairs) and causes nuisances exceeding any acceptable norms.

Along numerous sections, the streets of Olsztyn must carry excessive traffic compared to their width, geometry of junctions and throughput of vehicles at traffic lights. The highest flows of vehicles are generated by the southern suburbs of the town, from which about 6,000 cars per hour travel to the centre and to the industrial area. This has stimulated a project of constructing a ring road that would run through several communes around Olsztyn: Gietrzwałd, Stawiguda, Purda, Barczewo and Dywity. The planned length of the ring road is 39 km and its main functions will be:

- to intercept the transit traffic (national and international), which currently runs through the town;
- to improve the access to transport routes from these areas of the town of Olsztyn, which have been zoned for commercial development;
- to make it easier to commute from the suburban residential areas of the town and neighbouring villages to the town's centre.

The ring road of Olsztyn is planned to consist of two sections. The southern section measuring 27 km in length will involve the construction of a new alignment road section from Kudypy (west of Olsztyn) to Wójtowo (east of Olsztyn). The construction project also includes construction or reconstruction of local roads leading to the ring road, which will have in total 95 km in length, and construction of 7 road junctions. The northern part of the ring road will consist of 13 km of a dual carriageway, construction or reconstruction of access roads of the total length of 45 km and construction of 6 junctions. The basic parameters of the ring road construction design are presented in Table 1.

Table 1. Basic investment parameters

Variable	Southern section	Northern section
Length of the section (km)	27	13
Investment outlays (million PLN)	900	250
Duration of the construction	2012–2015	2012–2015
FNPV (million PLN)	−1 280.74	
Number of vehicles daily (pcs)	30 000	25 000

Source: Feasibility study of the Olsztyn Ring Road project. GDDKiA 2009.

The financial analysis shows that the investment project is unprofitable because the expected FNPV value is 1,280.74 million PLN at a discount rate of $k = 5\%$ and operating costs of 7 million PLN annually.

Valuation of the economic and social effects of the project

Evaluation of particular types of effects has been performed according to the dual prices based on available information and analyses of the Olsztyn Ring Road project[2].

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[2] Main sources of data for valuation of the effects were the following documents: Feasibility study for the Olsztyn Ring Road project, data provided by GDDKiA in Olsztyn for 2008–2011, local and regional statistics, Strategy for the development of Olsztyn in 2007–2013, Strategy for the development of the Province of Warmia and Mazury in 2010–2020.

Below (Table 2) the valuation of the defined effects of constructing a ring road around Olsztyn is presented in the context of one year, assuming that $n = 30$ years.

Table 2. Forecasted economic effects of the Olsztyn Ring Road

Effect	Description	Evaluation of effects annually
	Direct effects	
Shorter transit time [Spieker-mann, Neubauer 2002]	– car velocity raised from 15 to 90 km per hour – valuation formula: number of vehicles × time saving × × hourly rate x number of days a year	↓ 59% = 74 million PLN
Lower main-tenance costs	– car velocity raised from 15 to 90 km per hour – valuation formula: number of vehicles × transit time × × average fuel consumption × fuel price	↓ 22% = 45 million PLN
Lower costs of traffic accidents	– levelling cost of treatment of accident casualties – valuation formula: 0.14 PLN[a] per person per km × × number of passengers × distance in km × 0.30% (decrease in number of accidents)	↓ 30% = 8 million PLN
Lower road repair costs	– reduced costs due to road repairs in town – valuation formula: costs by the Municipal Road Maintenance Management on road repairs due to transit of heavy truck and trailers	↓ 28% = 15 million PLN
Total		142 million
	Indirect effects	
Higher revenue of the commune	– higher revenue from personal and commercial taxation – higher revenue from real estate taxation 5 years after the investment project – valuation formula: increased revenue of the commune from personal (39.34%) and commercial taxes (6.71%) with respect to higher employment and higher GDP in the area	↑ 5% = 12 million PLN
Higher real estate prices	– benefits from higher prices of commercial real estates on land adjacent to the ring road – valuation formula: data from the Olsztyn District Office on commercial real estate prices	↑ 50% – price per 1 ha

[a] Rate 0.14 PLN per person per km was established by the Minister for the Infrastructure to valuate costs of road accidents per 1 km of national roads.

Source: Own elaboration.

The biggest advantage gained from constructing the planned ring road is the time saving, as the transit time will be 59% shorter, which means that 74 million PLN Can be Saved annually at the assumed traffic flow of 30,000 vehicles daily [Generalny po-miar ruchu 2010]. The second most important economic benefit is a 30% decrease in the costs of traffic accidents, which generates 8 million PLN savings a year. The cost of maintaining vehicles will be reduced by 22% owing to a shorter transit time, which will correspond to 45 million PLN saved each year assuming that the traffic flow will equal 30,000 cars a day.

Table 3. Forecasted social effects of constructing a ring road around Olsztyn

Effect	Description	Valuation of effects annually
Higher employment/ /lower unemployment	employment for construction works – 350 jobs, and jobs in companies locating their new premises near the ring road – about 850 jobs (IKEA, DomPlast, PKN Orlen, Lotos)	↓ decreased social aid costs by 8 million PLN valuation formula: number of jobs × cost of maintaining an unemployed person ↑ increased consumer demand by 34 million PLN valuation formula: average pay × number of employees × 12 months
Transfer of companies closer to the ring road	– service companies, e.g. petrol stations, restaurants, hotels – 5 businesses – a hypermarket – 1 – production companies – 3 – other companies – 15	↑ in total – 24 enterprises ↑ estimate formula: the feasibility study for the project, data from the Olsztyn Town Hall
Benefit of increase in population	– areas near the ring road will be more attractive places to settle down	2% of the population estimate formula: average number of residents of Olsztyn per 1 ha
Improved safety	– fewer road accidents – reconstruction and construction of safe crossings for local residents	↓ 80% of the road accidents estimate formula: based on police statistics from comparable ring roads
Improved access to transport	– lower costs of commuting to work or school – higher mobility of local communities – less traffic pressure on the town centre	↓ 15% of commuting costs valuation formula: analysis of costs of commuting from neighbouring communes
Decreased amounts of exhaust fume gases: CO_2, SO_2	– decreased amounts of GHG in the town	↓ 30% = 24 million PLN source of data: data from Sanitary Inspection on costs due to emission of CO_2 and SO_2
Less noise	– less noise in the town – construction of noise barriers along the ring road	↓ down to below 50 LA_{eq} source of data: the feasibility study for the project
Fewer accidents with wild animals involved	– construction of passages for wild animals	↓ 70% = 87 of animals annually source of data; police statistics
Better landscape management – undeveloped areas	– use of undeveloped areas by agriculture and forestry – development of some land under commercial facilities	↓ 30% = 8 million PLN data forecasting: higher prices of unused land, farmland and land for development

Source: Own elaboration.

The major indirect effects include 5% higher revenues for the commune for local taxes and fees, higher prices of industrial real estates located near the planned ring road and an increased number of companies, which will mean higher employment and consumer demand.

The principal social effects gained from building a ring road around Olsztyn are: higher employment generated by construction works on the ring road (350 persons) and

also in companies that will open afterwards (850 persons), which in turn will lead to the commune expenditure on social aid decreasing by 8 million PLN. More money on the market will stimulate the consumer demand. It is also forecasted that new companies will open along the ring road (24 companies in five years after completing the construction project). Other direct effects include expansion of housing estates, better chances of finding work and starting a family. Improved access to transport routes will decrease costs of commuting to school or work, which will have a positive influence on the mobility of local populations either to gain better qualifications or to search for work (Table 3).

The construction of the planned road infrastructure will cause many indirect, i.e. time--delayed social effects, which generate benefits totalling to 201 million PLN a year, without the economic and social valuation of benefits in dual prices. The final assessment of the profitability of the project can be found in Table 4.

Table 4. Valuation of the profitability of the Olsztyn Ring Road project

Parameter (PLN)	Annually	For the whole period, $n = 30$
Outlays		1.15 billion
CF (cash flow) economic, social and environmental benefits	201 million	3.65 billion
FNPV (financial net present value)		− 1.3 billion
ENPV (economic net present value)		2.5 billion

Source: Own elaboration.

Financial current net value (FNPV = –1.3 billion). Indicator is negative value for researched project FNPV, that enables forestalling about union means. Economic current value defines all benefits from project net (ENPV = 2.5 billion) and it is greater than zero shows that propriety of investment. Based on the performed analyses, it can be concluded that the construction of the Olsztyn ring road is profitable.

CONCLUSIONS

The question raised in this article belongs to a research area which is included in the broadly viewed strategy of road transport development. This article – is a introductory contribution towards improving the methodology applied to investigations on valuation of effects of construction or reconstruction of road transportation corridors, which includes sustainable development, in which social and environmental issues are considered next to economic aspects. The model presented in this article helps to categorize and classify economic and social effects, which is a good starting point for any further analytical work on complex assessment and planning of road transport infrastructure.

Due to the complex character of investments into road transport, each project should be approached individually by defining specific effects, quantifiable in monetary units, which subsequently can be incorporated into a complex profitability study. Valuation of the effects at the stage of planning and designing a project will improve the decision-taking process and rule out any misunderstandings regarding the assessment of the effectiveness of a given project. With the project of building a ring road around Olsztyn

taken as a case study, the author has presented some practical aspects of the valuation of particular types of effects. The financial analysis showed that the expected value was FNPV = –1281 million PLN, but when benefits gained form other effects were taken into consideration the expected economic value ENVP was 2.5 billion PLN.

Based on the performed analyses, it can be concluded that the construction of the Olsztyn ring road is profitable and will generate a series of indirect effects, among which economic benefits are evidently dominant.

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MODEL WYCENY EFEKTÓW EKONOMICZNO-SPOŁECZNYCH NA PRZYKŁADZIE PROJEKTU BUDOWY OBWODNICY OLSZTYNA

Streszczenie. W opracowaniu poruszono tematykę związaną z infrastrukturą transportową będącą jednym z podstawowych elementów układu społeczno-gospodarczo każdego regionu. Rozwój infrastruktury transportowej wywołuje tzw. akumulację efektów uzyskanych

za pośrednictwem różnych kanałów, takich jak: poprawa technologii komunikacyjnych, zmniejszenie czasu i kosztów przejazdu, poprawa bezpieczeństwa, a w długim okresie poprawę wyników ekonomicznych. W artykule przedstawiono model wyceny efektów ekonomiczno-społecznych inwestycji w infrastrukturę transportu drogowego na przykładzie projektu budowy obwodnicy Olsztyna. Analizę efektów oparto na założeniach metodyki CBA (cost and benefit analysis) wykorzystywanej do ewaluacji projektów współfinansowanych z funduszy unijnych. Opracowana metodyka umożliwia bardziej dokładną wycenę uzyskanych efektów z planowanych inwestycji a jednocześnie stanowić może narzędzie usprawniające proces decyzyjny.

Słowa kluczowe: infrastruktura transportowa, model wyceny, ceny dualne

REGIONAL DIFFERENCES IN THE LEVEL AND QUALITY OF HOUSING CONDITIONS AMONG POLISH HOUSEHOLDS[*]

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Abstract. Housing conditions largely affect the standard and quality of life. The problem connected with housing conditions is an important social issue for each country due to its socializing, economic and social functions. Having in mind the importance of apartments in terms of the population security and stabilization, the authors of this paper have made an attempt to present the housing situation in Poland through an analysis of regional diversification of housing indexes. Additionally, subjective assessments of housing conditions by the population of provinces: the Kujawsko-pomorskie, the Mazowieckie and the Warmińsko--mazurskie, have been presented. These studies were carried out using the method CAPI. Based on the analyses it was found that housing resources and conditions in Poland are significantly poorer as compared to those in Western Europe and the disproportions can be noticed throughout the country.

Key words: apartment, resources, quality, level, household, regional differences

INTRODUCTION

The category "living conditions" is not precisely defined as it applies both to material and non-material needs and the degree of their fulfillment in the place of living [Sobczyk 2007]. Słaby [2004] defines living conditions as all objective infrastructure conditions accessible to the society. It seems though that the main determinant of peoples' living conditions is their economic situation, their basic needs fulfillment degree, housing resources and availability of durable goods.

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The possibility of meeting the population needs is treated as one of the major determinants of the society standard of living [Kosturbiec 2006]. An apartment determines the material and social conditions for people to live and the resources, such as a living space or the location provide boundaries of the living standards for people, their families, households, and whole societies.

The degree of housing needs, distribution of resources and tendencies to change in time are defined through the issues connected with demographic structure and state, processes of housing resources exchange and the country social-economic development as well as the degree of technological progress implementation [Podoski and Turnowiecki 2001]. The problems connected with housing relations and occurring regularities are addressed by the housing policy. As a scientific discipline it sets goals and defines methods for fulfillment and improvement in housing conditions. The issues connected with housing conditions are currently especially difficult social problem. The residential construction lags behind the population needs and the quality of dwelling houses maintenance is rather poor.

MATERIAL AND METHODS

This study deals with spatial diversification, throughout Polish provinces, in the field of people's housing conditions created by housing resources and equipment of apartments with devices and installations of water supply and sewage systems, bathroom, toilet, and access to gas and central heating.

The addressed research subject has been analyzed on the basis of empirical material collected with the use of publicly available latest data from Central Statistical Office (GUS) and database and report from Social Diagnosis research project realized in 2011 [Rada Monitoringu Społecznego 2011]. The article also presents a fragment of opinion survey carried out within a research grant funded by the National Science Centre "Living standard and quality of life of Polish people". Surveys on the subject of life quality have been carried out in three Polish provinces: the Mazowieckie, the Kujawsko-pomorskie and the Warmińsko-mazurskie. The provinces were chosen according to a synthetic measure of the level of life which was calculated on the basis of objective indicators of the Polish population level of life[1].

Next, research on the quality of life of people from selected provinces was performed according to CATI (computer assisted telephone interview) method[2]. The research tool was a specially prepared questionnaire which included 69 questions from seven areas: safety level; functioning of social assistance; level and availability of services; functioning of public transportation and the condition of roads; level of culture and entertainment;

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[1] The Mazowieckie Province is one of the these in which there is the highest standard of living, in the Kujawsko-pomorskie – average, and the Warmińsko-mazurskie – the lowest, according to A. Murawska in Socio-economic development and the standard of living of households in Poland (doctoral dissertation, WULS-SGGW, unpublished manuscript), 2009.

[2] CATI is a telephone interview with computer assisted. It consists in conducting a survey through a telephone conversation with the respondent and response selection in a computer version of the survey.

level of education and employment; and evaluation of pro-social attitudes; including the respondents' involvement in sustainable development in their place of their living. In the survey 300 respondents took part including: 181 from the Mazowieckie Province, 71 from the Kujawsko-pomorskie Province and 48 from the Warmińsko-mazurskie Province. Such a distribution of the research sample groups was determined by the number of inhabitants living in a given province with regard to their age, sex, education and place of living.

Basic statistical methods have been used in order to interpret the results, among others coefficients of variation, asymmetry and dynamics have been calculated.

RESULTS

Definition of an apartment

The apartment is one of the most important aspects of human existence and household functioning, being the basis element in a system way of defining this important economic microstructure. An apartment also plays the role of a specific "concentration center" for a group of householders, thus meeting one of the conditions necessary for existence of a social group represented by a household consisting of a few members [Gutkowska 2001]. Significant factors that allow to use a given apartment are: the apartment construction standard concerning its size (area, number of rooms), equipment with technical-sanitary installations, applied construction material, interior layout and technical state.

The assessment of housing resources and equipment of apartments with standard facilities and water supply and sewage installations

One of the basic determinants of housing conditions quality is the independence of residence. According data obtained from Social Diagnosis 2011 in Poland, more than 4% of households do not reside independently. This figure has not changed substantially since 2007. Most frequently households not residing independently were found among those whose maintenance sources did not come from employment contracts (7%), farmers (6%), those located in rural areas (5%) and in the Lubelskie Province (over 11%) [Social Diagnosis 2011].

The analysis of an average number of rooms in an apartment, number of heads falling on one apartment and one room as well as the analysis of an average living space of an apartment play an important role in the assessment of housing resources. According to the latest results obtained from the National Opinion Poll 2011, in the years 2002–2011, there was reported a growth of the average living space of apartments. The average living space of an apartment was 69.2 m^2 in 2011 and it increased by 1.3 m^2 as compared to 2002. In turn, the average number of rooms in an apartment has remained almost at the same level (3.7) [Report of the National Census of Population and Housing 2011, 2012]. This is due to building apartments with larger living space and developing the existing resources.

The average living space of one apartment does not vary considerably from province to province in Poland[3]. Significant differences in this field are not observed in towns or rural areas, either. The smallest apartments, both in towns and in rural areas, occur in the Warmińsko-mazurskie Province (respectively, in towns – 59.90 m^2 and in rural areas

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[3] Obtained results based on data from the Statistical Yearbook of Voivodships 2012.

– 75.95 m^2). Relatively small apartments are found in towns of the Łódzkie Province (57.17 m^2) and the Kujawsko-pomorskie Province (59.01 m^2), whereas in rural areas small apartments, comparable with those in the Warmińsko-mazurskie Province, occur mainly in the Zachodniopomorskie Province (79.64 m^2) – Table 1.

The households situated in the regions of central and southern Poland are on the opposite side in terms of housing resources, especially the living space of apartments. The larger apartments are located in the Wielkopolskie Province (respectively in towns – 68.20 m^2 and in rural areas – 93.77 m^2). Apartments in towns have also relatively higher living space in the Podkarpackie Province (66.75 m^2). In turn, in rural areas can be found in the south of Poland, especially in the Śląskie Province (93.63 m^2) and the Małopolskie Province (90.97 m^2) – Table 1.

Table 1.   The average living space of one apartment (m^2) totally in towns and in rural areas, in Poland in 2011

Specification	$\overline{X}$	V_s	Minimum	Maximum	Fluctuation amplitude	Data skew
Total	70.73	6.48	65.56 (Warmińsko--mazurskie)	78.18 (Opolskie)	1.19	0.49
Town	62.21	4.30	57.17 (Łódzkie)	68.20 (Wielkopolskie)	1.19	0.51
Rural areas	86.49	5.30	75.95 (Warmińsko--mazurskie)	93.77 (Wielkopolskie)	1.23	–0.54

$\overline{X}$ – average for 16 provinces; V_s – coefficient of variation in %.

Source: Author's own calculations on the basis of Central Statistical Office data.

If the housing resources do not reveal substantial differences from region to region, significant disproportions can easily be observed between towns and rural areas. In 2011 the living space of apartments in rural areas was larger in rural areas as compared to towns by 25.91 m^2 (in 2010 this difference amounted to 24 m^2). While in 2011 the average number of rooms in rural areas was 4.21, in towns it was 3.54. In turn, in towns almost one person less falls on one apartment than in rural areas (respectively 2.59 and 3.45 persons per 1 apartment).

For the last 10 years there has been noted an improvement in the equipment of houses with standard installations, though this development has not reduced regional dispropor-tions, especially in rural areas. The survey results show that, although in terms of housing resources, there are no substantial differences between towns and rural areas, the same cannot be said about the equipment of apartments with standard facilities, such as water supply, sewage systems and gas. As far as towns are concerned, regional differences in this field are not much visible and insignificant ($V_s < 10\%$), though they do differ in rural areas ($V_s > 10\%$) – Table 2.

Analyzing particular regions, significant differences can be observed in the Ma-zowieckie Province. In this region there are usually high values of indexes defining the level and quality of life, such as GDP per head, average amount of people's salaries and incomes. However, in the field of apartment's equipment with standard facilities, this region leaves much to be desired. The number of inhabitants, provided with basic instal-

lations both in towns and rural areas, is the smallest in this province from all the provinces in Poland. Thus, the lowest percentage of people in towns, who use the water supply system, is in the Mazowieckie Province (in 2011 – 91.5%) and in the Podkarpackie Province (91.8%), those, who use sewage system, live in Śląskie Province (82.1%), and those, who has access network gas, live in the Podlaskie Province (42.6%). As for rural areas, the worst situation in terms of using the water supply system can be observed in the Małopolskie Province (58.1%) and the Podkarpackie Province (64.6%), in case of the sewage system – in provinces: the Lubelskie (13.6%), the Łódzkie (15.1%) and the Mazowieckie (17.8%), whereas gas network – in the Kujawsko-pomorskie Province (2.9%) – Table 2.

The Pomorskie Province appears to be on the opposite side in terms equipment of rural and urban apartments with elements of the water supply infrastructure. As compared to other provinces, the inhabitants of towns of this province account for the highest percentage of those, who use the water supply system (in 2011 – 98.0%) and sewage system (93.7%). In the rural areas of the Pomorskie Province the number of people, who use the sewage system infrastructure, is also the highest in Poland (40.6%). It has also

Table 2. Population using facilities in towns and rural areas (%) of the total population of towns and rural areas in Poland

Specification		$\overline{X}$	V_s	Minimum	Maximum	Amplitude of fluctuations	Data skew	I_z
Population with access to networks	Water supply							
		Town 2011	95.57	2.06	91.50 (Mazowieckie)	98.00 (Pomorskie)	1.07	−0.93	100.1
		Town 2010	95.51	2.09	91.20 (Mazowieckie)	97.90 (Pomorskie)	1.07	−0.98	100.0
		Rural areas 2010	77.40	11.11	58.10 (Małopolskie)	91.30 (Opolskie)	1.57	−0.66	100.7
	Sewage	Town 2011	87.43	3.56	82.10 (Śląskie)	93.70 (Pomorskie)	1.14	0.53	100.6
		Town 2010	86.90	3.73	81.40 (Śląskie)	93.40 (Pomorskie)	1.15	0.59	100.3
		Rural areas 2010	25.43	33.83	13.60 (Lubelskie)	40.60 (Pomorskie)	2.99	0.51	104.8
	Gas	Town 2011	72.11	14.46	42.60 (Podlaskie)	88.80 (Podkarpackie)	2.08	−1.38	99.6
		Town 2010	72.38	14.38	43.00 (Podlaskie)	89.00 (Podkarpackie)	2.07	−1.36	99.9
		Rural areas 2010	16.49	101.41	2.90 (Kujawsko-pomorskie)	60.10 (Podkarpackie)	20.72	1.76	102.0

$\overline{X}$ – average value for 16 provinces; V_s – coefficient of variation in %, I_z – index of dynamics in comparison with the previous year.

Source: Author's own calculations on the basis of Central Statistical Office data.

been observed that an equally high value of this index in rural areas occurs on the territory of the Zachodniopomorskie Province (40.6%). In turn, the highest percentage of rural population, who use the water supply system, is in the Opolskie Province (91.3%) and the Wielkopolskie Province (87.3%). In the Pomorskie and the Zachodniopomorskie Provinces the availability of water supply system is the highest, though it does not exceed the average in the country (Table 2).

Gas network is best developed in the Podkarpackie Province (town 89.0%, rural areas –60.1%). Gas network is also characterized by a very high regional diversification in rural areas. In 2010 the variance coefficient (V_s) for 16 provinces was 101.41% (in 2009 – 103.39%). However, V_s equal to 124.5% in 2003 [Murawska 2012] means that the differences from region to region are decreasing, and the index of dynamics in 2009 at the level of 111.7% and in 2010 at the level of 102% (compared to the previous year) confirms ongoing dynamic development of the gas infrastructure in order to decrease of disproportions that occur in rural areas (Table 2).

According to the latest results of the National Census of Population and Housing, since 2002 there has been observed a notable improvement in apartments equipment with installations, such as water supply system, sewage system, bathroom, central heating or network gas. Since 2002 the number of apartments with a bathroom has increased by 7.7%. with sewage system by 14.7%, central heating by 4.9% and network gas by 4.2%. A dynamic drop in the number of apartments without the considered facilities and installations has also been confirmed by the results of Social Diagnosis [Social Diagnosis 2011]. The housing conditions in Poland have been improved not only by development of water supply, sewage systems and gas network, but also by building new apartments and modernization of the earlier resources.

The number of households provided with all the considered equipment is relatively high in towns, and regional diversification in this field is insignificant ($V_s < 10\%$). In rural areas these indexes are different as they are much lower than in towns and here regional disproportions occur. On the basis of carried out analyses it can be said that the fewest town households with water supply system, sewage system and bathroom are in the Świętokrzyskie Province, whereas in rural areas, in the Podlaskie Province. In turn, the biggest number of apartments with water supply system, bathroom and sewage system is in the north of the country, in the Pomorskie, the Zachodniopomorskie and the Warmińsko-mazurskie Provinces, and also in the Opolskie Province – Table 3.

The percentage of households without network gas is constantly decreasing [Social Diagnosis 2011, Murawska 2012], however, the results of surveys indicate that there are still significant differences in equipment of households with this installation, especially in rural areas. In 2011, in towns, the coefficient of variance, calculated for 16 provinces was $V_s = 12.78\%$, whereas, in rural areas $V_s = 107.58\%$. As far as towns are concerned, the fewest apartments equipped with network gas can be found in the Podlaskie Province (49.8% – data from 2011) and in rural areas in the Kujawsko-pomorskie Province (2.6%). However, on the opposite side there is the Podkarpackie Province, where the number of apartments equipped with network gas both in towns and rural areas is the largest.

In 2007–2011 there has been observed a notable drop (by almost 3% points) in the number of apartments with fuel stoves giving place to collective and individual central

Table 3.   Apartments equipped with installations (%) totally Poland and in towns and rural areas in 2011

Specification		$\overline{X}$	V_s	Minimum	Maximum	Amplitude of fluctuations	Data skew
Water supply	Total	96.21	3.39	89.80 (Lubelskie)	99.30 (Zachodniopomorskie)	1.11	−0.89
	Town	99.18	0.78	97.70 (Świętokrzyskie)	99.90 (Warmińsko- -mazurskie)	1.02	−0.75
	Rural area	91.41	6.85	80.50 (Podlaskie)	97.80 (Zachodniopomorskie)	1.21	−0.70
Sewage system	Total	95.43	3.96	87.70 (Lubelskie)	99.00 (Pomorskie)	1.13	−1.00
	Town	98.96	0.79	97.40 (Świętokrzyskie)	99.70 (Pomorskie)	1.02	−0.86
	Rural area	89.18	8.84	75.50 (Podlaskie)	96.80 (Zachodniopomorskie)	1.28	−0.77
Bathroom	Total	93.46	5.51	82.60 (Lubelskie)	98.20 (Opolskie)	1.19	−1.07
	Town	98.40	1.08	96.00 (Świętokrzyskie)	99.40 (Pomorskie)	1.04	−1.09
	Rural area	85.14	11.74	67.60 (Lubelskie)	96.50 (Opolskie)	1.43	−0.73
Network gas	Total	56.53	21.82	32.10 (Podlaskie)	73.60 (Podkarpackie)	2.29	−0.34
	Town	78.02	12.78	49.80 (Podlaskie)	90.30 (Dolnośląskie)	1.81	−1.50
	Rural area	15.36	107.58	2.60 (Kujawsko- -pomorskie)	58.50 (Podkarpackie)	22.50	1.84
Central heating	Total	78.81	4.25	72.70 (Lubelskie)	84.10 (Pomorskie)	1.16	−0.07
	Town	86.17	4.31	80.00 (Śląskie)	91.10 (Mazowieckie)	1.14	−0.31
	Rural area	66.08	11.32	49.50 (Podlaskie)	78.20 (Śląskie)	1.58	−0.59

$\overline{X}$ – average for 16 provinces; V_s – coefficient of variability in %.

Source: Author's own calculations on the basis of Central Statistical Office data.

heating, whereas, this type of change was most visible in groups of households of farmers and the retired, multiperson, non-family households, households of married couples and multichildren families [Social Diagnosis 2011]. Despite an improvement in the situation, in rural areas only 66.08% of all the apartments are equipped with central heating, whereas, in the Lubelskie Province this index ranged in 2011 at the level 55.0%, the Podlaskie Province – 49.5%, which was the lowest in the country.

The Opolskie Province deserves special attention as in this region, thanks to dynamic drop in the number of apartments with fuel stoves in rural areas, a considerable improvement has been noted, and in 2011 this province was found to be in the second position (74.6%), right after the Śląskie Province (78.2%). However, as compared to rural households, the highest percentage of apartments equipped with the central heating, can be found in Provinces: the Mazowieckie (91.1%), the Lubelskie (89.6%) and the Podlaskie (90.9%).

Subjective assessment of housing conditions quality and the place of living on the basis of empirical data.

The quality of housing conditions and the place of living is an important factor determining the population living standards. Perception and assessment of housing conditions by people is diversified and depends on different features characteristic for respondents. According to data coming from the research project Social Diagnosis 2011, those who are relatively more often satisfied with housing conditions include persons up to 24 or above 60 years old, living rural areas in the Pomorskie and the Opolskie Provinces, with high school and university education. Whereas, the most dissatisfied with housing conditions are persons at the age from 25 to 60 years old, living in big cities of the Lubuskie, the Zachodniopomorskie and the Świętokrzyskie Provinces, with elementary and vocational education and the unemployed and retired.

On the basis of empirical tests, carried out within a research grant no 1708/B/ /H03/2011/40, it can be said that the inhabitants of the Kujawsko-pomorskie, the Warmińsko-mazurskie and the Mazowieckie Provinces are of a positive opinion on the subject of their housing conditions. Whereas, town inhabitants who have a high opinion of their housing conditions account for 86.7%[4] of the respondents are from the Warmińsko- -mazurskie, 77.3% of respondents are from the Kujawsko-pomorskie and 75.0% from the Mazowieckie Province. However, in rural areas this statement was supported by relatively fewer respondents. That is, in the Kujawsko-Pomorskie Province it was 74.1% and in Warmińsko-mazurskie Province 72.3% and in the Mazowieckie Province only 66.2% of rural areas inhabitants were satisfied with their housing conditions. One of the factors affecting the low evaluation of housing conditions by the inhabitants of the Mazowieckie Province can be connected with the above presented low values of infrastructure indexes involving equipment with water sewage installations (Table 4).

Table 4. Evaluation of housing conditions in the place of my living (%)

I have high opinion of the housing conditions in the place of my living	Province								
	Kujawsko-pomorskie			Warmińsko-mazurskie			Mazowieckie		
	o	m	w	o	m	w	o	m	w
I definitely disagree	0.0	0.0	0.0	0.0	0.0	0.0	1.7	0.9	3.1
I disagree	1.4	2.3	0.0	0.0	0.0	0.0	4.4	4.3	4.6
I rather disagree	22.5	20.5	25.9	18.8	13.3	27.8	21.5	19.8	24.6
I rather agree	60.6	56.8	66.7	58.3	60	55.6	51.4	47.4	58.5
I agree	14.1	18.2	7.4	18.8	26.7	5.6	18.8	25.0	7.7
I definitely agree	1.4	2.3	0.0	4.2	0.0	11.1	1.7	2.6	0.0
No opinion	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	1.5

o – generally, m – town, w – rural areas.

Source: Author's own research.

According to subjective rankings on the importance of different human needs, the housing needs is classified right after the need to care for health and reliance on food [Kusińska 2005]. Nowadays, in the times of improving living standards, quality, and fam-

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[4] Total of answers: I rather agree, I agree, I definitely agree.

ily model changing from a multigeneration to one- or two-generation, with high involvement of people in job activities resulting in a growing number of educated members of households, adequate housing resources are and will be of great importance. Therefore, it is essential to examine the quality of housing conditions or the place of living on the basis of subjective opinions of the household members.

CONCLUSIONS

Summing up the carried out investigations, it can be said, that housing resources make up an important element that characterizes the level of the population living standards and affects functioning of households. An apartment is a place, where consumption needs are met, and it determines the natural boundaries of peoples' privacy.

The level of housing resources on the territory of Poland is found to be diversified. There occur significant disproportions between towns and rural areas, to disadvantage of the latter ones. Carried out analyses have also revealed significant regional differences in the housing resources within rural areas, especially in the field of access to infrastructure, such as water supply system, sewage system, gas or other facilities, including bathroom, toilet or central heating.

In households located in towns there can be observed only slight differences between regions and the analyzed indexes fulfillment degree is relatively high. Provinces, such as the Pomorskie and the Podkarpackie, are considered to have relatively good housing conditions in towns, whereas, the poorest ones are found in the Podlaskie, the Świętokrzyskie, the Mazowieckie and the Śląskie Provinces.

In turn, in rural areas the disproportions are significant which has been confirmed by calculated coefficients of variance and asymmetry and fluctuation amplitude. Good housing conditions in rural areas can be found in provinces of northern Poland: the Pomorskie, the Zachodniopomorskie, and the Opolskie, as well as the Podkarpackie and the Śląskie, while poor housing conditions are common for provinces of eastern Poland: the Lubelskie, the Podlaskie, the Małopolskie and the Kujawsko-pomorskie.

Taking into consideration the housing conditions in Poland it can be said along with the process of social and economic development, a significant improvement in the population existence quality has taken place. Dynamic growth of infrastructural indexes levels has been reported especially in rural areas and in the eastern part of Poland. However, due to significant developmental delay of these areas in the past, especially as compared to population centers of central and northern regions, the level of housing resources and availability of public facilities still leave much to be desired.

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REGIONALNE ZRÓŻNICOWANIE POZIOMU I JAKOŚCI WARUNKÓW MIESZKANIOWYCH W GOSPODARSTWACH DOMOWYCH W POLSCE

Streszczenie. Warunki mieszkaniowe są istotnym czynnikiem wpływającym na poziom i jakość życia gospodarstw domowych. Problematyka mieszkaniowa jest ważną kwestią społeczną państwa, z uwagi na jej socjalizacyjne, ekonomiczne, a także społeczne funkcje. Mając na uwadze znaczenie mieszkań dla poczucia bezpieczeństwa i stabilizacji ludności, w artykule przedstawiono sytuację mieszkaniową w Polsce poprzez analizę regionalnego zróżnicowania wskaźników mieszkaniowych. Dodatkowo przedstawiono subiektywną ocenę warunków mieszkaniowych przez ludność zamieszkującą województwa kujawsko-

-pomorskie, mazowieckie i warmińsko-mazurskie. Badania te zostały przeprowadzone za pomocą metody CAPI. Na podstawie przeprowadzonych analiz stwierdzono, że zasoby i warunki mieszkaniowe w Polsce znacznie odstają od tych występujących w krajach Europy Zachodniej, a na terenie kraju są widoczne dysproporcje w tym zakresie.

Słowa kluczowe: mieszkanie, zasoby, poziom, jakość, gospodarstwo domowe, regionalne zróżnicowanie

THE IMPORTANCE OF CORPORATE SOCIAL RESPONSIBILITY OF ENTERPRISESE IN BUSINESS

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Abstract. The aim of the study was to determine actions that should be undertaken by companies to be seen as socially responsible, and what factors influence on the choice of the employer by respondents. A diagnostic survey method was used including the author's questionnaire, which was tested upon 1,157 residents of Lubelskie Province. The stratified random selection was applied, and discriminant function analysis for statistical calculations. According to respondents, a socially responsible company is such that prefers ethical action, well treats the employees, has a honest relationship with employees and customers, as well as supports charity and ecological organizations. When choosing an employer, earnings, opinion of employees about the atmosphere in the company, and the prospect of the employees development proved to be the most important. Experiences of other countries should be used in Corporate Social Responsibility (CSR) in order to achieve the most practical management methods, while entrepreneurs should be familiarized with the importance of CRS, and take care of the social approval of their company in media, as well as seek to cooperate with the authorities and the local community.

Key words: Corporate Social Responsibility of entrepreneurs, ethical activity, Lubelskie Province

INTRODUCTION

Corporate Social Responsibility (CSR) is a new, voluntary strategy including social, economic, ethical, and ecological aspects of a business in dealing with the environment [Carroll 1979]. It is also an ethical commitment to a business for economic development by improving the life quality of employees and their families, as well as the welfare of society as a whole [Dahlsrud 2008]. The term Corporate Social Responsibility is now widely used in the international business arena [Lindgreen et al. 2009].

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The approach to the business is changing in Poland; it is no longer limited only to multiply profits, but is aimed at non-economic activities, that greatly affect the functioning of a company and determine its quality [Rybak 2004]. Research conducted by MIT Sloan Management Review showed that currently 70% of U.S. companies taking into account the sustainable development in their business plans, have done it for six years, 20% of them – for two years, which undoubtedly is a good omen for Polish enterprises [Kiron et al. 2012].

Business activity affects the whole society and thus entrepreneurs should carry out such activities that would be consistent with the social objectives and values [Bowen 1953] and it is a view not only to the personal interest of the company, but also to the willingness to take the responsibility for social matters [Rabiański 2011].

CSR is a great tool to strengthen the company's position in the market [Handelman, Arnold 1999] by presenting a positive and ethical corporate image in the local community [Sen, Bhattacharya 2001]. Ethics of the company comes directly from the idea of corporate social responsibility and sustainable development. Responsible and sustainable company targets to include ethical standards into strategy and to use them in a conscious way [Paliwoda-Matiolańska 2009].

Motivations to be engaged in social and environmental initiatives vary considerably between companies. Some use CSR as a tool to improve their relationships with stakeholders, while others – as a way to increase operational efficiency, or approach to CSR as morally legitimate actions [Pedersen 2006a, Pedersen, Neergard 2006]. Researchers say that a concern for image of the company is the primary motivation applying CSR. Also, the essential motivations include ethical and moral actions aimed at achieving intended activities within CSR [Poksinska et al. 2003, Pedersen 2006b].

It is accepted that the most important and key issues that affect the development of CSR are: relationships with consumers (74%) and employees (72%), proper organization of work in the company (65%), and honest relationships with customers and business partners (53%) [PARP 2012]. Through systematic monitoring, companies watch effects of their actions aimed at: customers, suppliers, society, employees, and others who have an interest in the company [Lee 2008].

The aim of this study was to determine what actions should be undertaken by Polish companies to be seen as socially responsible. The aim was also to identify factors, respondents focus on, when choosing an employer. The level of corporate social responsibility was determined by means of presenting opinions of Lublin region residents.

MATERIAL AND METHODS

The study applied a diagnostic survey method including the author's questionnaire to test 1,157 respondents from Lubelskie Province. The study was conducted in April 2013. To measure the attitudes, a five-point Likert scale was used after having the construction and validation procedure. The scale reliability index was calculated, in which Cronbach's alpha was 0.87. The criterion for dividing respondents into research groups was the level of their education. Stratified random selection was applied in the sampling procedure. Population was divided taking into account the place of residence: village, town below

20 thousand inhabitants, and urban residents in cities with more than 20 thousand inhabitants [GUS 2012]. In the next stage of sampling, the number of men and women was proportionally determined. These actions allowed for calculating the sample size, in which the confidence level was set at 0.95, estimated fraction size at 0.50, and the maximum error at 0.03. When selecting the sample and taking into account the gender and residence place of studied population, the quota sampling, in which respondents were selected on the basis of their availability, was used.

Of tested respondents, 43.6% were residents of rural areas, 20.2% lived in small towns, while 36.3% – in cities with over 20 thousand residents. In 29.5%, respondents had higher education degree, 59.9% graduated secondary school, and 10.6% had vocational and basic schools education degree. In the age group up to 30 years old, respondents accounted for 53.9%, from 31 to 45 years old – 24.6%, from 46 to 60 years old – 17.0%, and 61 or more years old – 4.5%. Surveyed women accounted for 51.6% of the respondents, while men for 48.5%.

Statistical analyzes were performed using Statistica 8.1 PL software including the discriminant function analysis, that is used for the settlement which variables discriminate the emerging group. Classification functions were used in the form of calculating their coefficients that were determined for each group [Stanisz 2007]. Prior to analysis, the multidimensional normality was examined by verifying each variable for distribution normality. It was assumed that the variables variance matrices are homogeneous in groups. Slight deviations were not so important, because of the large number of respondents in particular groups [Tabachnik, Fidell 1996].

RESULTS

Among seven factors making up the attempt to assess companies as socially responsible in the model of discriminant function, there were five, namely: supporting charities, environment protection, providing jobs, good treatment of employees, and being honest with customers and employees. The total value of Wilks' lambda of discriminant function, as well as calculated values for particular activities were close to 1, which indicates poor discrimination power of these functions. Besides the model, following factors that in respondents' opinion had little impact on the assessment of entrepreneurs, were included: fair tax paying and taking into account the common good by entrepreneurs (Table 1).

Certain classification functions for three groups of respondents showed that the most important factor that determined the company as socially responsible was good treatment of the employees. Value of this factor was similar in all groups of respondents, which indicates no significant differences between them. Values of factor taking into account the fair relation of entrepreneur towards customers and employees were on the same levels. Also in this case, no significant differences between groups were identified. Nearly four times less importance were characterized by activities of companies that were directed at supporting charities and environmental protection. Supporting charities was significantly less important factor for respondents with higher than secondary, basic and vocational education degree. Measures aimed at protecting the environment had significantly greater importance among respondents with higher and secondary education than primary

Table 1. Rank of company activities for social responsibility in the opinion of Lubelskie Province residents (summary of the discriminant function analysis – variables in the model; Wilks' lambda = 0.975, approximate F(12.229) = 2.359, p < 0.005)

Activity	Wilks' lambda	Partial Wilks' lambda	F of introduction	p-level	Tolerance	1-tolerance (R-square)
Supporting charities	0.985	0.989	5.810	0.003*	0.856	0.143
Protecting the environment	0.979	0.996	3.084	0.034*	0.912	0.087
Providing jobs	0.980	0.995	2.823	0.049*	0.914	0.085
Good treatment of employees	0.979	0.996	2.054	0.128	0.780	0.219
Fairness in relation to customers and employees	0.977	0.997	1.185	0.306	0.761	0.238

* significance level at p < 0.050.

Source: Own elaboration.

and vocational education degrees. Providing employment by the employer was the least important among factors chosen for the model. It was significantly more important for respondents with primary and vocational education, than with secondary and higher education levels (Table 2).

Table 2. Rank of company activities for social responsibility in the opinion of Lubelskie Province residents (determination of the classification functions for each group)

| Activity | Respondents with | | |
	primary and vocational education degree (p = 0.106)	secondary education degree (p = 0.598)	higher education degree (p = 0.292)
Supporting charities	1.073	1.090	0.892
Protecting the environment	0.806	1.027	1.071
Providing jobs	0.901	0.756	0.779
Good treatment of employees	4.410	4.697	4.649
Fairness in relation to customers and employees	4.614	4.399	4.417
Constant	28.877	27.041	27.915

Source: Own elaboration.

To examine the activities that have the greatest influence on the choice of employer, 10 factors were selected, from which 5 got into the discriminant function model, namely: prospect of employees development by means of training and courses, honesty employer, company brand, opinion of employees on the working atmosphere, and the amount of offered wages. Value of Wilks' lambda was determined for 0.960 at p < 0.001. Following factors were beyond the discriminant function model: possibility of advancement, good corporate image in the community, size of the company, the company's involvement in social and environmental responsibility of the employer (Table 3).

Table 3. Actions influencing on the choice of the employer by employee in the opinion of residents (summary of the discriminant function analysis – variables in the model; Wilks' lambda = = 0.975, approximate F(12.229) = 2.359, p < 0.005)

Activity	Wilks' lambda	Partial Wilks' lambda	F of introduction	p-level	Tolerance	1-tolerance (R-square)
The prospect of the development – training etc.	0.969	0.991	5.142	0.005*	0.761	0.238
Honesty of the employer	0.965	0.995	2.658	0.070	0.811	0.188
Company brand	0.966	0.994	3.245	0.039*	0.933	0.066
Opinion of the employees on the atmosphere at work	0.966	0.944	3.230	0.040*	0.926	0.071
Level of the proposed earnings	0.964	0.996	2.060	0.128	0.921	0.078

* significance level at p < 0.050.

Source: Own elaboration.

When choosing an employer, the most important factor, according to respondents, was the height of proposed salary. Value of this factor was high in all studied groups. The opinion of employees about the working atmosphere, which was significantly more important for respondents with vocational and basic (4.268) than with higher education degree (4.005), was also of great importance. High average values in the classification function were also ranked by activities related to prospects of workers development, in which respondents with higher education degree (3.115) were significantly the most interested, while to the least extent by respondents with basic and vocational education degree (2.683). The company brand was much less important for respondents when

Table 4. Classification functions related to the choice of the employer by employees with regard to the place of residence

Activity	Respondents with		
	primary and vocational education degree (p = 0.106)	secondary education degree (p = 0.598)	higher education degree (p = 0.292)
The prospect of the development – training etc.	2.683	2.916	3.115
Honesty of the employer	0.790	0.972	0.876
Company brand	1.801	1.247	1.320
Opinion of the employees on the atmosphere at work	4.268	4.185	4.005
Level of the proposed earnings	4.800	5.010	4.886
Constant	30.140	31.147	31.561

Source: Own elaboration.

choosing an employer, which had significantly higher ranks in the group of respondents with primary education and vocational (1.801) rather than higher (1.320) and secondary education level (1.247) – Table 4.

DISCUSSION

The aim of research assumed to identify factors that distinguish a company as socially responsible. It has been shown that for respondents, the most important activity should be ethical, i.e. good and fair treatment of employees and customers by the company. Ethics thus becomes the foundation of CSR, which should be developed through mutual concessions based on the law that functions in a given society. Without this there is no ethics and ethical standards in the company activity [Rabiański 2011].

Supporting charities is one of the most important factors that affects the recognition of the company as a socially responsible business. This is consistent with principles of functioning within CSR, as it is recommended that companies to keep balanced policy in order to increase their benefits, but also to reduce and even to eliminate damages resulting from their activities by investing in social infrastructure, such as building schools and hospitals. These activities are aimed at balancing the effects of business activity through a positive impact on the society, in which they functioning. Lack of such approach can result in a lack of public acceptance for the company's operations, cut it off from resources, and consequently its liquidation [Walsh et al. 2003, Frederick 2006].

An important factor prominent in research, is the support the activities related to environmental protection by businesses. In well-developed countries there is a high willingness to support initiatives for sustainable development of society, including activities related to ecology. It is a sign of a highly developed awareness of taking care of natural and ecologically clean environment, which is necessary for the proper functioning of people. A greater interest in environmental protection among younger respondents is shown, which is confirmed by a negative correlation between age and perception of environmental qualities [Johnson et al. 2004].

The choice of employers problem indicated that amount of proposed wages and employee's opinion on atmosphere at work was focused greatly by respondents with primary and vocational education levels. An important problem for the respondents, is the ability to upgrade their professional qualifications through training courses organized by employer. The study has also raised the problem of the company's brand, which when choosing an employer, the greatest attention was paid by respondents with primary and vocational education degree as well.

Being socially responsible means for individuals and organizations to manifest ethical behavior and to demonstrate sensitivity to the social, cultural, economic, and environmental issues. It is confirmed that the implementation of these behaviors is beneficial for the functioning of businesses. For example, the Asia-Pacific CSR Group was established to support activities related to environmental protection and human resources in this region of the world [Gautam, Singh 2010]. Also, companies in the aviation industry have incorporated CSR into their business structures due to the negative impact of its operation on the environment, and the issue concerned the limitation of pollutants emission and

noise reduction [Cowper-Smith, de Grosbois 2011]. Executives believe that CSR creates a competitive advantage for their businesses, thereby increasing its market share [McWilliams, Siegel 2001].

Today, corporate social responsibility is no longer seen as a moral responsibility of business people, but as a strategic resource that aims to improve the efficiency of functioning between society and corporation [Lee 2008]. Despite the voluntary of CSR introduction, it is not quite voluntary concept, because CSR is a contemporary need for a long-term and stable business development [PARP 2012].

It has been shown that American companies profiting from the use of CSR are more likely to cooperate with external partners, have well-defined business model based on CSR, and most importantly, have a management team who are heavily involved in CSR [Kiron 2012]. The key benefits of CSR are: positive image of the company, motivating employees, income and savings, and good relationship with the environment [PARP 2012].

CONCLUSIONS

1. In activities for sustainable development of Lubelskie Province, systematic study and learn from experiences of other countries in order to achieve the most practical methods of management in accordance with the interests of entrepreneurs, particularly in harmony with a society and environment, in which they function, are extremely important.
2. Trainings and realizing the entrepreneurs, what CRS is, should be carried out. As confirmed by studies, this has been implemented in a perfect way in the United States, where in a short time nearly 90% of companies have started to introduce the principles of CSR.
3. Publicizing the activities established by a company for social responsibility in the media and through the web sites, will bring positive results in a form of good reception of the company and the approval of the local community for these activities.
4. There is a need for the involvement and cooperation of local community representatives, environmentalists, politicians, representatives of local authorities, supported by the preparation of development plans for the region to achieve the sustainable development of society through corporate social responsibility.

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ZNACZENIE SPOŁECZNEJ ODPOWIEDZIALNOŚCI PRZEDSIĘBIORSTW W DZIAŁALNOŚCI GOSPODARCZEJ

Streszczenie. Celem badań było określenie działań, jakie powinny podejmować przedsiębiorstwa, by mogły być postrzegane jako odpowiedzialne społecznie oraz jakie czynniki decydują o wyborze pracodawcy przez respondentów. Wykorzystano metodę sondażu diagnostycznego, a w niej autorski kwestionariusz ankiety, którym przebadano 1157 mieszkańców województwa lubelskiego. Zastosowano dobór losowy warstwowy, a przy wyliczeniach statystycznych analizę funkcji dyskryminacyjnej. Według respondentów, przedsiębiorstwo społecznie odpowiedzialne to takie, które preferuje działania etyczne, dobrze traktuje pracowników, ma uczciwy stosunek do pracowników i klientów oraz wspiera charytatywne i ekologiczne organizacje. Przy wyborze pracodawcy najważniejsze okazały się zarobki, opinia pracowników na temat atmosfery w firmie i perspektywa rozwoju pracowników. W działaniach CSR należy wykorzystywać doświadczenia innych krajów w celu osiągnięcia najbardziej praktycznych metod zarządzania, uświadamiać przedsiębiorcom znaczenie CRS, dbać o aprobatę społeczną firmy w mediach oraz dążyć do współpracy z władzami i społecznością lokalną.

Słowa kluczowe: społeczna odpowiedzialność przedsiębiorców, etyczne działania, województwo lubelskie

THE DIVERSITY OF MARKETING ACTIVITIES ON THE WEBSITES OF POLISH DAIRY COOPERATIVES

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Abstract. The article presents evaluation of marketing activities of Polish dairy cooperatives on their websites. The objective of the research was to determine whether the marketing activities are uniform or differentiated, and what were the differences between the researched websites. In the research the content analysis method was used. In the course of the research the elements of a website were classified into three categories representing marketing functions. Using content analysis, 20 of websites were analysed in terms of websites' elements performing marketing functions of advertising, public relations and sale. The research proves that the Polish dairy cooperatives implement on their websites differentiated marketing activities in terms of the number of the elements and their marketing functions. Some of the researched cooperatives attach greater importance than others to using their website as a marketing tool.

Key words: website, promotion, dairy cooperatives, content analysis, Internet marketing

INTRODUCTION

Specifics of marketing in dairy industry

Dairy industry is an important sector of the Polish agribusiness. Processed dairy products in Poland are to a considerable degree produced by the enterprises that are of co-operative legal form. The Polish dairy enterprises are considered as less efficient comparing to the dairy enterprises in Western Europe. At the same time they lose their competitive price advantages on domestic and international market [Baran 2013]. Therefore the Polish enterprises should look for possibilities of increasing competitive advantage using the non-price instruments.

Changing technological environment causes attempts of enterprises to harness electronic media in their competitive strategies. The Internet is particularly important for enterprises that base their business models on the medium. Nevertheless its importance

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is increasing even for firms that sell FMCG products through traditional intermediaries. Many enterprises spot the opportunity to use a website as a tool for improving their marketing communications, managing brand and develop loyalty.

The Polish dairy cooperatives are similar in terms of legal form, organizational form, and products offered on the market. It may be assumed that the similarity translates into the similarity of marketing activities between their websites. The research attempts to assess marketing activities of dairy cooperatives implemented on their websites. The main objective of the research is to determine whether the marketing activities are uniform or differentiated, and what are the differences between the researched websites.

Website as a marketing tool

Internet marketing is a broad area of the Internet usage in the enterprise marketing strategies. The article is focused on the topic of a company's website that is one of the Internet marketing areas among others, such as display advertising, search engine marketing, and social media marketing.

The websites of Polish companies usually contain some characteristic and common elements, such as [Bonek, Smaga 2012]:
•   "About our firm" which is a description of the firm and its history;
•   "Offer" or "Products", that is a catalogue of offered products with photos and descriptions.
•   "Contact" which includes addresses, e-mail addresses, phone numbers, electronic contact forms, and the other information enabling clients to communicate with a company and its employees;
•   "News", which is an element that includes current information connected with a company and its operation;

The other relatively often occurring elements are: "Information for investors", "Certificates and awards", "Information on business partners", "Price promotions", "Company's branches".

A firm's website combines many elements and features of traditional media. The elements are integrated with each other therefore the marketing effect of a single website is more than the sum of the elements [Hoffman, Novak 2011]. A website has a potential for performing all the marketing mix elements [Winer 2009]. A website offers the opportunities to augment a product [Prahalad, Ramaswamy 2004]. In many firms a website is used as the alternative distribution channel [Bockstedt et al. 2006]. Internet enables more efficient price comparison for customers [Frischmann et al. 2012]. A website can support all the promotional mix instruments, which are advertising, public relations, sales promotion, personal selling, and direct marketing.

However, it is a problematic issue how the elements of websites should be interpreted as regards marketing functions. A firm's website is an important tool of public relations since it enables a firm to act as a journalist and to develop mutual understanding with the company's audiences [Christ 2007]. A firm's website performs advertising functions since it can inform, persuade and remind about products. A company's website can be also considered of having the attributes of both advertising and direct selling since a website encourages potential customers to initiate a dialog with a firm and buy a prod-

uct [Deighton, Kornfeld 2009]. The different views on a firm's website prove, that it constitutes a very complex marketing tool of integrated marketing elements and functions.

A firm's website is a commonly used marketing tool. According to the data of the Main Statistical Office (GUS) at the beginning of the 2012 year 67.6% of the Polish enterprises had their own websites. In the group of big enterprises there were 93.2% of enterprises having a website, comparing with 85.5% of the medium enterprises and 63.2% of small enterprises. In the group of the food industry enterprises the percentage was 53% [GUS 2013]. According to the GUS, the websites played mainly promotional role and were rarely used to perform advanced marketing functions. The selected functions of the food industry enterprises' websites are included in the Table 1.

Table 1.   Selected functions of the websites of food industry enterprises

Functions of websites	Ordering products online	Personal data protection	Product catalogues and price lists	Online tracking of a shipment	Ordering of products according to a buyer specification	Content personalization
Percentage of food industry enterprises	8.6	22.7	44.9	5.4	8.2	3.5

Source: Główny Urząd Statystyczny, 2013. Wykorzystanie technologii informacyjno-(tele)komunikacyjnych w przedsiębiorstwach i gospodarstwach domowych w 2012 r., Warszawa.

Table 1 shows that the relatively advanced elements of websites such as enabling customers to order products online, enabling to track a shipment, content personalization according to the customer profiles and product customization, are rare on the food industry websites.

Having a website is not enough to achieve marketing objectives. To harness the potential of the Internet and its unique features, companies developing their websites should also consider the quality and scope of marketing activities performed on a website. According to the 6C concept, websites to be successful should meet such factors, as [Chaffey et al. 2009]:

- capture – that means attracting to a website as many visitors as possible;
- content – providing interesting and good quality information, so that visitors will like to return to the website in the future;
- community – creating an electronic community of people that will like to meet and interact with each other on the website;
- commerce – websites should support sales of a company. Even if a firm does not sell product via the Internet, still should seek ways of using its website to increase the sales in traditional distribution channels;
- customer orientation – companies should design websites considering the profiles of their target markets;
- credibility – designing websites, firms should find ways of including elements that will increase trust among visitors and ensure potential visitors that the company is credible.

Properly designed and developed website may contribute to the improved brand perception, customer loyalty and increasing sales. Improperly designed website may damage company's image and brand. From the food producers' perspective, it is important that website visitors are highly involved and active in acquiring information [Jiang et al. 2010].

Moreover, the market of food products is competitive. The market model is of monopolistic competition characterized by differentiated products. It is the reason why enterprises should consider their websites as an important tool of achieving competitive advantage and differentiating products on the market.

MATERIAL AND METHODS

The method used in the research was content analysis. The method is defined as the systematic, objective and quantitative analysis of the content of messages [Neudorf 2012]. Content analysis is a research method for making replicable and valid interferences of data to their context [Kripendorff 2012]. The method is often used in the analysis of mass communications.

The method has been employed in studies of human – computer interaction analysis and website analysis [Kim, Kulijs 2010]. The analysis of websites are more complex comparing to the analysis of the content in traditional media. The complexity of website content analysis follows from such features, as [Neudorf 2012]:
• diversity of many content forms that occur at websites;
• various kinds of commercial activities performed on the Internet (e.g. display advertisement, selling, different forms of setting prices, various kinds of marketplaces);
• various methods of website design;
• great number of websites resulting in difficult sampling.
   The research consisted of the following stages:
1. Defining the population. The population was represented by the Polish dairy producers' websites.
2. Initial observation of the websites of dairy cooperatives.
3. Identification of elements of websites that constituted the research variables.
4. Selecting the sample group. The sample of 20 websites was selected randomly from the population of 63 dairy cooperatives that possessed websites according to the list of the Polish dairy cooperatives included on the website www.mleczarstwopolskie.pl of The National Dairy Cooperative Association (Krajowy Związek Spółdzielni Mleczarskich).
5. Counting and coding of the websites' elements. The data were represented by values: 1 – element occurring on a website, and 0 – element not occurring.
6. Statistical analysis of the coded data.
   The content analysis research was conducted in November and December of the year 2013. The addresses of the analysed websites and the names of the cooperatives are included in the Table 2.

Table 2.   The websites selected for the content analysis

No.	Names of the dairy cooperatives	Website addresses
1.	Okręgowa Spółdzielnia Mleczarska w Kowalewie-Dobrzycy	www.osm-kowalew.pl
2.	Okręgowa Spółdzielnia Mleczarska w Głuchowie	www.osmgluchow.com.pl
3.	Spółdzielnia Mleczarska "RYKI" w Rykach	www.smryki.com.pl
4.	Okręgowa Spółdzielnia Mleczarska w Bochni	www.osm-bochnia.com.pl
5.	Okręgowa Spółdzielnia Mleczarska w Łowiczu	www.mleczarnia.lowicz.pl
6.	Okręgowa Spółdzielnia Mleczarska w Stalowej Woli	www.osmstwola.pl
7.	Okręgowa Spółdzielnia Mleczarska w Końskich	www.osm.konskie.pl
8.	Okręgowa Spółdzielnia Mleczarska "MILKAR" w Karczewie	www.milkar.com.pl
9.	Okręgowa Spółdzielnia Mleczarska w Pszczynie	www.osmpszczyna.pl
10.	Spółdzielnia Mleczarska "LAZUR" w Nowych Skalmierzycach	www.lazur.pl
11.	Okręgowa Spółdzielnia Mleczarska w Krośniewicach	www.osmkrosniewice.com.pl
12.	Okręgowa Spółdzielnia Mleczarska w Piaskach	www.osmpiaski.pl
13.	Spółdzielnia Mleczarska Polmlek "Maćkowy" w Gdańsku	www.mackowy.com.pl
14.	Okręgowa Spółdzielnia Mleczarska w Sierpcu	www.osm-sierpc.pl
15.	Średzka Spółdzielnia Mleczarska "Jana" w Środzie Wielkopolskiej	www.jana.com.pl
16.	"JOGO" Łódzka Spółdzielnia Mleczarska w Łodzi	www.jogo.com.pl
17.	Okręgowa Spółdzielnia Mleczarska w Skierniewicach	www.osmskierniewice.pl
18.	Okręgowa Spółdzielnia Mleczarska w Limanowej	www.osm-limanowa.com.pl
19.	Okręgowa Spółdzielnia Mleczarska w Siedlcach	www.osm.siedlce.pl
20.	Spółdzielnia Mleczarska "Mleczwart" w Wartkowicach	www.mleczwart.com

Source: Own research.

In the research, variables represented distinct elements of analysed websites. The variables were classified into three categories representing marketing functions. The categories were named as: Advertising, PR and communities, and Sale and customer support. The variables are presented in the Table 3.

Table 3.   Variables represented by elements counted in the content analysis

Variable category	Variables
Advertising	Catalogue, Photos of products, Advertising slogans, Products described by advertising messaging, Advertising films, Suggestions on product use, Dynamic graphic element in the form of billboard, Information on price promotions, Links in the form of pictures, Information on new products
PR and communities	Logo, About our enterprise, Information on production technologies, Certificates and awards, News, Recipes, Information on a webmaster, Integration with Facebook, English version of a website, Photo gallery, Privacy policy
Sale and customer support	Contact information, Electronic contact form, Location on Google Maps, Online product ordering, Electronic storefront for consumers, Information for business partners, Addresses of shops selling the products for consumers

Source: Own elaboration.

The numbers of variables in each category were: Advertising – 10 variables; PR and communities – 11; Sale and customer support – 7.

RESULTS AND DISCUSSION

The analysed websites were different in terms of the number of elements. The Table 4 presents statistical values calculated for the elements of the websites.

Table 4. Statistical calculations of the elements occurring on the websites

Statistical calculations of the elements of the website			
Minimum	Maximum	Mean	Standard Deviation
7	18	12.05	2.91
% of websites in terms of the number of elements			
70–10 elements	11–14 elements		15–18 elements
30	50		20

Source: Own calculations.

The Table 4 shows that the analysed websites were different in terms of the number of marketing elements. The range between the largest and smallest number of elements is 8. The mean value of elements is about 12, and the standard deviation is about 3. The group of the investigated websites on which the scope of elements was relatively great (15–18 elements) was small, with only 20% of the researched population.

Figure 1 shows the frequency of advertising elements occurring on the analysed websites. The most frequently occurring elements were catalogues with photos of products that were provided by every analysed website. Some of the cooperatives (30%) described products in the electronic catalogue using advertising messaging. On three websites occurred suggestions on the possible ways of a products use. Information on the new
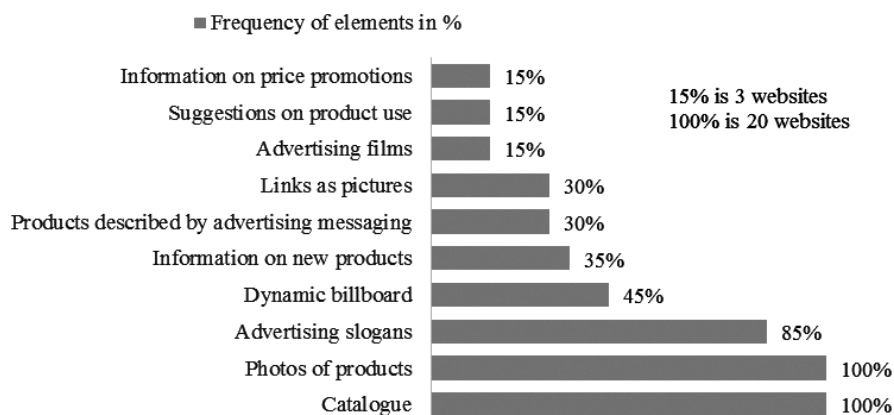
Fig. 1.   The frequency of advertising elements on the analysed websites
Source: Own research.

products being introduced by the cooperatives were found on 35% of the websites. Three of the websites included information on the current price promotions.

Very often occurring, were advertising slogans found on 85% of the home pages. The slogans often featured a theme that stressed taste, tradition, accordance with nature. Less frequently stressed were such features, as quality, product use, unique production technology.

Figure 1 also shows that many of the home pages included dynamic graphic elements of a billboard shape. On 30% of the websites were placed links in the graphic form, which is an element that makes users to perceive a website as more user friendly and of more advanced design.

The next category of variables was named PR and communities and was represented by 11 elements. Figure 2 shows a frequency of the PR elements occurring on the analysed websites.

The most frequently used PR elements were Logo and basic information about enterprise, which occurred on every website. Information on certificates and awards won by an enterprise were provided by 75% of the websites. News that were important information connected with a cooperative operation were included by 45% of the websites. Information on the webmaster were included by 40% of the websites. Recipes of which the main ingredients were products offered, were found on 30% of the websites. The researched websites were very rarely integrated with Facebook. Only three websites had connections with the social portal. The information on privacy policy was also rare.

The third category of elements was named Sale and customer support and was represented by 7 elements. As Figure 3 shows it, the more frequently appearing elements of the category were basic contact information, electronic contact form, and location of the cooperative on Google Maps. The less frequently occurring were such elements, as online product ordering for intermediaries, and information for business partners.

■ Frequency of elements in %

Privacy policy	15%
Integration with Facebook	15%
Photo gallery	30%
English language version	30%
Recipes	30%
Information on production technologies	35%
Information on a webmaster	40%
News	45%
Certificates and awards	75%
About our enterprise	100%
Logo	100%
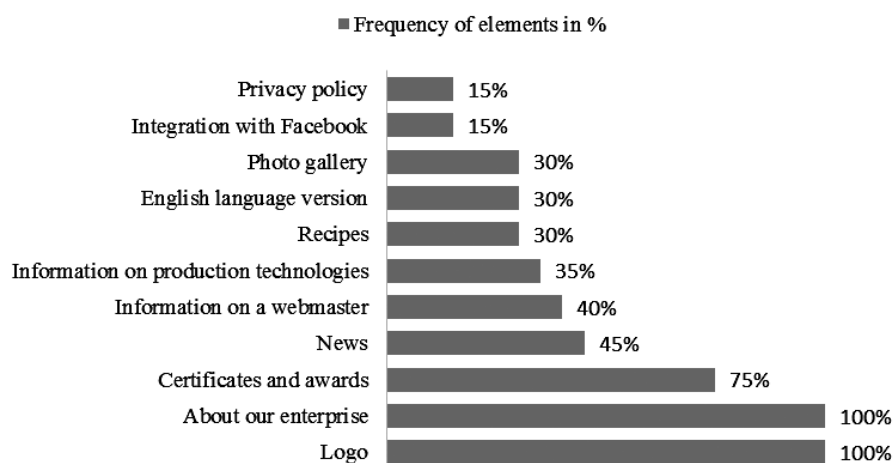
Fig. 2.   The frequency of "PR and communities" elements on the analysed websites
Source: Own research.

■ Frequency of elements in %

Addresses of shops — 5% *
Electronic storefront for consumers — 5%
Online product ordering — 10%
Information for business partners — 25%
Electronic contact form — 40%
Location on Google Maps — 60%
Contact information — 100%

* 5% is 1 website
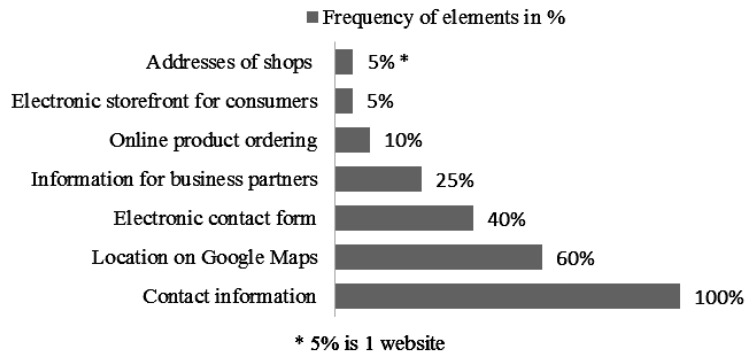
Fig. 3.   The frequency of sale elements on the analysed websites
Source: Own research.

There was one case of an electronic storefront present on a website. The electronic storefront was implemented to sell products to consumers. On one website occurred addresses of shops selling the products for consumers.

CONCLUSIONS

The presented content analysis prove that websites of the Polish dairy cooperatives differ in performing marketing functions. As the research shows, the websites were different in terms of number of elements representing marketing functions.

In the course of the research website elements were grouped into individual categories representing marketing functions. Despite the theoretical difficulties of determining marketing functions performed on a website it was possible to classify the website elements into three categories regarding advertising, PR, and sale functions.

The more differentiating advertising elements, which occurred on the websites were: using advertising messaging in the description of products in catalogues, placing advertising films on a website, suggestions on a product use, using links in the graphic form, information on new products and information on price promotions. The theme of advertising slogans placed on homepages also varied among the websites.

The next important function performed on the analysed websites was PR. The untypical PR elements that differentiated PR function between the websites were: recipes, integration with Facebook, English language version, photo gallery, and privacy policy.

Some of the cooperatives were especially active in using their websites to support sales. The elements that differentiated the sale function between the websites were, such as: information for business partners, information for consumers on shops, electronic store for consumers, and online ordering for intermediaries.

The conducted content analysis prove that the marketing functions on the websites of dairy cooperatives are differentiated between companies. The results show that some cooperatives attach greater importance to their website as a marketing medium and seek opportunities of using it as a tool for performing advertising and PR functions, supporting brand image, and increasing sales.

Comparing the websites according to the 6C concept, it was found that some of the researched cooperatives were especially engaged in the improvement of the content and commerce factors.

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ZRÓŻNICOWANIE DZIAŁAŃ MARKETINGOWYCH NA STRONACH INTERNETOWYCH POLSKICH SPÓŁDZIELNI MLECZARSKICH

Strzeszczenie. W artykule zaprezentowano ocenę działań marketingowych, które polskie spółdzielnie mleczarskie prowadzą na swoich stronach internetowych. Głównym celem badania było określenie, czy działania są zróżnicowana, czy jednolite oraz na czym polegają różnice. W badaniu użyto techniki badawczej zwanej analizą treści. Elementy stron internetowych sklasyfikowano do trzech kategorii reprezentujących funkcje marketingowe.

Wykorzystując metodę analizy treści, przeprowadzono analizę 20 stron internetowych pod względem elementów stron pełniących marketingowe funkcje reklamy, public relations oraz sprzedaży. Badanie pokazuje, że polskie spółdzielnie mleczarskie stosują na swych stronach internetowych zróżnicowane działania marketingowe pod względem liczby oraz funkcji poszczególnych elementów stron. Niektóre z badanych spółdzielni przywiązują większą wagę od innych do wykorzystywania strony internetowej jako narzędzia marketingu.

Słowa kluczowe: strona internetowa, promocja, spółdzielnie mleczarskie, analiza treści, marketing internetowy

DETERMINANTS AND DIRECTIONS
OF THE DEVELOPMENT OF TOURISM IN COMMUNES
FROM THE EASTERN PART OF
WARMIŃSKO-MAZURSKIE PROVINCE

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Abstract. An increased significance of tourism in economy and a growing competition in this area between local government units imply the need for information that would make it possible to identify and assess development opportunities of particular communes. The aim of the research was to assess tourist attractiveness of rural and rural-municipal communes of the eastern part of Warmińsko-mazurskie Province and to identify factors determining their development. Secondary data and information collected by means of a survey were used in the research and analysed statistically. In order to assess tourist attractiveness, synthetic analysis was made with the use of 11 variables. The results made it possible, inter alia, to select three groups of communes with different levels of tourist attractiveness, to define their spatial distribution and to determine the significance of the factors in the development of this economic sector.

Key words: tourist attractiveness, competitiveness, territorial marketing, tourist potential, local development

INTRODUCTION

Currently tourism is one of the important industries of the world contributing to the economic growth [Kim et al. 2006]. Therefore, numerous countries, regions or towns recognise the need for the development of this sector. This development is understood as a positive, desired change of quantity, quality and structure both in spatial and in social systems taking into consideration material and non-material elements. One of the symptoms of such development is an increase in tourist movement in a particular area, which influences an increase in sales and profits of tourist companies, airlines and accommoda-

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tion services, and also of companies indirectly related to tourism. In the latter example this impact on the financial results of department stores or entertainment businesses is much more limited [Chen 2007, Chen, Kim 2010]. The intensity of tourist movement also influences the wealth of local inhabitants and an increase in the local government revenue. In local government units tourism shapes not only income, but also expenditures connected with higher needs, such as road maintenance, cleaning and aesthetics [Derek et al. 2005].

A more important meaning of tourism in the economy of a particular area is determined by its values and activities of local government, community and business entities shaping its attractiveness [Słodowa-Hełpa 2002]. The priorities of initiatives undertaken by local governments do not have to mean their increased financial activity. However, it requires an open, creative and sometimes unconventional approach to the realisation of various initiatives generating low costs or such initiatives whose costs may be transferred to other units. Such an approach creates an opportunity to raise an interest of various entities in the tourist value of a unit. Presently there are many distinguishing features showing the attractiveness of both smaller areas, such as a commune, county or province, and of countries or regions of the world. Differences and similarities between them result from the characteristics of a local community [Meinung 1989], constituting two groups of attributes, i.e. active (dynamic) and passive (static) attractiveness.

Active tourist attractiveness is an interest of tourists in spending time in a particular area [Czyżycki et al. 2012]. This attractiveness may be measured, inter alia, by a number of tourists using accommodation, the number of accommodation places sold or the length of stay. It should be noted that the number of trips to a particular place is a common means of measuring the level of attractiveness but also of the development of tourism in the area [Wang, Godbey 1994]. As far as statistics is concerned, attractiveness is defined by natural and anthropogenic values as well as social infrastructure serving tourists and local inhabitants [Milewski 2005, Meyer 2010]. This potential may be estimated in the qualitative and quantitative form on the basis of statistical data that make it possible to define, e.g. what area in the commune is covered by waters, forests and protected areas.

Tourism in Warmińsko-mazurskie Province plays a significant part in the process of the socio-economic development. Moreover, an increasing area competition [Camagni 2002] raises the need of local governments to search for solutions facilitating the determination of direction and range of activities aiming at more dynamic development leading to a better quality of life of the inhabitants. Achieving this aim is mainly identified as economic development which reaches various levels in various communes. It is connected both with the quality of public services [Zalewski 2000] and with the resources and the ability to manage them [Heffner 2008]. This process also requires proper administration of information [Frąckiewicz 2004] so that decision-makers can compare communes and regions, arrange them, reveal their strengths and weaknesses, search for potential deviations which require correction, and find factors which may serve as an advantage in the competition for tourist demand.

Information gap and practical dimension of information which can be gained and used to define development directions were the determinants of taking up research whose main aims included the following:

1. Selecting similar communes as far as tourist attractiveness is concerned and indicating variables which differentiate them.
2. Identifying development factors and indicating elements of the potential of communes being the most significant for the development of tourism.
3. Describing tourist attractiveness of the eastern part of Warmińsko-mazurskie Province.
4. Finding out whether a commune type (rural-municipal, rural) determines tourist attractiveness.
5. Identifying major areas which local governments focus on in order to develop tourism in their communes.

MATERIAL AND METHODS

The research included 20 rural communes and 11 rural-municipal communes from the eastern part of Warmińsko-mazurskie Province (Table 1).

Table 1. Characteristics of the examined communes

Area (km)	140–199	200–299	300–399	400–640
Number of communes	7	16	6	2
Number of inhabitants	3 000–3 999	4 000–6 999	7 000–9 999	10 000–28 000
Number of communes	9	5	10	7

Source: Authors' own calculation based on data published in work titled Województwo warmińsko-mazurskie 2012 – podregiony, powiaty, gminy" (Warmińsko-mazurskie Province 2012 – sub-regions, counties, communes") by Statistical Office in Olsztyn.

In order to assess differences between the examined communes concerning their tourist attractiveness, secondary, quantitative data were used [Łukaszewicz-Paczkowska et al. 2008, Województwo warmińsko-mazurskie… 2012, Wykaz zabytków… 2013]. This made it possible to evaluate the state of such areas as accommodation and catering infrastructure or the level of interest in staying in this area, taking into consideration environment and anthropogenic factors. With the use of the collected data the following indicators were calculated: $X1$ – accommodation facilities per 100 km^2; $X2$ – number of hotel beds per 100 local inhabitants (Baretje–Defert index); $X3$ – number of tourists using accommodation per 100 local inhabitants (Schneider index); $X4$ – number of accommodation places sold per 100 local inhabitants (Charvat index); $X5$ – number of nights spent by one tourist (length of stay); $X6$ – percentage of forest area in the commune area; $X7$ – percentage of protected areas in the commune area; $X8$ – natural monuments per 100 km^2 of the commune area; $X9$ – percentage of water area in the commune area; $X10$ – number of hotel and catering facilities according to the National Business Registry Numbers (REGON) per 100 local inhabitants; $X11$ – number of historic buildings per 100 km^2 of the commune area.

According to the methodology of the research, the most attractive communes were the ones with the highest values of the aforementioned indicators.

The collected data were supplemented by the results of the survey conducted in the communal councils. The questions included in the questionnaire aimed at defining the priorities in the development of tourism and assessing activities in the seven areas (legal, economic, political, social, technical-technological, geographic-topographic, cultural).

Variables used to define tourist attractiveness and to assess activities were standardised prior to the statistical analysis due to the fact that they had different measurement scales. This made it possible to transform them so that they were independent from the units in which the measurement was made. Statistical analysis was carried out with the use of Statistica programme.

At the beginning of data analysis communes were classified according to the similarity criterion on the basis of the indicators calculated. One of the methods used in this type of research on territorial units is a data clustering method belonging to the group of taxonomic methods [Kropsz 2009, Zygmunt, Mach 2011]. Agglomerative data clustering method made it possible to combine the examined communes without providing the number of clusters and having no earlier knowledge of the structure of dependencies between them. With such an approach, distances between the clusters were estimated with Ward method, based on variance analysis and aimed at ensuring uniformity within clusters and heterogeneity between them. The distances between the objects were measured with Euclidean metric.

Complete realisation of the research aims required cluster analysis, variance analysis, Pearson's Chi-square test, Kruskal–Wallis test and Thurstone's scaling method within statistical analysis.

RESULTS

According to the research methods applied, communes were grouped with agglomerative data clustering method taking into consideration tourist attractiveness defined by eleven variables. The point of division was set on the basis of agglomerative distance between clusters, where its increase was the highest (Fig. 1), i.e. between 8 and 12.

Next, on the basis of the analysis of dendrogram (Fig. 2) taking into consideration the assumed rules of division, three groups (clusters) of relatively uniform communes were selected. The first group appeared to be the smallest. It included 6 communes, i.e. 3 rural-municipal (Mikołajki, Ruciane-Nida, Ryn) and 3 rural (Giżycko, Kruklanki, Piecki). The second group was bigger and included 9 communes, i.e. 4 rural-municipal (Węgorzewo, Korsze, Reszel, Olecko) and 5 rural (Budry, Barciany, Kętrzyn, Sorkwity, Kalinowo). The last group was the biggest and included 16 communes, i.e. 12 rural (Miłki, Wydminy, Pozezdrze, Mrągowo, Banie Mazurskie, Dubeninki, Kowale Oleckie, Świętajno, Wieliczki, Ełk, Prostki, Stare Juchy) and 4 rural-municipal (Biała Piska, Orzysz, Pisz, Gołdap), which constituted 51.6% of all the units examined. On the basis of the calculated $Chi^2 = 1.636$ (df = 2; p = 0.441), it may be concluded that the inclusion of the commune in one of the three groups is not connected with its type, i.e. whether it is a rural or rural-municipal commune. Therefore, both variables should be treated as independent ones in this case.
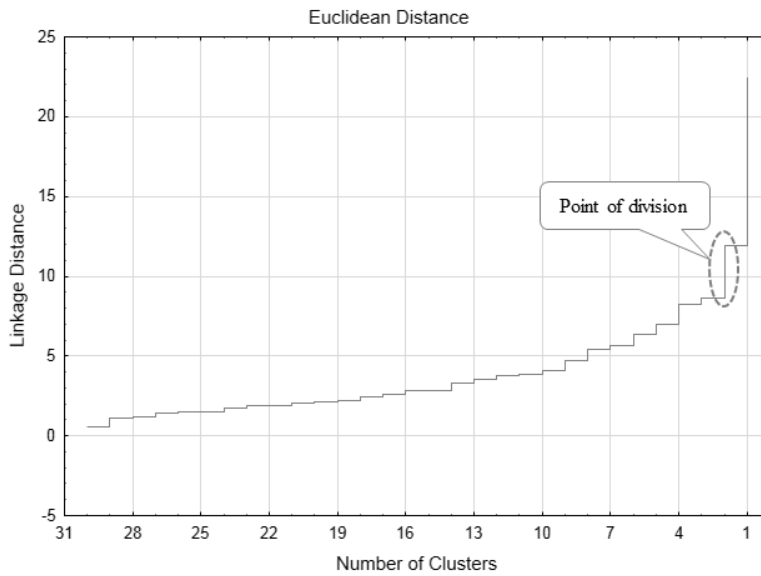
Fig. 1.   Distances between clusters with reference to the stages of cluster creation in particular communes

Source: Authors' own calculation with the use of Statistica software.
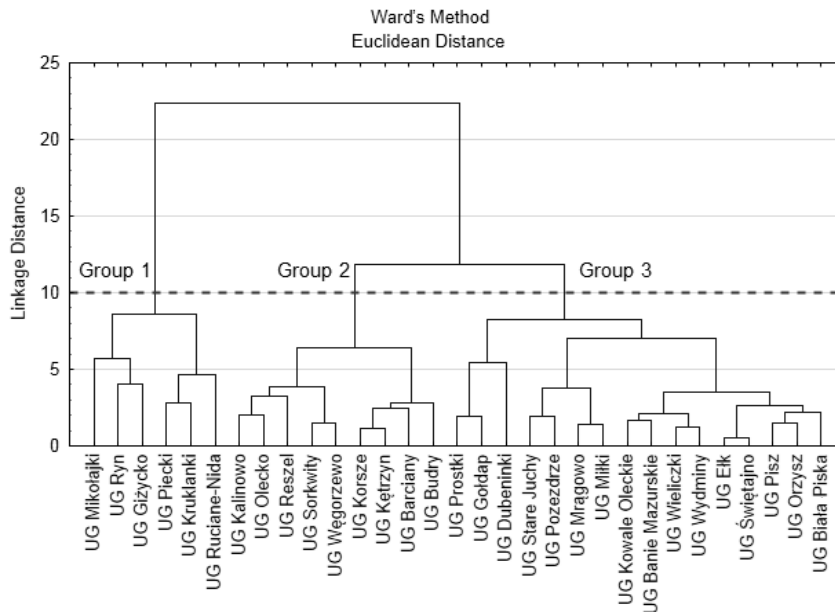

Fig. 2.   Dendrogram of the typology of communes with regard to their tourist attractiveness

Source: Authors' own calculations with the use of Statistica software.

The variance analysis of the variables describing tourist attractiveness made it possible to define which of them diversify the selected groups significantly. The established division shows significant differences concerning 10 out of 11 variables, including six at the level of $p < 0.001$, four at the level of $p < 0.01$ and one at the level of $p < 0.05$. Only X5 variable – called the length of stay in a particular commune – appeared to be statistically insignificant ($p = 0.255$). Statistical dispersion of this variable within the group was considerable, while the dispersion between groups was slight. Baretje–Defert index (X2) was the variable which was the most uniform internally and at the same time diversified particular groups (Table 2).

Table 2. The variance analysis of the variables describing tourist attractiveness in the selected groups of communes

Variable	Between SS	df	Within SS	df	F	p
X1	18.22	2	11.78	28	21.65	0.000
X2	24.35	2	5.65	28	60.39	0.000
X3	14.40	2	15.60	28	12.92	0.000
X4	14.66	2	15.34	28	13.39	0.000
X5	2.79	2	27.21	28	1.43	0.255
X6	9.28	2	20.72	28	6.27	0.006
X7	8.22	2	21.78	28	5.28	0.011
X8	9.68	2	20.32	28	6.67	0.004
X9	9.39	2	20.61	28	6.38	0.005
X10	17.44	2	12.56	28	19.45	0.000
X11	14.10	2	15.90	28	12.42	0.000

Full names of the variables are included in the previous part of the work titled Material and methods.

Source: Authors' own calculations.

On the basis of the profiles (Fig. 3) showing differences within particular variables, the selected groups were described in terms of tourist attractiveness:
- Group 1 – consists of communes which are popular among tourists, possess numerous natural values but a small number of historic buildings. There is also a big number of hotel and catering facilities.
- Group 2 – consists of communes with a low hotel and catering potential and a low natural potential with a big number of natural monuments. This area is rich in historic buildings.
- Group 3 – consists of communes with a low hotel and catering potential and an average natural potential with a small number of historic buildings and natural monuments.

While analysing the spatial distribution of the selected groups of communes (Fig. 4), it may be noted that the communes which are most popular among tourists (Group 1) constitute a zone separating the remaining two groups of communes. On the western side there is a majority of communes (7 out of 9) belonging to Group 2 with a low level of
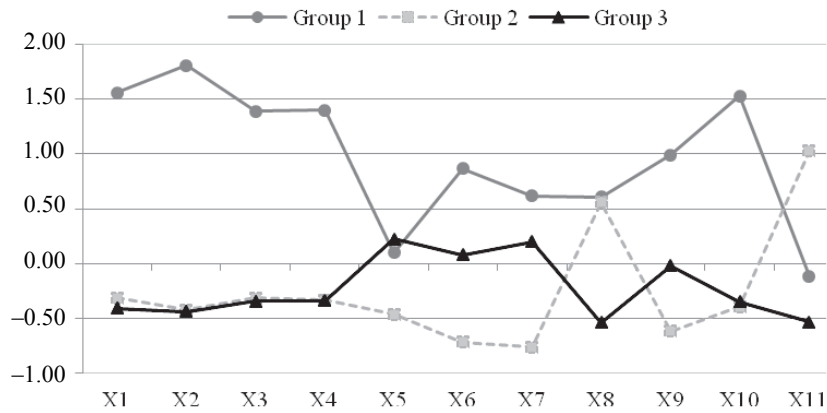
Full names of the variables marked with X1, X2 etc. are included in the previous part of the work titled Material and methods.

Fig. 3.   Profiles of standardised mean values of the variables in the selected groups of communes
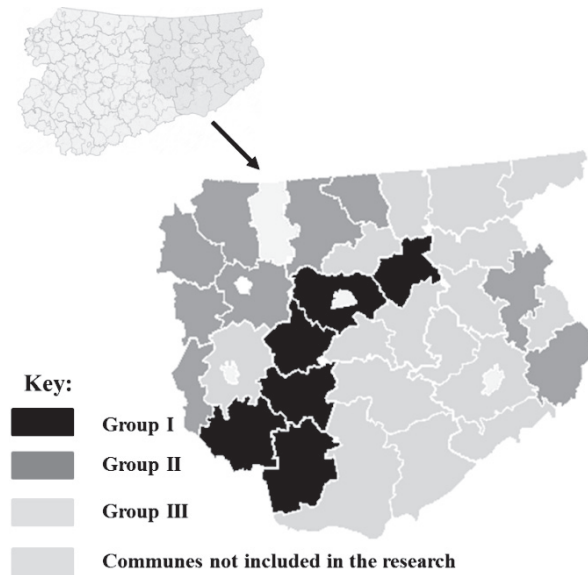
Source: Authors' own calculation.

Fig. 4.   Spatial distribution of the examined communes of Warmińsko-mazurskie Province with regard to the division into groups

Source: Authors' own calculations.

tourist interest and limited natural values but with a high potential concerning the number of natural monuments and historic buildings. On the eastern side there are communes with a low concentration of tourist movement and average natural potential as well as a low number of natural monuments and historic buildings.

In order to determine which tourism development factors are the most significant, a range scale was used (1 – the most important, 6 – the least important). Thurstone's method made it possible to identify transitional relations, i.e. to indicate preferences towards particular factors which, according to commune councils, determine the development of tourism, and to indicate differences (distances) between these factors (Fig. 5). The results revealed that natural values are the most important for the development of tourism in all the communes but their level of significance differs. The highest level was noted in Group 2 (4.42) and Group 1 (3.65), while the lowest level in Group 3 (1.62). Another difference revealed is the importance of tourism development factors in particular groups. The representatives of local governments responsible for the development of tourism interviewed in the research responded that, apart from natural values, tourism is also influenced by hotel facilities and historic buildings (in Group 1) or by historic buildings only (in Group 2). However, in Group 3 all factors, apart from natural values, are nearly uniform and are close to the least significant factor, i.e. transport infrastructure. This may indicate that all the factors, except for natural values, are perceived as having little significance in the development of tourism (Fig. 5).
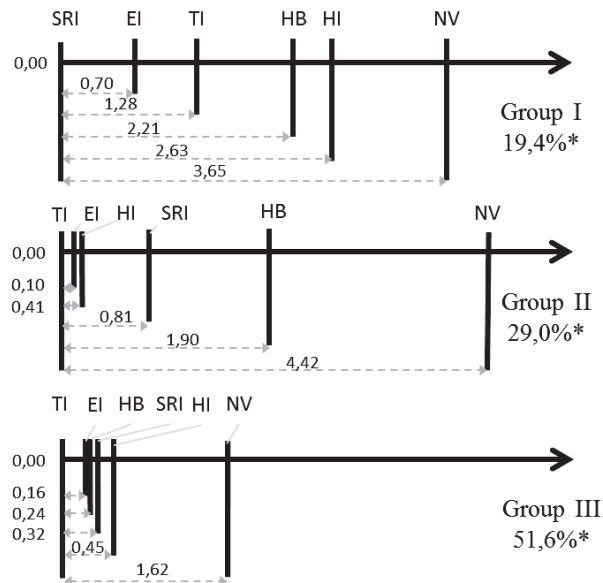
SRI – Sports and recreation infrastructure; EI – Entertainment infrastructure ; NV – Natural values ; HB – Historic buildings; HI – Hotel infrastructure; TI – Transport infrastructure; *percentage of the examined communes.

Fig. 5.   The significance of particular factors in the development of tourism in the groups of communes (one-dimension comparison scale)

Source: Authors' own calculations with the use of Statistica programme.

In order to define to what extent communes focus on activities in the seven areas, a questionnaire with a five-grade evaluation scale, where 1 was the least important and 5 – the most important, was used. The areas were as follows:

– legal (changing the functioning of local government institutions, facilitating tourist activity);
– economic (financial support of initiatives that develop tourism);
– political (attitude of local governments to new tourist investments);
– social (attitudes of the society towards tourism);
– technical-technological (technical and infrastructural development in the region);
– geographic-topographic (the use of natural resources, the shaping of the area and location for the development of tourism);
– cultural (supporting initiatives aiming at preserving and developing cultural heritage as well as an access to them).

The data presented in Table 3 show that the examined groups do not differ significantly in any of the areas in terms of focusing on activities promoting tourism in the area.

Communes from Group 1 and Group 3 mostly focus on activities realised in the area which was defined as "geographic-topographic", including, inter alia, preparing, promoting and making accessible the existing natural values. Communes classified in Group 2 mostly support activities in the area of broadly understood cultural heritage. All the examined communes, regardless of the classification to the group, focus the least on the legal area which aims at creating institutional and legislative support facilitating activities in tourism sector (Table 3).

Table 3. Focus of communes on activities facilitating the development of tourism in seven areas

Area	All communes without division into groups ($n = 31$)		Group 1 ($n = 6$)		Group 2 ($n = 9$)		Group 3 ($n = 16$)		Kruskal–Wallis test (df = 2, $n = 31$)	
	x	SD	x	SD	x	SD	x	SD	H	p
Legal	2.94**	1.12	2.67**	0.52	2.89**	1.05	3.06**	1.34	0.494	0.781
Economic	3.94	1.06	4.50	0.84	4.00	0.71	3.69	1.25	2.508	0.285
Political	3.90	1.14	4.33	0.82	3.89	1.05	3.75	1.29	0.859	0.651
Social	3.35	1.14	3.00	0.89	3.44	1.33	3.44	1.15	0.976	0.614
Technical-technological	3.48	1.15	3.67	0.82	3.33	1.12	3.50	1.32	0.298	0.861
Geographic-topographic	4.48*	0.96	4.83*	0.41	4.67	0.50	4.25*	1.24	1.181	0.554
Cultural	4.10	1.16	4.00	1.10	4.78*	0.44	3.75	1.34	4.434	0.109

*the biggest focus; **the smallest focus; x – arithmetic mean; SD – standard deviation.

Source: Authors' own calculations.

DISCUSSION AND CONCLUSIONS

The research made it possible to distinguish three groups of communes taking into consideration their general attractiveness that stems both from being interested in staying in a particular commune and from tourist potential of the communes. The first region selected may be called a tourist attractiveness leader. It is very interesting for tourists and has a high natural potential. The second group of so-called particular values includes communes which have an unsatisfactory level of tourist infrastructure but have a specific natural and anthropogenic potential. The third group is a region of natural environment potential. Just as in the previous group, this is an area with big deficiencies in tourist infrastructure but having a big natural potential. Taking into account the selected regions (groups), it cannot be firmly concluded which of the areas is the most attractive for tourists. It happens that areas which are predisposed to draw attention of tourists are not so popular, while the ones with worse natural environment values but with a well-developed hotel infrastructure are popular among tourists [Bąk, Wawrzyniak 2012]. A multi-characteristic analysis makes it possible to analyse attractiveness not only with regard to values, but also differences in the area which, under certain circumstances, may generate higher or lower interest of various groups of tourists.

On the basis of the results it may be concluded that communes from Groups 2 and 3 need to have their hotel and catering infrastructure as well as tourist activity developed while in Group 1 the existing hotel infrastructure is not fully used. It is worth noting that among the examined communes, especially the neighbouring ones, there is also a possibility of mutual completion of potentials. This, in turn, may increase the chance for attracting more tourists, lengthening their stay or gaining new groups which have not been interested in this region so far. One of the ways to realise these assumptions is to build products within the natural and anthropogenic diversity existing in a particular unit [Warmińska et al. 2012].

The area of Warmińsko-mazurskie Province is one of the most attractive areas for tourists. Its high attractiveness is caused by natural, landscape, cultural and ethnic, architectural and historic values [Karbowiak 2008]. To a certain extent these values influence the fact that local governments perceive climate and geographical location as the main factors of socio-economic development [Babuchowska, Kisiel 2006]. The proximity of traffic routes and areas of direct impact of big cities is of particular significance [Pomianek 2010]. Such dependence cannot be noted with regard to the development of tourism, since attractiveness defined by being included in one of the three groups is independent of the type of commune. It proves that the tourist potential of the analysed units varies a lot and that the level of urbanisation is independent of the type of attractiveness represented by the communes. However, geographic location seems to influence the type of attractiveness to a large extent [Bąk, Wawrzyniak 2012]. Communes located in the central part of the examined area are so-called attractiveness leaders, communes from the West are the region of particular values, while these from the East have a natural environment potential.

The importance and meaning of particular factors determining the development of tourism in the analysed groups of communes vary a lot. Comparative analysis indicates that Groups 2 and 3 must redefine priorities and reinforce their importance in order to attract tourists in the competition with Group 1 communes.

The examined units mainly focus on activities in the geographic-topographic and cultural area. This is justified by the need to create brand original tourist products determined by nature and culture [Batyk 2011]. Activities in legal area are the least emphasised and are not politically, financially and socially justified. Their small significance may result from the lack of possibility to make fast progress, from the fact that the possibilities in this area have been used up or there are no ideas worth implementing. The fact that it is impossible to define clearly the reasons for such a low interest of the government in this field opens new areas of research.

It may be concluded that the suggested dynamic-static approach to the assessment of tourist attractiveness made it possible to identify similar territorial units regarding their tourist potential, to show their spatial distribution and to reveal differences occurring between the selected groups of communes. The research enabled us to reveal differences in perceiving the significance of factors influencing the development of tourism and to define to what extent communes focus on activities realised within the distinguished components. The results as well as holistic approach to the analysis of attractiveness provide information which, in a long term, will help to compare development changes in the examined units. Additionally, it makes it possible to establish priorities of the development and activities and to monitor their implications at the same time using this knowledge to stimulate the development of communes.

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UWARUNKOWANIA I KIERUNKI ROZWOJU TURYSTYKI W GMINACH WSCHODNIEJ CZĘŚCI WOJEWÓDZTWA WARMIŃSKO-MAZURSKIEGO

Streszczenie. Wzrost znaczenia turystyki w gospodarce oraz nasilająca się rywalizacja między jednostki terytorialnymi w tym obszarze implikuje zapotrzebowanie na informacje pozwalające zidentyfikować i ocenić możliwości rozwojowe poszczególnych gmin. Celem podjętych badań była ocena atrakcyjności turystycznej gmin wiejskich i miejsko-wiejskich wschodniej części województwa warmińsko-mazurskiego oraz identyfikacja uwarunkowań

determinujących ich rozwój. W przeprowadzonych badaniach wykorzystano dane wtórne oraz informacje zgromadzone w trakcie badań ankietowych, które następnie poddano analizie statystycznej. W pracy do oceny atrakcyjności turystycznej wykorzystano syntetyczny miernik składający się z 11 zmiennych. Uzyskane wyniki pozwoliły między innymi na wyodrębnienie trzech grup gmin charakteryzujących się odmienną atrakcyjnością turystyczną, określenia ich przestrzennego rozmieszczenia oraz ustalenia znaczenia czynników, jakie mają dla rozwoju tego sektora gospodarki.

CONTENTS
SPIS TREŚCI