

DIVERSITY OF ECONOMIC SAFETY OF RURAL COMMUNES OF EASTERN POLAND IN 2009-2018

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Abstract. Economic security is of interest to both economics and other social sciences. This is due to the interdisciplinary nature of economic security, but also different research perspectives. Economic security is expressed primarily in the economy's ability to survive and develop. The greater the economic potential of the economy, the more secure and stable its economy is. Financial resources are the basis for the operation and implementation of current and development tasks. The aim of the article is to assess the diversity of economic security of rural communes using a synthetic measure. Empirical data were collected in spatial terms of 484 rural communes of the Eastern Poland region for 2009-2018. The analysis showed that rural communes of eastern Poland are characterized by significant disparities in the field of economic security. It seems that the main reason for the relatively small impact of financial conditions on economic security is their strong dependence on transfer revenues transferred from the state budget and the amount of current expenditure. The above circumstances stiffen and stabilize the financial economy, making it relatively less susceptible to the influence of other factors. The obtained results may constitute an important source of information for local government authorities on the disproportions existing between units, for determining potential directions of optimization of the local finance structure.

Key words: security, economic security, financial security, commune, synthetic measure.

JEL Classification: D74, D81, F52, F62, H12

1. Introduction

Economic security and development are two basic dimensions of the existence of individuals and entire communities. These two dimensions are mutually conditioning. J. Sperling and E. Kircher believe that economic security means the ability of the state (region) to defend the social and economic structure of society. It represents the ability of states to regulate the market effectively and maintain the integrity of society, or to cooperate with others to establish an international economic environment (Sperling, Kircher, 1998). They can be understood as the sum of conditions ensuring stability and prosperity of management processes, both on a microeconomic and macroeconomic scale (Pięta, 2009). In studies in the field of social sciences we can find the concept of security as the ability to survive, independence, identity and development.

The local dimension of security includes systemic security, social order, personal security, public security, public order, financial security. They include specific

to the local community: needs, problems, possibilities and forms of activity. It can be concluded that the standard of meeting the needs of residents on a local scale that forms the basis of their safety (e.g. ensuring public order, access to educational and educational institutions, care for the local labor market, access to social assistance services in crisis situations, ensuring access to services medical (Fehler, 2009). In local terms, security concerns people, groups of people, various organizations, and formalized and territorially recognizable administrative and state structures such as commune, powiat, and voivodeship (Kitler, 2010; Stańczyk, 1996).

One of the factors affecting economic security is the state of finances of local government units. Communes, powiats and voivodeships perform public tasks on their own behalf and at their own responsibility. This requires local government units to have the necessary funds to carry out the tasks.

The aim of the article is to assess the diversity of economic security of rural communes using a synthetic

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measure and taking into account financial, economic and social variables. The standard method was used to build synthetic measures. The aggregated value of the synthetic variable facilitates the comparison of objects in multidimensional spaces, but also allows their arrangement due to the studied phenomenon. Empirical data were collected in spatial terms of 484 rural communes in the Eastern Poland region (Lubelskie, Podlaskie, Podkarpackie, Świętokrzyskie and Warmian-Masurian Voivodeships). In the case of municipalities, the choice of variables was largely determined by the availability of secondary data collected in a municipal system at the Local Data Bank of the Central Statistical Office (BDL GUS) for 2009-2018.

2. Methods of research

Determinants of the economic development of communes are interactive. They are a set of interrelated factors that create a multidimensional space. They should be seen as a set of interdependent variables that occur in the same time and space horizon. The study distinguished the following categories characterizing the economic security of municipalities: entrepreneurship, infrastructural demographic and labor market and the environment.

In the process of building a synthetic measure, the following stages can be distinguished:

I. Selection of variables describing the examined objects and determining the direction of preference for simple variables in relation to the general criterion under consideration, dividing them into stimulants, destimulants. Having information about objects at your disposal, you can create a data matrix. It was presented in the form of an observation matrix:

$$X_{ij} = [x_{11} x_{12} \dots x_{1m} x_{21} x_{22} \dots x_{2m} \dots \dots x_{n1} x_{n2} \dots x_{nm}] \quad (1)$$

where: X_{ij} means the values of j -th variables for the i -th object, i is the object number ($i = 1, 2, \dots, n$), j is the variable number ($j = 1, 2, \dots, m$).

The process of verification of variables is aimed at extracting from the extracted variables such that, from the point of view of the analyzed complex phenomenon, bring the largest information and differentiating values in relation to the considered objects. From the set of variables, those characterized by low variability (according to the coefficient of variation, the limit value was adopted at the level of 0.10) (Młodak, 2006) and high correlation of variables (according to the inverse correlation matrix method) (Malina, 2004) were removed. Diagnostic features (measurable, complete and available) are considered to be those, which, in the light of substantive knowledge about the studied phenomenon, are the most important for comparative analysis of objects (Panek, 2009).

II. Replacement of destimulants with stimulants and standardization of variables (Łuczak, Wysocki, 2005).

Variable destimulants were replaced with a stimulant, counting its inverse by formula;

$$X'_{ij} = \frac{1}{X_{ij}} \quad (2)$$

where: X_{ij} is the original value of the destimulant, X'_{ij} is the value of the destimulant transformed into a stimulant.

Diagnostic variables usually have different titers and different ranges of variation, which prevents them from being directly compared and even less added (Walesiak, 2005). Stimulants were subjected to the unitarisation procedure zeroed according to the formula:

$$\text{for stimulants when } z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} \text{ when } x_i \in S \quad (3)$$

where: S is stimulant, $i = 1, 2 \dots n$; $j = 1, 2 \dots m$, $\max x_{ij}$ is the maximum value of j -variable, $\min x_{ij}$ is the minimum value of j -variable, x_{ij} means value of j -trait for the tested unit (Kukuła, 2000). The tests were carried out in a dynamic way, determining the $\min \{x_{ij}\}$ and $\max \{x_{ij}\}$ values for the entire period, i.e. 2009-2018. After the transformation, diagnostic variables are standardized in the range $[0; 1]$, which allows them to be compared (Grabiński, Wydymus, Zeliaś, 1989).

As a result of the unitarisation process, the matrix of property values was obtained:

$$Z_{ij} = [z_{11} z_{12} \dots z_{1m} z_{21} z_{22} \dots z_{2m} \dots \dots z_{n1} z_{n2} \dots z_{nm}] \quad (4)$$

where Z_{ij} is the unified value of the j -th variable for the i -th object

III. Calculation of the synthetic measure using the reference-free method. The value of the synthetic measure is estimated using aggregate functions, whose analytical form can be different. The synthetic measure determined using the standard method is to average the normalized values of simple features, according to the formula:

$$S_i = \frac{1}{p} \sum_{j=1}^p z_{ij}; i = 1, 2, \dots, p,$$

where: S_i is the synthetic measure in the examined period, z_{ij} means features of the structure of the synthetic indicator, p is the number of features. The indicator takes the value from the range $[0,1]$. A value closer to unity means that the object is characterized by a high level of the analyzed phenomenon (Dziekański, 2016), whereas when the values are closer to 0 – the object is less developed in the examined respect (Trojak, Tokarski, 2013).

IV. In the last stage, the studied area was divided into typological groups. The first, second and third quartiles were used as threshold values. The size of the synthetic measure in the first group means a better unit, in the last one the weakest. Correlation coefficient (Pearson) was assessed. A scatter plot with a fit line for synthetic measures was also presented, and a linear regression analysis was performed (Trojak, Tokarski, 2013).

3. Economic safety as a dimension of operation of communes

Economic security (with its financial, raw material and energy, food) is a very broad concept. It is such a state of reality in which harmonious development of the economy and ensuring an adequate standard of living for citizens through uninterrupted access to raw materials, markets, capital, modern technologies and information are possible (Książkowski, 2011). Economic security is an endogenously and exogenously balanced state of the economy's functioning, in which the occurring risk of imbalance is maintained in designated and acceptable organizational and legal norms as well as principles of social coexistence (Raczkowski, 2012). Economic security is the ability of the state's economic system to make use of internal development factors and international economic interdependence that will guarantee its undisturbed development (Frejtag-Mika, Kołodziejak, Putkiewicz, 1996). The notion of economic security reflects not only the compatibility of certain economic figures, but also numerous challenges and threats that must be overcome by the efforts of society as a whole. Challenges and threats have their source both in the internal system of a given country and more and more often result from the development and functioning of the global economy. Economic security is the result of economic development factors and barriers limiting it, the state of the economy and its structure as well as economic relations enabling effective opposition to negative external actions. Therefore, this is the general state of economic dependence determining the degree of external economic interference in internal economic development (Stachowiak, 2012).

Financial security is a state of (non-risk) that gives a sense of certainty in the functioning of the entity and a chance for its development, or an intermediate state in building financial independence. It means no threats in the sphere of public finances, corporate finances, insurance, banking or personal finances of households (Bartkowiak, Ostaszewski, 2004). The financial security of an entity is determined by its behavior and its financial position.

R.I. Berne and R. Schramm include the main conditions of the financial situation among others local community needs, supply sizes and distribution directions for local public goods and services, wealth of the society, way of conducting financial policy (Berne, Schramm, 1986). X. Wang, L. Dennis and Y. Sen believe that the socio-economic environment is only one factor that should be taken into account when analyzing the financial situation (Wang, Dennis, Sen, 2007). The financial situation is a relative assessment of the commune's finances, i.e. the possibilities to ensure financial security. This security includes the ability to perform tasks and credibility regarding the ability to pay both current and future obligations (Stanny, Strzelczyk, 2018). The financial

situation cannot be described with one indicator based, for example, on the financial statements or the budget. Knowledge of the current state of finances allows local authorities to make comparisons with other entities and is helpful in making financial decisions.

The role of communes in the responsibility for building and maintaining the economic security of each society boils down to conducting appropriate socio-economic policy and making efforts to ensure access to goods and services of the basic consumer basket at a basic level (Duczowska-Piasecka, 2017). A commune is a basic territorial unit whose purpose is to meet the basic needs of local communities and to provide appropriate conditions for the activity and development of economic entities operating on its territory or socio-economic development (Springer, Walkowiak, Bernaciak, 2020). Adequate financial resources at the disposal of the commune are necessary to implement the development and needs of local communities (Prus, Dziekanski, 2019). It is pointed out that this development should be based on local resources, including local development factors (Korenik, 2003). The commune is forced to constantly adapt to changing environmental conditions, seek competitive advantage in the development process in all aspects of its activity (Ryńca, 2009). Financial resources are the basis for the operation of local government units, conditioning the implementation of their current and development tasks. Their analysis allows not only to assess the structure of the budget itself, but also indirectly provides information on the state of the local economy. Finances allow a comprehensive assessment of the operation of municipalities and its development opportunities.

4. Results

Economic security is directly connected with the issue of socio-economic development of the state. Economic security is constantly changing, which results from the specifics of the market economy, for which, among others, cyclical fluctuations.

The value of myths of synthetic economic security of rural communes in eastern Poland in 2018 was from 0.13 (Miączyn, the weakest unit) to 0.46 (Stawiguda, the best unit), and in 2009 from 0.11 (Miączyn) to 0.40 (Stawiguda). The range of distribution was in 2018 (range 0.33) higher than in 2007 (range 0.29), which may indicate an increase in the diversity of rural communes in the studied area.

The histogram (Figure 1) indicates a distribution model for the synthetic measure of development, left-skewed in 2009 and 2018 (average > median; $0.19 > 0.18$; $0.23 > 0.22$, Table 1). The municipalities have a safety measure below the average value. The most numerous range in 2009 was 0.15-0.20 (232; 48%), while in 2018 0.15-0.20 (177; 37%) and 0.20-0.25 (175; 36%), which means that there is a dominant in this range.

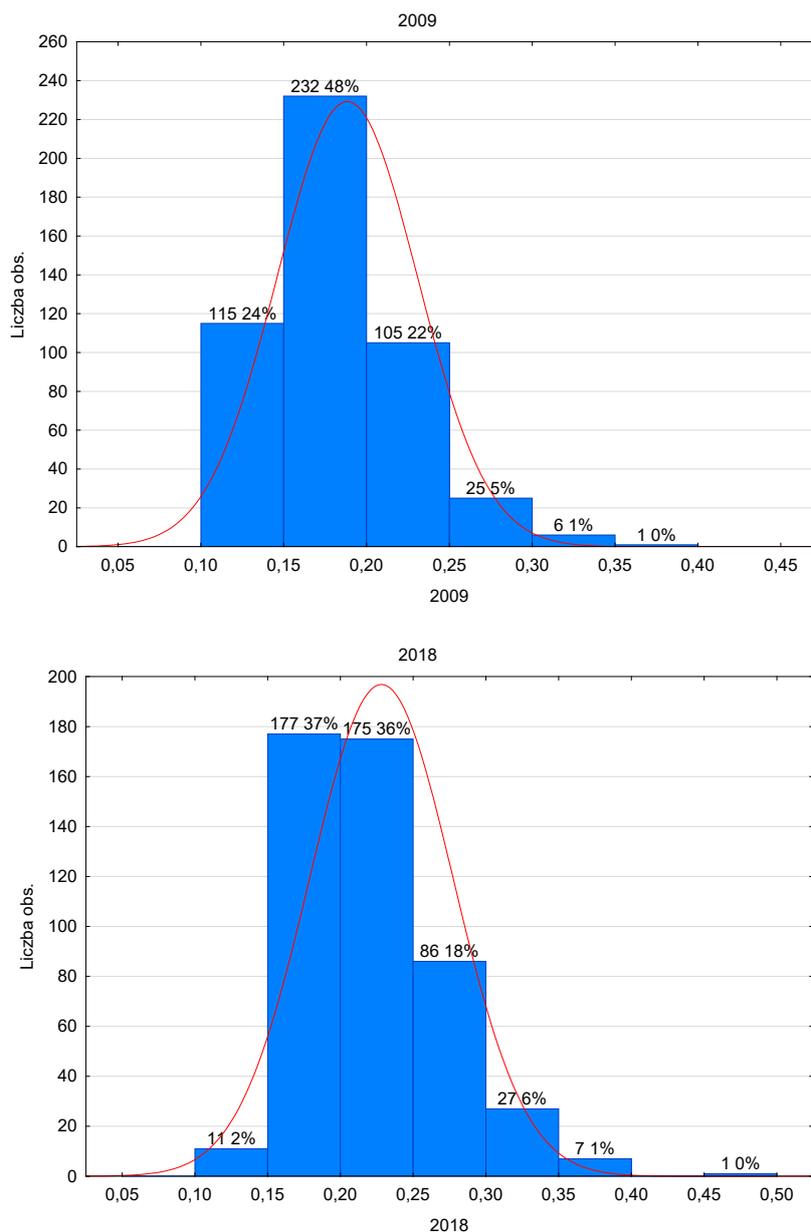


Figure 1. Synthetic measure of economic security of rural communes Eastern Poland in 2009 and 2018

Source: own study

The dispersion analysis (Figure 1) of the measure of economic security of rural communes in eastern Poland in 2009 and 2018 indicates a slight increase in diversity. This is indicated by the range (0.29-0.33), quartile range (0.05-0.06), standard deviation (0.04-0.05). The phenomenon stability is indicated by a coefficient of variation (0.22-0.22), a quarter deviation (0.03-0.03).

The Pearson correlation coefficient in 2018 in relation to 2009 between the value of the measure of economic security and the financial situation was 0.473 and 0.584 (Figure 2). The ability to generate income from own sources affects sustainable development and allows for more flexible spending on investment purposes.

Therefore, the good financial condition of municipalities ensures economic security and freedom of action.

The synthetic measure of the economic security of rural communes in eastern Poland was correlated with own revenues and transfers from the state budget (revenues from subsidies and subsidies). The financial situation relates to the general economic development and the ability of the individual, including to accumulate sufficient financial resources, to provide public services and to manage debt. It indicates the ability to meet your own administrative and investment needs, which means maintaining and developing your own assets in line with current and future public service demand. It

also determines the possibilities of the commune and its investment policy. Regions located peripherally with respect to the central center are characterized by, among others the effect of leaching social potential (sucking the potential from the periphery to the central center), which is manifested in a negative migration balance. Adequate economic potential increases economic security, living standards, better social situation, and greater public security. The commune's potential, resulting from a combination of local conditions, determines its possibilities and development directions. The socio-economic potential factors that were positively correlated with the measure of economic security are presented in Table 2.

To assess the impact of the variable financial situation of rural communes of Eastern Poland voivodeships on the diversity of the synthetic measure of economic security (taking into account the values of correlation

Table 1
Statistical characteristics of a synthetic measure security of rural communes Eastern Poland in 2009 and 2018

	2009	2018
min	0.11	0.13
max	0.40	0.46
range	0.29	0.33
average	0.19	0.23
median	0.18	0.22
standard deviation	0.04	0.05
quartile deviation	0.03	0.03
coefficient of variation	0.22	0.22
quartile range	0.05	0.06
quartile 1	0.16	0.19
quartile 2	0.18	0.22
quartile 3	0.21	0.25
asymmetry	1.12	0.88
kurtosis (measure of concentration)	1.75	0.98

Source: own study

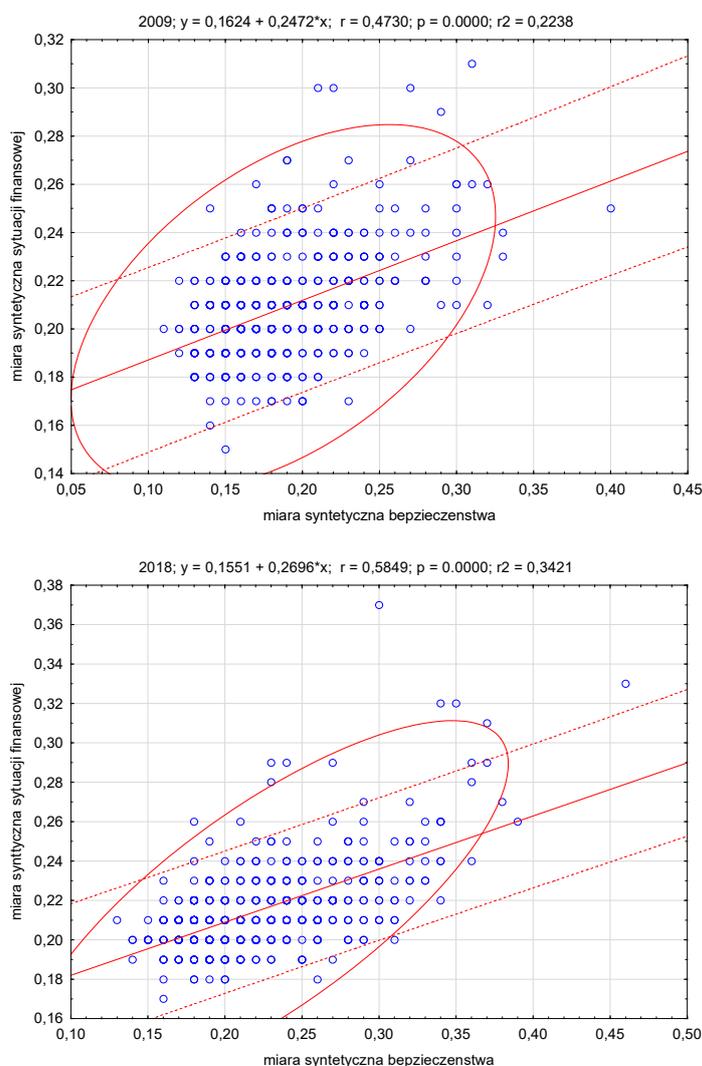


Figure 2. The relation of the measure of synthetic economic security to the financial situation in rural communes of eastern Poland in 2009 and 2018

Source: own study

Table 2

Correlation between a synthetic measure of economic security and the financial and socio-economic variables of rural communes in eastern Poland in 2009 and 2018

	Measure of economic security
Synthetic measure of financial security	0.5469
Own income / total income	0.5072
Transfers from the state budget / total income	0.4394
Entities entered in the REGON register	0.6429
Natural persons conducting business activity	0.6288
% of population using the sewage system	0.8221
% of the population using the gas network	0.4992
Balance of migration	0.4500
% of the population using the sewage treatment plant	0.7807

Linear correlation coefficients for observations from sample 1-4840 Critical value (at a 5% bilateral critical area) = 0.0282 for n = 4840

Source: own study

Table 3

Results of the regression analysis between the measure of economic security and variables of the financial situation of rural communes in western Poland in 2009-2018

	Coefficient	Standard error	t-Student's	p-value
const	0.0639382	0.00340700	18.77	<0.0001
Share in taxes constituting state budget revenues *	0.276699	0.0195643	14.14	<0.0001
Local Taxes	-0.175686	0.00748199	-23.48	<0.0001
Transfer income from the state budget	0.0617927	0.00162046	38.13	<0.0001
expenses for Education	3.78380e-05	2.34171e-06	16.16	<0.0001
expenses for Housing	5.38616e-05	6.34229e-06	8.492	<0.0001
expenses for Health	0.000110115	2.88984e-05	3.810	0.0001
expenses for Agriculture	-2.81324e-05	2.13165e-06	-13.20	<0.0001
Arithmetic mean of the dependent variable	0.206884	Standard deviation of dependent variable	0.046959	
Sum of squares residuals	6.947756	Residual standard error	0.037919	
Coefficient of determination R-square	0.348889	Adjusted R-square	0.347946	
F (7, 4832)	369.8801	P-values for F-test	0.000000	
Logarithm of credibility	8974.266	Inrom.Crit. Akaike'a	-17932.53	
Crit. Bayes.Schwarz	-17880.65	Crit. Hannana-Quinna	-17914.32	

*Municipalities have a share in the personal income tax (PIT) and the corporate tax (CIT), PLN the basic monetary unit in Poland observations 1-4840 used; dependent variable synthetic measure of economic security

Source: own study

measures between selected variables), a regression model was estimated. The model only explains 0.348 variable variations. Statistics values F (369.88) and their corresponding probability level p mean that all parameters are statistically significant. Further increasing the multidimensionality of the model would not increase the R2 value (0.348; table 3), and statistically insignificant variables could be included in the model. The adjusted determination ratio did not reach 60%. This indicates the situation of extending the ranges of variables with social and economic elements, so as to characterize economic security in a multidimensional way.

5. Conclusions

Security, as a complex matter, is universal and ambiguous in nature, as it can relate to many aspects of the functioning of individuals, families, groups, communities as well as the entire society and the entire state. Economic security is expressed primarily in the economy's ability to survive and develop. The greater the economic potential of the economy, the more secure and stable its economy is.

The value of myrrh synthetic synthetic economic security of rural communes in Eastern Poland in 2018 was from 0.13 to 0.46, while in 2009 from 0.11 to 0.40. The distribution of the assessment of the

economic security of rural communes of eastern Poland was spatially polarized. The results indicate that economic security is associated with a better financial situation. Local authorities should first of all improve the economic potential, which will increase the attractiveness of the land and attract new entrepreneurs.

It seems that the main reason for the relatively small impact of financial conditions on economic and social development is their strong dependence on transfer revenues transferred from the state budget, a high share of current expenditure legally determined in the structure of budget expenditure. The above

circumstances stiffen and stabilize the financial economy, making it relatively less susceptible to the influence of other factors. Low independence can therefore constitute a significant barrier to future local development.

The results of the study give local governments the opportunity to compare economic security with the situation of neighboring municipalities or municipalities with similar economic and social conditions. The conclusions drawn on this basis may allow local authorities to set out potential directions for optimizing the operation process.

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