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FINANCIAL SITUATION OF CITIES WITH POVIAT RIGHTS IN EASTERN POLAND VOIVODSHIPS IN 2009-2017

Summary
The financial situation of cities with poviat rights is the state of finances within a specified period of time. Its level is demonstrated by, among others, ability to achieve budget balance and increase assets. The financial situation is strongly correlated with the measure of development potential, own revenues as well as revenues from PIT and CIT as well as transfer revenues. The financial situation is also influenced by investment expenditure and expenditure on education. The aim of the article is to assess the financial situation of cities with poviat rights in Eastern Poland using the synthetic measure. The conducted analysis concerns the comparison of the situation in 2009 and 2017. The information basis for the research is the data taken from the Central Statistical Office, BDL.

Introduction

Cities with poviat rights operate in a very dynamic and complex environment constituting places gathering economic activity. They perform functions assigned not only to poviats but also to communes (Kozera, 2016, pp. 145-166) and are characterized by independence in making decisions. Their activities are directed towards endogenous resources, i.e. financial, human, material and information. In the operation of local government units, which are cities with poviat rights, the financial situation, which affects the economic situation of the local government, is of special importance (Dworakowska, 2013, pp. 31–39). The multidimensionality of their functioning is demonstrated by the directions of using interdependent and related economic, social, infrastructural and natural factors (Dziekański, Wiraszka, 2018).

Actions of cities with poviat rights (as well as communes, poviats, voivodships) depend on the financial situation. Financial resources are the basis for the operation of the unit and a condition for the implementation of its

statutory tasks (Borodo, 2007, p. 200). The financial situation is correlated with the level of local development. Development is a process of quantitative and qualitative changes within a given entity. It refers to the standard of living of residents and the activities of business entities (Sobczyk, 2010, pp. 125–136), and also translates into disproportions in the scope of the ability to meet local needs and the quality of implementation of public tasks. The aim of the article is to assess the financial situation of cities with poviat rights in Eastern Poland using the synthetic measure. The conducted analysis concerns the comparison of the situation in 2009 and 2017. The information basis for the research is the data taken from the Central Statistical Office, BDL (Local Data Bank).

Part 1. Methodology and materials used

Cities with poviat rights of underdeveloped voivodships of Eastern Poland are the object of interest of the authors. S. Korenik points to the process of thickening economic and social activity around active economic centers and the disappearance of this activity as they move away from them. He also emphasizes that disparities in the level of development are the natural phenomenon and that it is more important to support the progress of individual regions at their own pace adapted to their capabilities than to level the differences between regions at all costs[1].

The variables used to analyze the financial situation of cities with poviat rights in Eastern Poland voivodships are presented in Table 1. Due to the subject of the analysis, the basic criterion for selecting features for further research has been meeting the significance requirement (Pawlik, 2014, p. 94).

Table 1

**List of variables describing the financial situation of cities
with poviat rights in Eastern Poland voivodships**

Variable	S/D[a]
Share of own income in total income (financial independence indicator)	S
Share of tax revenues (PIT and CIT) in total revenues (index of fiscal wealth)	S
Operating surplus per capita	S
Share of transfer income in total revenue (indicator of financial interference by the state)	D
Share of property expenditure in total expenditure (investment attractiveness ratio)	S
Expenses for debt service per capita	D
Expenses for housing economy per capita	S
Expenses for education and upbringing per capita	S
Expenses for healthcare per capita	S
Expenses for public safety and fire protection per capita	S
Self-financing index	S

[a]s – stimulant; d – destimulant

Source: author's own compilation

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[1] S. Korenik, 2011, *Region ekonomiczny w nowych realiach społeczno-gospodarczych*, Warszawa, CeDeWu, s. 194.

The analysis was made using two synthetic measures and was carried out in successive stages (Dziekański, 2018a, 2018b, 2018c). The diagnostic variables describing the studied phenomenon were selected, determining also whether the given variable was a stimulant or a destimulant. From the set of variables, using a coefficient of variation, those characterized by low variability and those with high correlation of variables according to the inverted matrix method were removed (Malina, 2004, pp. 96-97).

In the next stage, the destimulant was replaced with a stimulant according to the formula (Kolenda, 2003):

$$x_{ij} = \frac{1}{x_{ij}} \qquad (1),$$

The selected variables were subjected to the procedure of zero unitarization using the following formula:

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \text{ where } x_i \in S \qquad (2),$$

where: S-stimulant, i = 1, 2... n; j = 1, 2... n, xij – means the value of the j-th feature for the examined unit, max – the maximum value of the j-th feature, min – the minimum value of the j-t feature (Wysocki, 1996; Młodak, 2006; Wysocki, Lira 2005).

As a part of the adopted method, a synthetic measure of financial situation was determined separately for each city with poviat rights based on the TOPSIS method, taking into account the distance between the unit and the pattern (= 1) and antipattern (= 0), according to the following formulas:

$$d_i^+ = \sqrt{\frac{1}{n}\sum_{j=1}^{m}\left(z_{ij} - z_j^+\right)^2} \qquad (3)$$

$$d_i^- = \sqrt{\frac{1}{n}\sum_{j=1}^{m}\left(z_{ij} - z_j^-\right)^2} \qquad (4)$$

where n- is the number of variables that make up the pattern or antipattern,z_{ij} – means the unified value of the j-th feature for the unit being tested, z_j^+, z_j^- - means the pattern or antipattern.

Then the TOPSIS measure was determined for individual objects based on the formula:

$$q_i = \frac{d_i^-}{d_i^- + d_i^+}, gdzie\ 0 \leq q_i \leq 1, i = 1, 2, \dots, n; \qquad (5)$$

with: $qi \in [0; 1]$; $\max i\ \{qi\}$ – the best object; $\min i\ \{qi\}$ – the worst object, d_i^- -means the distance of the object from the anti-pattern (from 0), d_i^+ – means the distance of the object from the pattern (from 1). The higher value of the measure indicates a better situation of the individual in the studied area (Wójcik-Leń, et al., 2019; Behzadian, et al., 2012; Zalewski, 2012; Hwang, Yoon 1981).

The second synthetic measure was determined using the reference-free method, consisting of averaging 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: Si – synthetic measure in the examined period, zij – features of the structure of the synthetic indicator, p − 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, whereas when the values are closer to 0, the object is less developed in the examined respect (Dziekański, 2018a, 2018b, 2018c).

In the last stage of analyses, in order to interpret the obtained measures, the division into quartile groups was used, where the size of the indicator in the first group means a better unit and weaker units in subsequent groups. The mutual consistency of the obtained results was also verified based on the correlation coefficient and a scatter chart of synthetic measure was presented (Dziekański, Wyszkowski, 2018; Zeliaś, Malina, 1997; Nowak 1990).

Part 2. Diversification of the financial situation of cities with poviat rights in Eastern Poland voivodships

Cities with poviat rights combine the features and tasks of the commune and poviat. They carry out the tasks of the commune and poviat (Kotlińska, 2012, p. 151; Dworakowska 2013, p. 31). They have legal personality and create their own financial policy under existing law, which is related to their financial independence (Wyszkowska, Wyszkowski, 2015, p. 132). By implementing tasks in the social and infrastructural sphere, they affect the standard of everyday life of the population and the socio-economic development of the region. As at January 1, 2018, 66 cities in Poland had poviat status, and in eastern voivodships there were 14 cities with poviat status. Cities with poviat rights are the driving force of the dynamics of the local and regional economy.

The importance of cities with poviat rights in the implementation of public tasks was highlighted, among others, by Dylewski and Stasik (2012, pp. 49-60), and Dolewka (2014, pp. 31-41). The scope of financial resources at the disposal of cities with poviat rights is inadequate in relation to the increasingly numerous needs related to the organization and implementation of ongoing and development-oriented tasks (Pawlik, 2018).

Research conducted by P. Churski (2013) and co-authors as well as M. Stanna (2013, 2015) and P. Dziekański (2018) indicate that finance is an important development factor. Focusing on the issues of income and expenditure of municipal governments, these authors emphasize the importance of finance from the point of view of the potential financing of

development-oriented tasks. Unfavorable changes in the demographic and social situation (e.g. aging of the society) may affect the income situation, limit their financial independence and, as a consequence, contribute to limiting their development. Entities with adequate income potential and level of financial independence can afford investment activities that favor the development of cities with poviat rights (Kotlińska, 2012, p. 152).

Douglas and Gaddie (2002), Benreke (1996) relate the financial situation to the ability to timely fulfill financial obligations by local authorities (towards lenders, employees, consumers and others) and to ensure continuity in providing services to the local community. Lin, Raman (1998), on the other hand, describe it as a probability as to maintaining services at the current level with an appropriate level of taxes. The financial situation of the commune is the state of its finances within a specified period of time. Its level is demonstrated by, among others, ability to achieve budget balance and increase assets, to analyze the financial situation, among others, variables such as: commune income level, financial independence of the entity, volume of investment expenditure, ability to obtain external financial resources, financial result achieved by the commune (Ossowska, Zieminska, 2010). The financial situation of cities with poviat rights may be determined by dependent factors: the area, in which the unit operates (e.g., location and size of local government units), available resources and natural assets, investment attractiveness as well as factors independent of them, e.g., economic fluctuations in the country and in the world, state public finance, the scope of income and expenditure authority of local government units (Dziekański, 2013, 2014).

Financial potential affects the proper functioning and development of local government units. The implementation of the tasks of cities with poviat rights is closely related to finance. Financial resources are an element necessary for the effective implementation of the objectives of individuals. Feedback occurs between socio-economic and financial variables (Dennis, 2004; Motek, 2006; Satoła, 2015; Standar, 2017). On the one hand, good financial standing is the goal of the individual's operation, and on the other, the result of previous decisions and related development opportunities.

In 2017, the financial standing measure (TOPSIS) ranged from 0.28 Chełm – the weakest unit to 0.48 Rzeszów – the best unit, while, in 2009, from 0.29 Chełm and Przemyśl to 0.51 Olsztyn. The range of values adopted by the measure of financial position was lower in 2017 (range 0.20) than in 2009 (range 0.22). The synthetic Si measure, on the other hand, took values in 2017 from 0.25 – Chełm to 0.48 – Rzeszów, and in 2009 from 0.25 – Chełm to 0.51 – Olsztyn. The range of Si measures in 2017 was 0.23 and was lower than in 2009 when it was 0.26. This indicates a similar range of unit differentiation, see Table 2.

Figure 1 presents the level of diversification of the financial situation of cities with poviat rights in Eastern Poland in 2009 and 2017 prepared on the

basis of synthetic measures. Units extremely far out in this regard are: Rzeszów and Białystok as well as Zamość, Przemyśl and Chełm.

The analysis of the diversity of the measure of the synthetic financial situation indicates that, in 2017, compared to 2009, the degree of differentiation was smaller. This is evidenced by the values of the standard deviation for the TOPSIS measure: 0.08-0.06 and for the Si measure: 0.09-0.06 and the classic coefficient of variation respectively: 0.19-0.14 and 0.23-0.18 as well as the range for TOPSIS: 0.22-0.20 and for Si: 0.26-0.24 see Table 3.

<div align="right">Table 2</div>

Quartile groups of synthetic measures of the financial situation of cities with poviat rights in Eastern Poland voivodships in 2009 and 2017

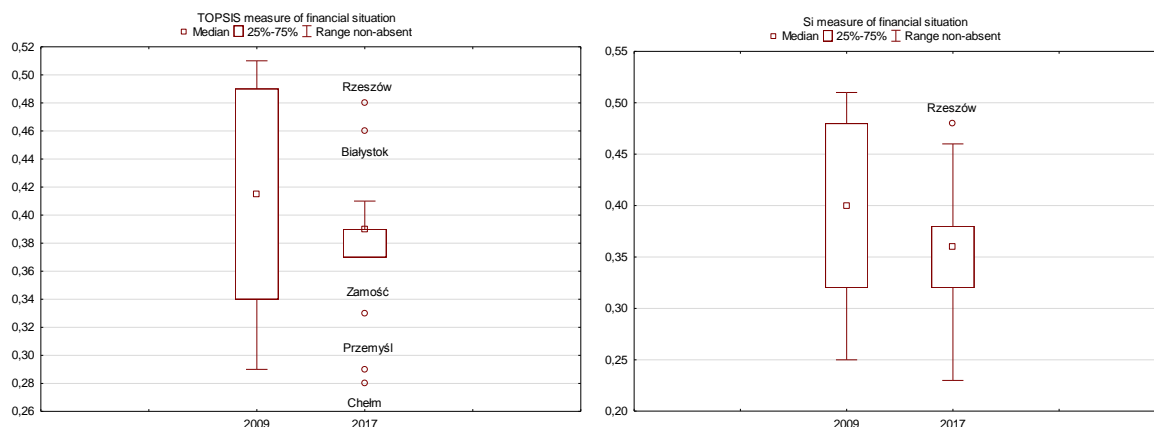| Gr.	TOPSIS financial situation		Si financial situation	
	2009	2017	2009	2017
I	Olsztyn 0.51 Rzeszów 0.49 Lublin 0.49 Kielce 0.49 Elbląg 0.49	Rzeszów 0.48 Bialystok 0.46 Krosno 0.41 Lublin 0.39 Łomża 0.39 Kielce 0.39 Elbląg 0.39 Olsztyn 0.39	Olsztyn 0.51 Kielce 0.49 Rzeszów 0.48 Białystok 0.48	Rzeszów 0.48 Bialystok 0.46 Krosno 0.4 Łomża 0.38 Kielce 0.38
II	Białystok 0.48 Krosno 0.44	Biała Podlaska 0.38 Tarnobrzeg 0.38	Lublin 0.48 Elbląg 0.48 Krosno 0.43	Lublin 0.36 Tarnobrzeg 0.36 Elbląg 0.36 Olsztyn 0.36
III	Łomża 0.39 Suwałki 0.37 Biała Podlaska 0.36	Suwałki 0.37	Łomża 0.37 Suwałki 0.35 Biała Podlaska 0.34	Suwałki 0.35
IV	Zamość 0.34 Przemyśl 0.29 Chełm 0.29	Zamość 0.33 Przemyśl 0.29 Chełm 0.28	Zamość 0.32 Tarnobrzeg 0.31 Przemyśl 0.26 Chełm 0.25	Biała Podlaska 0.32 Zamość 0.29 Przemyśl 0.27 Chełm 0.25

Source: own study based on the GUS data

Figure 1. Dispersion of synthetic measures of the financial situation of cities with eastern poviat rights in Poland in 2009 and 2017

Source: own study based on the Central Statistical Office data

Figure 2 presents correlograms describing the year-to-year relations of synthetic measures of the financial situation of cities with poviat rights in Eastern Poland voivodships, for which the correlation coefficient is 0.778 (TOPSIS) and 0.754 (Si). Outlying units are Rzeszów, Olsztyn and Chełm. This indicates a similar reaction of cities with poviat rights to changes taking place in the economy and the spatial stability of the studied phenomenon.

In the theory of cumulative causation referring to the analysis of the interdependence of social, economic and institutional phenomena, Gunnar Myrdal has proved that every element interacting with another element affects its behavior, and at the same time it is modified by the reaction of that element (Stanny, Strzelczyk, 2018). The financial situation is strongly correlated with the measure of development potential with own revenues as well as with PIT and CIT, transfer revenues. The financial situation is also influenced by investment expenditure and expenditure on education and upbringing.

Table 3

Differentiation of synthetic measures of the financial situation of cities with poviat rights in Eastern Poland voivodships in 2009 and 2017

	TOPSIS financial situation		Si financial situation	
	2009	**2017**	**2009**	**2017**
average	0.41	0.38	0.40	0.36
standard deviation	0.08	0.06	0.09	0.06
quarter (quartile) deviation	0.42	0.39	0.40	0.36
classic coefficient of variation	0.19	0.14	0.23	0.18
positional coefficient of variation	1.00	0.99	1.01	0.98
min.	0.29	0.28	0.25	0.23
max	0.51	0.48	0.51	0.48
range	0.22	0.20	0.26	0.24
quartile 1	0.34	0.38	0.32	0.33
quartile 2	0.42	0.39	0.40	0.36
quartile 3	0.49	0.39	0.48	0.38
quartile range	0.14	0.02	0.16	0.05
skewness	-0.24	-0.23	-0.29	-0.07
measure of concentration-kurtosis	1.64.	0.50	-1.51	0.31

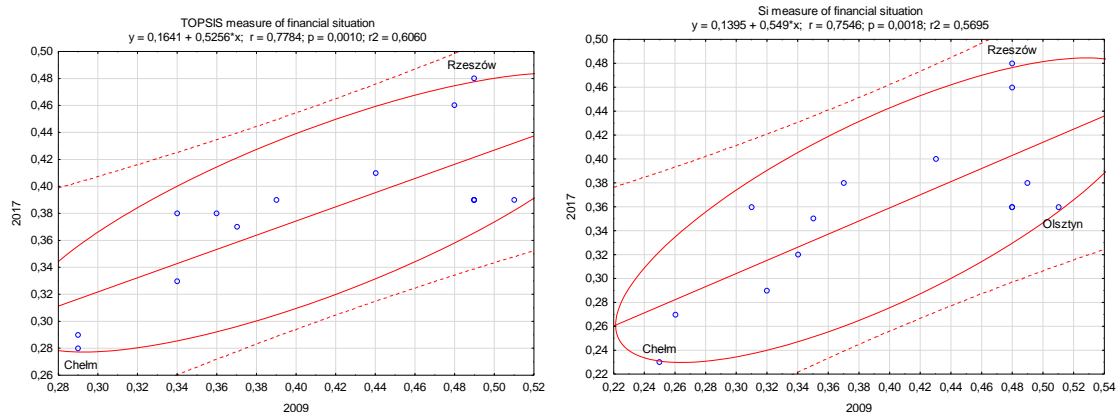*Source: own study based on the Central Statistical Office data*

Figure 2. Scatter chart with an adjustment line synthetic measures of the financial situation of cities with poviat rights in Eastern Poland voivodships in 2009 compared to 2017

Source: own study based on the Central Statistical Office data

Conclusions

The methods used allowed to compare the financial situation of cities with poviat rights in Eastern Poland voivodships. The value of measures depended on the number and type of variables adopted for the study. They also made it possible to present a hierarchy and assess disproportions between individual

cities with poviat rights in Eastern Poland voivodships. The design of the indicator used is not perfect, however, it ensures high comparability of the surveyed units, and the reliability and time range of the data used allow the formulation of cautious conclusions and generalizations. The proposed indicator can also be a starting point for further research taking into account a narrower or broader group of examined units [Pawlik, Dziekański, 2018]. By serving the region's local authorities to assess the effectiveness of development instruments used in the past, it confirms the need to introduce changes that can become the basis for the development of a knowledge-based economy.

In 2017, the financial standing measure (TOPSIS) ranged from 0.28 (Chełm) to 0.48 (Rzeszów), and in 2009 from 0.29 (Chełm, Przemyśl) to 0.51 (Olsztyn). The synthetic Si measure took values from 0.25 (Chełm) to 0.48 (Rzeszów) in 2017, and from 0.25 (Chełm) to 0.51 (Olsztyn) in 2009. Regardless of the method of determining the synthetic measure, the best financial situation in 2017 was in Rzeszów and Białystok, and the weakest in Chełm and Przemyśl.

The financial situation of cities with poviat rights of Eastern Poland voivodships was determined by their size and appropriate adjustment over time of income and expenditure. It was also influenced by the unit's development potential, own income as well as PIT and CIT income, transfer income and investment expenses as well as education and upbringing. The level of financial standing was also shaped by interactions with the level of unemployment, the number of employees or entities and natural persons conducting business activity.

The results of the analysis confirm the overall gradual improvement in the economic situation of Eastern Poland voivodships measured by variables describing the financial situation of cities with poviat rights. This is also demonstrated by a decrease in the level of unemployment and an increase in the number of registered business entities in the REGON register. It should also be pointed out that the values of the analyzed indicator for cities with poviat rights in Eastern Poland voivodships are low. The results also confirmed the significant importance of the poviat cities: Kielce, Rzeszów, Lublin, Białystok, Krosno, Olsztyn, Elbląg, Suwałki, Zamość, Biała Podlaska, Chełm, Łomża, Przemyśl and Tarnobrzeg as local centers of economic activity.

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