DETERMINANTS OF DEBT IN RURAL MUNICIPALITIES ON THE EXAMPLE OF THE WARMIŃSKO-MAZURSKIE VOIVODESHIP

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ABSTRACT

One of the major consequences of the economic crisis with which the local governments had to deal was growing debt, the implications of which could endanger the continuity of public services. It appears that the largest cities in Poland were especially exposed to the negative effects of the indebtedness, yet the problem affected the village communes as well. Therefore, the main aim of the article was to assess the level of indebtedness of rural communes against other communes as well as to identify the determinants of the debt. As an example for the analysis communes of the Warmińsko-Mazurskie Voivodeship were selected, as the region is characterized by a high share of rural areas as well as a rather unfavourable economic situation. The general indebtedness of the selected rural communes remained at a relatively low level in comparison to the urban and urban-rural communes. Findings also suggest that the level of debt was influenced primarily by such factors as the number of inhabitants in the studied area, the number of primary schools, as well as the share of the post-working age population in the population total.

Key words: indebtedness, rural communes, financial crisis, depopulation

JEL codes: H74, G01, G18

INTRODUCTION

The long-term financial sustainability of local governments is influenced not only by the robustness of policies concerning local taxes and the scope, type and provision of public services, but also by local borrowing power [IPSASB 2011, Wichowska and Ostrowska 2018]. External financing can drive public investments in infrastructure and human resources, including education and health care. On many developed markets, programs to counteract unemployment are financed by local governments, thus contributing to local financial burden and public debt. According to Keynesian theory, such programs act as automatic stabilizers that alleviate the socio-economic consequences of market slowdown [Tešić et al. 2014]. However, growing levels of debt and budget deficit can contribute to local as well as macroeconomic and global problems. Increased budget deficit leads to spending cuts and drives down incomes due to the depletion of municipal funds and higher debt servicing costs, which increases the risk of irresponsible fiscal policy and intervention from higher level authorities. In the most extreme cases, a municipality can declare bankruptcy or can even be dissolved. The above scenario materialized in the municipality of Ostrowice in the Zachodniopomorskie

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Voivodeship which was dissolved on 1 January 2019 due to excessive debt [Jastrzębska 2017, Ustawa z dnia 5 lipca 2018 r. …].

In the literature, two approaches to municipal deficit have been proposed in reference to different types of municipalities in the administrative structure. According to the first approach, rural municipalities are characterized by lower levels of public debt than urban municipalities [Poniatowicz 2014], whereas the second approach postulates that rural and urban municipalities are at equal risk of excessive public debt in periods of slow economic growth, but the causes of deficit are somewhat different [Kim and Warner 2018]. The latter approach is most frequently cited in foreign literature. In view of the above discrepancies, the aim of this study was to analyse the debt of rural municipalities in relation to other types of municipalities.

Despite the fact that rural areas continue to attract growing interest in the literature [Kozera 2017], the factors that affect local deficit have been rarely analysed. In studies that address this problem, municipal deficit is generally analysed from a specific point of view, such as financial sustainability, fiscal stress or a municipality's financial condition [Ossowska and Ziemińska 2010, Bolivar et al. 2014, Kim and Warner 2018]. Standard debt indicators recommended by the Ministry of Finance for analysing the state of local finances are usually used in such evaluations. This study attempts to fill in the existing knowledge gap by identifying the determinants of municipal debt.

The study covered all rural municipalities in the Warmińsko-Mazurskie Voivodeship (67 out of the total of 116 municipalities). Rural municipalities, i.e. areas situated outside the administrative boundaries of cities, occupy around 97.5% of the voivodeship's territory. In the past, more than 100 collective farms had operated in the rural municipalities of Warmińsko-Mazurskie Voivodeship. The consequences of collective farming and the privatization of State-owned farms are still being felt in the evaluated voivodeship [UM WM Olsztyn, ROPS, ROT-OPS 2015]. The study analysed data for 2010–2017, i.e. the period that followed the global financial crisis.

Warmińsko-Mazurskie Voivodeship is one of the least economically developed Polish voivodeships.

Therefore, an analysis of the determinants of municipal debt will not only expand the existing knowledge on the subject, but will also have practical implications by providing valuable inputs for improving local management and control and implementing rational financial policies.

THEORETICAL BACKGROUND

In the United States [Kim and Warner 2018] and Europe, including Great Britain, Ireland and Spain [Milan and Creutzig 2016, Turley et al. 2018], the consequences of the Great Recession that began in the late 2000s were also felt by local governments, in particular in rural municipalities. In recent years, the global economic slowdown also affected Polish municipalities. At the local level, the main consequences of the recession were decreased public spending and growing debt. The above problems were largely exacerbated by the existing budget deficits [Jastrzębska 2016] which resulted from a decrease in municipal incomes during the crisis, higher levels of public spending, higher number of investments co-financed by European funds, as well as speculations relating to changes in legal regulations concerning public debt limits and local government borrowing in the future [Parlińska 2014].

The accumulation of the above problems, in particular in less developed municipalities, can compromise territorial units' credit rating and financial sustainability. The above usually leads to an increase in debt servicing costs, and it undermines a municipality's ability to provide public services. Certain types of public services, in particular capital expenditure related to infrastructure, may be abandoned, and local governments are forced to find new sources of revenue. This situation is often referred to as fiscal stress [Kloha et al. 2005, Maher and Deller 2007]. According to research, the long-term consequences of lower capital spending include slower economic growth [Afonso 2014] and a decrease in the economic performance of municipalities [Arezki and Ismail 2013]. However, these consequences can also be felt at the regional level, and they can compromise the competitiveness of voivodeships because municipalities are burdened with most public tasks relating to, for example, infrastructure development.

As previously noted, local debt is usually exacerbated by higher demand for funds. Large municipalities generally have higher financial needs than less populated territorial units, most of which are rural municipalities [Warner and Pratt 2006, Poniatowicz 2014]. The above can be attributed to the fact that many cities finance public services that are also used by the inhabitants of the neighbouring municipalities. This effect is generally referred to as the free rider problem [Swianiewicz 2000, Swianiewicz and Łukomska 2017]. Labour costs and property prices are higher in large municipalities, which increases the cost and scope of public services that have to be provided by the local government, including spending on welfare, environmental protection, public transport and education [Swianiewicz 2001]. Therefore, growing financial needs generate higher debt in urban than in rural municipalities. Urban municipalities generally have a higher credit rating due to higher creditworthiness, higher levels of economic activity and lower operating costs (effects of economies of scale) [Wenner 2007]. The results of research studies investigating local government debt in large cities in Poland [Poniatowicz 2014, Kozera 2016] and Slovakia [Kling et al. 2002] have confirmed that municipal debt is generally higher in large urban agglomerations.

Some of the observations relating to local government debt in large municipalities also apply to rural municipalities which are undergoing dynamic changes in Poland. According to many researchers, rural areas are catching up with urban municipalities not only in terms of socio-economic growth, but also social aspirations, consumer trends and demographic trends [FDPA 2016]. Suburbanization induces changes in villages which are increasingly likely to take on residential and service functions [Kozera 2017]. Rural municipalities where agriculture continues to be the main source of income are experiencing negative social phenomena, including population ageing, higher percentage of elderly citizens in the local population, greater demand for public services and a reduced tax base [Wolf and Amirkhanyan 2010]. Poverty and unemployment also pose a considerable challenge for rural municipalities that are situated remotely from regional business hubs. These problems are exacerbated by the ongoing consequences of the economic recession, which increases local government expenditure,

decreases revenues, contributes to local deficit and the demand for external sources of funding, such as State aid and loans [Hollander 2011]. Both fund raising options are limited in rural municipalities. Firstly, rural municipalities do not have sufficient potential to compete effectively for State aid with urban municipalities [Shortall and Warner 2010], and secondly, they are bound by rigorous debt limits [Ustawa z dnia 27 sierpnia 2009 r. …].

In view of the above, two research questions can be posed: what is the level of local government debt in rural municipalities relative to the remaining municipalities? and what are the key determinants of local debt in rural areas? Based on the assumption that local government debt is an element of local financial stability and that it is shaped by similar factors [Bolivar 2014], two types of potential variables were selected for this study: demographic and economic factors. Other determinants that were proposed in a study investigating the level of fiscal burden on taxpayers in non-metropolitan areas in the USA, mostly rural areas [Johnson 1995], were also used. According to the cited authors, fiscal burden is influenced not only by demographic and economic factors, but also by intergovernment revenue transfers from the State for financing local services.

The above-mentioned factors can exert a direct or an indirect effect on local governments' tasks and local debt. Most of these determinants are internal (local) factors. However, local governments also maintain relations with regional and national stakeholders, and the relevant external factors include legal regulations, debt limits and, indirectly, a municipality's administrative status. Non-legal factors, such as local institutions (banks and other lenders), the natural environment, natural resources, levels of social and economic development, structure of the national economy and inflation rate also play an important role [Felis 2018]. Most of the relevant quantitative data are not available at the local level, and these parameters were not taken into account in the study.

MATERIAL AND METHODS

A financial analysis was performed to evaluate the levels of local government debt in the rural municipalities of the Warmińsko-Mazurskie Voivodeship.

Local debt was measured based on total debt as well as long-term and short-term debt per capita in rural municipalities, and the results were compared with urban municipalities and urban-rural municipalities. Data concerning local debt were obtained from the consolidated financial statements of Polish municipalities which are published annually by the Ministry of Finance [2019]. The remaining data were acquired from the online Local Data Bank of Statistics Poland[1]. The analysed period was 2010 to 2017. The results of the financial analysis were presented graphically as the median of total debt per capita in the evaluated types of municipalities [Stanisz 2007].

The determinants of local government debt in rural municipalities were identified by linear regression. The explained (dependent) variables included total debt as well as long-term and short-term debt per capita. The explanatory (independent) variables were identified based on a review of the literature. The following explanatory variables were adopted in this study: population (X_1), population density (X_2), proportion of post-working age population in total population (X_3), proportion of pre-working age population in total population (X_4), gross enrolment in primary schools (X_5), gross enrolment in middle schools (X_6), number of primary schools (X_7), number of middle schools (X_8), unemployment rate (X_9), municipal revenues per capita (X_{10}), number of businesses per 1,000 population (X_{11}) proportion of other sources of revenue in total municipal revenues (X_{12}).

Variables that were not normally distributed in the Shapiro–Wilk test were normalized by Box–Cox transformation [Box and Cox 1981, Sakia 1992]. The assumptions justifying the use of a linear regression model were verified with the following tests and methods: linearity in parameters – Ramsey RESET test; assumption of homoscedasticity– White test; multivariate normality – Doornik–Hansen test; measure of autocorrelation – Durbin–Watson test. The quality of the model was evaluated with the use of the F-test of overall significance, Student t-test and the coefficient of determination (R^2) [Stanisz 2007, Kufel 2011, Welfe 2014].

The model assumptions were tested at a significance level of $p = 0.05$. The regression analysis was carried out in the GRETL v. 2017d-git program. Normality tests and Box–Cox transformations were performed with the use of the Statistica v. 13 program.

RESULTS AND DISCUSSION

In 2010–2017, total debt per capita was lowest in the rural municipalities of the Warmińsko-Mazurskie Voivodeship relative to other types of municipalities. Total debt per capita was highest in cities and somewhat lower in urban-rural municipalities. However, rural municipalities were characterized by greater fluctuations in total debt per capita than other municipalities. Total debt per capita in the analysed municipalities in 2010–2017 is presented in Figure 1.

An analysis of long-term debt indicates that lower total debt per capita could be attributed to relatively low levels of long-term debt per capita in rural municipalities. In 2011, long-term debt per capita was significantly reduced in rural municipalities, and it was more than PLN 1,000 lower than in urban municipalities and more than PLN 750 lower than in urban-rural municipalities. From 2011 onwards, long-term debt per capita in rural municipalities remained relatively stable and did not exceed PLN 455. Long-term debt per capita in the municipalities of the Warmińsko-Mazurskie Voivodeship in the analysed period is presented in Figure 2.

An analysis of short-term debt per capita in rural municipalities produced completely different results (Fig. 3). Beginning from 2011, short-term debt per capita was considerably higher in rural municipalities than in other types of municipalities until the end of the analysed period. The greatest differences were observed in 2013 when short-term debt per capita in rural municipalities was more than PLN 417 higher than in urban municipalities and more than PLN 739 higher than in urban-rural municipalities.

The low level of total debt and long-term debt per capita in rural communes results from many reasons. It is probably related primarily to the general, weak eco-

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[1] Bank Danych Lokalnych GUS webpage https://bdl.stat.gov.pl/BDL/start [accessed: 26.03.2019].
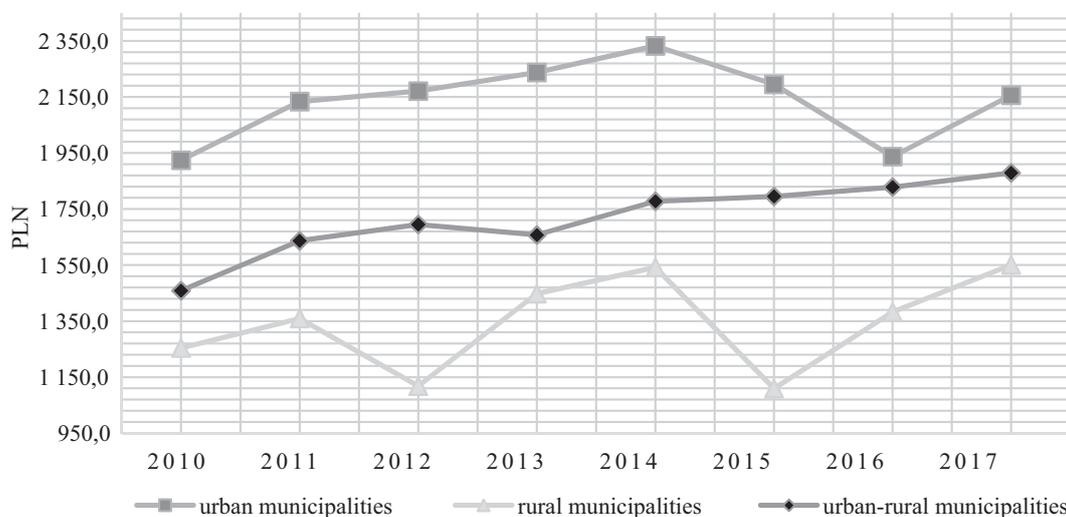
Fig. 1. Total debt per capita in different types of municipalities in the Warmińsko-Mazurskie Voivodeship in 2010–2017

Source: Author's own elaboration based on the Ministry of Finance data and the Local Data Bank of Statistics Poland.
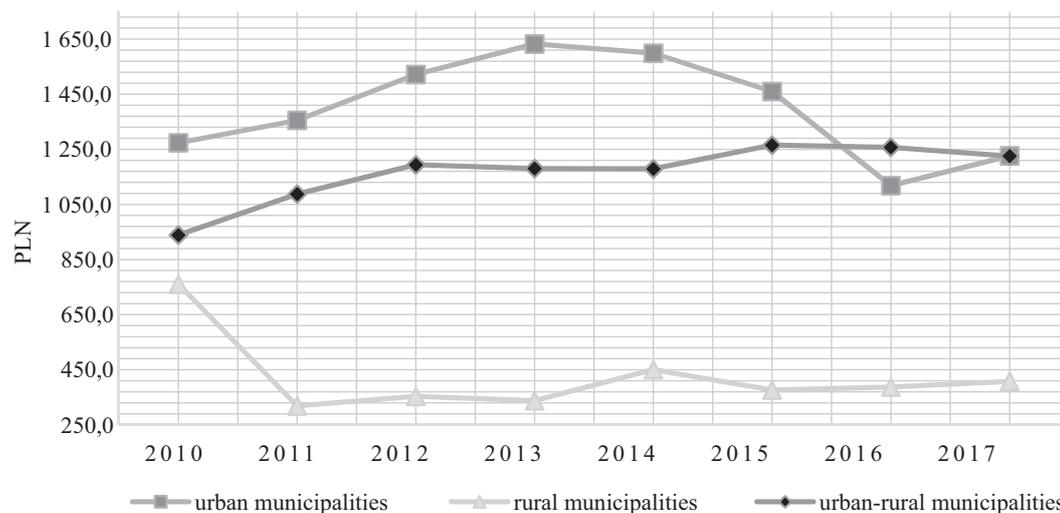

Fig. 2. Long-term debt per capita in different types of municipalities in the Warmińsko-Mazurskie Voivodeship in 2010––2017

Source: Author's own elaboration based on Ministry of Finance data and the Local Data Bank of Statistics Poland.

nomic situation of the communes of the Warmińsko--Mazurskie Voivodeship, and thus – to the low level of investment, lower ability to obtain European funds, as well as legal restrictions in making further commitments. Attention is drawn to the fact that rural communes were characterised by a relatively high short--term debt compared to other communes, which may have its causes, e.g. in the short-term view on planning and investment in the commune or financing only temporary needs.
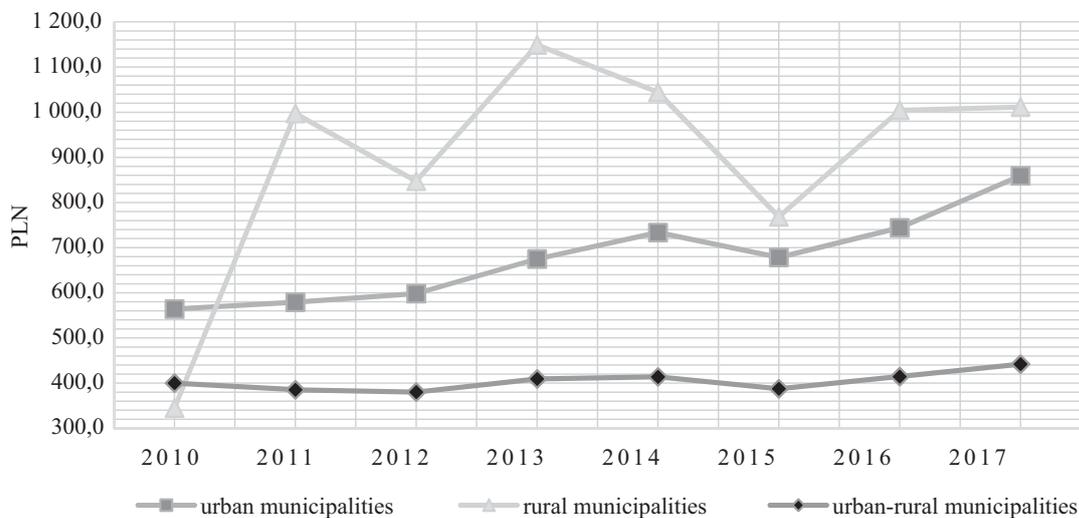
Fig. 3. Short-term debt per capita in different types of municipalities in the Warmińsko-Mazurskie Voivodeship in 2010–2017

Source: Author's own elaboration based on Ministry of Finance data and the Local Data Bank of Statistics Poland.

Local government debt in rural municipalities was analysed in view of internal factors, including demographic factors, economic factors and revenue transfers from the State budget. The results of linear regression analysis met the underlying assumptions, and they are presented in the table. The table (p. 127) presents only the variables that were significantly related to the dependent variable, as indicated by the Student t-test for the adopted parameters, whose significance level had to be less than $p < 0.05$. The analysis revealed that total debt per capita in the rural municipalities of the Warmińsko-Mazurskie Voivodeship was significantly correlated with one independent variable, namely the number of primary schools (X_7). The relationship was negative, which meant that the average increase in the independent variable could cause a decrease in the dependent variable. However, the level of explanation of the variability of total liabilities per capita by the number of primary schools in municipalities was not high. The coefficient of determination (R^2) was determined at 19.47%, which suggests that the percentage of variation in total debt per capita explained by the number of primary schools in municipalities was not high.

Long-term debt per capita was bound by a significant negative relationship with population (X_1). This meant that the average increase in population could have caused a fall in the dependent variable. The variation in long-term debt per capita was explained by population in 34.62%.

The proportion of the post-working age population in total population was significantly correlated with short-term debt per capita. The noted relationship was positive, which implies that an increase in the proportion of the elderly population in total population increased short-term debt per capita. The coefficient of determination (R^2) reached 98.65%, therefore, the above variable explained the observed variations in short-term debt per capita in nearly 100%. The high value of the coefficient of determination for this variable was the effect of the procedure normalizing the explanatory variables of Box–Cox.

The above results are a compilation of the previously discussed approaches to local government debt in rural municipalities in the literature. The presented findings confirm that rural municipalities are characterized by considerably lower total debt per capita than other types of municipalities. However, the results of the linear regression analysis and the identified determinants of local government debt indicate that demographic problems pose a particu-

Table. The results of the linear regression analysis for total, long-term and short-term debt per capita in the rural municipalities of the Warmińsko-Mazurskie Voivodeship in 2010–2017

Evaluation criteria	Total debt	Long-term debt	Short-term debt
Variables	X_7	X_1	X_3
Coefficient of regression	–2.37	–2.12	0.98
p-Value: Student t-test	7.90e-044	4.89e-014	2.05e-063
Combined significance of parameters	$F(1, 66) = 15.96$ with $p = P(F(1, 66) > 15.96) = = 0.000165$	$F(1, 66) = 35.95$ with $p = P(F(1, 66) > 35.96) = = 1.31e-07$	$F(1, 66) = 4\ 816.62$ with $p = P(F(1, 66) > 4\ 816.62) = = 2.05e-63$
Linearity test: Ramsey RESET test	$F(2, 64) = 0.58$ with $p = P(F(2, 64) > 0.58) = 0.56$	$F(2, 64) = 0.33$ with $p = P(F(2, 64) > 0.33) = 0.72$	$F(2, 64) = 3.21$ with $p = P(F(2, 64) > 3.21) = 0.05$
Normal distribution of the random component: Doornik–Hansen test	$\chi^2 = 2.26$ with $p = 0.32$	$\chi^2 = 1.79$ with $p = 0.40$	$\chi^2 = 1.35$ with $p = 0.51$
Homogeneity of residual variance: White test	$LM = 4.48$ with $p = P(\chi^2 > 4.48) = 0.11$	$LM = 0.79$ With $P = P(\chi^2 > 0.79) = 0.67$	$LM = 1.34$ with $p = P(\chi^2 > 1.34) = 0.51$
Autocorrelation: Durbin–Watson test	$DW = 2.18$ with $p = 0.76$ $dL = 1.57; dU = 1.63$	$DW = 2.22$ with $p = 0.81$ $dL = 1.57; dU = 1.63$	$DW = 2.18$ with $p = 0.75$ $dL = 1.57; dU = 1.63$
Coefficient of determination (R^2)	19.47%	34.62%	98.64%

Source: Author's own elaboration based on the results of the study.

lar challenge for rural municipalities in the investigated voivodeship. High short-term debt per capita was linked with a growing proportion of the post-working age population in total population, whereas high long-term debt per capita was correlated with a population decline. A relationship between fiscal stress and population decline was also reported in a study of Italian municipalities where fiscal burden increased with a decrease in population [Brusca et al. 2015].

The results of this study contradict the findings of the 2016 report of the Foundation for Development of Polish Agriculture (Fundacja na rzecz Rozwoju Polskiego Rolnictwa) entitled *Polska Wieś 2016*, which postulated that the levels of social and economic development are gradually converging in cities and rural areas. The above observation was not substantiated by the presented analysis based on the identified determinants of municipal debt.

CONCLUSIONS

The results of the presented study indicate that local government debt in the rural municipalities in the Warmińsko-Mazurskie Voivodeship did not increase significantly after the global recession. An increase was observed only in short-term debt per capita which fluctuated considerably in the analysed period. In the evaluated rural municipalities, total debt per capita was generally lower than in urban and urban-rural municipalities. The observed differences in debt levels could suggest that rural municipalities implement fewer infrastructure development programs and are less committed to raising additional funds for public

projects than larger municipalities. Very low levels of long-term debt per capita and high levels of short--term debt per capita in rural municipalities confirm the above observation.

The determinants of local government debt in rural municipalities were identified in the study. These findings not only expand our knowledge of local budgets, but they also have important practical implications. Municipalities are the lowest tier of government; therefore, they are directly confronted with local communities' needs and are most burdened with the high cost of public services. Social problems pose a considerable challenge for rural municipalities, and they should be resolved as part of long-term strategies. These problems are exacerbated by population ageing, which reduces tax revenues and increases spending on health care. Local governments can counteract these problems by implementing infrastructure development programs to stimulate business growth, including in the agritourism sector, and make rural municipalities more attractive to tourists and investors.

Further research is needed to evaluate the structure of debt in the rural municipalities of the Warmińsko--Mazurskie Voivodeship relative to other Polish regions, and to analyse the impact of demographic changes on local debt and the overall financial condition of rural municipalities. The developed models can be used to predict local fiscal stress in the coming years.

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DETERMINANTY ZADŁUŻENIA W GMINACH WIEJSKICH NA PRZYKŁADZIE WOJEWÓDZTWA WARMIŃSKO-MAZURSKIEGO

STRESZCZENIE

Jedną z głównych konsekwencji kryzysu gospodarczego, z którym zmagały się samorządy gminne, był rosnący dług, którego konsekwencje mogły zagrozić ciągłości usług publicznych. Wydaje się, że największe miasta w Polsce były szczególnie narażone na negatywne skutki zadłużenia, ale problem ten dotknął także gmin wiejskich. W związku z tym głównym celem artykułu jest ocena poziomu zadłużenia gmin wiejskich na tle innych gmin oraz określenie czynników determinujących ich dług. Jako przykład do analizy wybrano gminy województwa warmińsko-mazurskiego, ponieważ region ten charakteryzuje się dużym udziałem obszarów wiejskich oraz dość niekorzystną sytuacją gospodarczą. Ogólne zadłużenie wybranych gmin wiejskich pozostawało na stosunkowo niskim poziomie w porównaniu do gmin miejskich i miejsko--wiejskich. Wyniki badań wskazują także, że na poziom zadłużenia wpływ miały przede wszystkim takie czynniki jak liczba mieszkańców badanego obszaru, liczba szkół podstawowych, a także udział populacji w wieku poprodukcyjnym w ogólnej liczbie ludności.

Słowa kluczowe: zadłużenie, gminy wiejskie, kryzys finansowy, depopulacja