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Managing Rural Areas in the Context of the Growing Debt of Polish Local Government Units

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Abstract: Local development is a long-term process of economic transformation. To make it happen, expenditure must be incurred, especially including investments. At a local level, the financial burden involved in the transformation is mostly on local government units. Although a three-level administrative system is in place in Poland, bottom-level units (municipalities) are largely responsible for driving local development. Polish rural areas make up over 90% of the national territory, and rural municipalities alone are home to 11 million people, i.e., 30% of the total population. Poland's accession to the European Union and the ability of local government units (LGUs) to use Union funds contributed to local development, in particular by making many rural municipalities a more attractive place to live and invest in. However, a rapid increase in debt levels was another consequence. Excessive indebtedness of LGUs threatens not only their stable operation and local development but also the stability of the whole public finance sector. The main purpose of this study was to assess the level of and differences in indebtedness of Polish rural municipalities, and to identify the key socioeconomic conditions of debt. The analysis period was 2007–2017. This article used the TOPSIS routine to develop a synthetic indicator of municipal debt levels. An ordered logit model was also employed to identify the key conditions behind municipal indebtedness in Polish rural areas. This study found that, in 2007–2009, most rural municipalities (over 50%) recorded extremely low or low levels of debt while only one-fifth were at high or extremely high levels. In turn, already in 2015–2017, more than one-third of all rural municipalities were at a high or extremely high level of debt. The study also allowed to validate the research hypothesis formulated in this paper, namely that "the key reason for the growing level and diversity of indebtedness of Polish rural municipalities is the investment activity of local authorities in seeking funds from the European Union".

Keywords: rural areas; municipalities; local government unit; local development; debt; synthetic indicator

1. Introduction

Local development means a long-term process of positive, targeted changes affecting the economy. Note that, in addition to attaining economic goals, development measures must also address social and environmental objectives [1,2]. It consists of using the available regional resources to contribute to improvements in wellbeing and to equality goals [3]. To make it happen, the entity in charge of driving local development must incur investment expenditure. Authorities responsible for the creation of conditions that encourage local development include local government units. They take

different measures designed to contribute to advancements in the local or regional environment, which may also result in the restructuring of regional economies [4]. Although a three-level administrative system is in place in Poland, bottom-level units (municipalities) are largely responsible for most tasks and for driving local development. In addition to the 2477 municipalities, there are 380 districts and 16 voivodships. The municipalities are divided into urban, urban-rural and rural groups; rural municipalities account for 62% of all municipalities and have an entirely rural territory.

Therefore, municipal government units are vested with assets and enjoy guaranteed autonomy in their financial management. While municipal authorities may also use debt instruments, this is strictly governed by the law. Authors who provide a detailed description of the relevant principles include Działo [5] and Nizioł [6].

In recent years, especially after Poland's accession to the European Union (EU), much attention has been paid to the problems and prospects of (and threats to) rural development. The function of rural areas is not only to provide society with food products and raw materials for industry. Rural areas have numerous socio-economic, environmental, cultural and spatial functions of significant importance on a local, regional, national and global scale. Polish rural areas largely differ in development levels, especially when it comes to municipalities [7,8]. Kozłowski [9] and the Global Infrastructure Outlook [10] demonstrate that a large investment gap separates Poland from other EU countries. In order to pursue development goals, local government units must be in a good financial standing because an adverse financial situation has a negative impact on the population [11] and, generally, on economic development [12]. Today, this is a problem of particular importance, especially since the Polish local government sector could be among those absorbing the largest amounts of Union aid [13]. Financing can be provided for investments that meet the assumptions of the EU's regional policy. Local government units must have adequate financial resources in order to be capable of implementing such investment projects. In a context of budgetary constraints, LGUs have no other option but to incur debt if they want to implement projects co-financed with structural funds [14]. The use of repayable instruments may either positively or negatively affect the economy [15]. On the one hand, Dafflon and Beer-Toth [16] and Li and Chen [17] suggest that debt is a natural way to carry out tasks and an alternative option for financing investments in the absence of own funds. For instance, as Jing [18] notes, over the last years, Chinese local government units have accessed funds by issuing public debt. This is how they made a positive contribution to the implementation of social infrastructure projects and to the joint development of urban and rural areas; but on the other hand, insufficient control over local government debt levels may contribute to deteriorating their financial condition because excessive debt generates servicing costs that pose a considerable burden to local budgets. A decline in the municipal financial situation may result in reducing their capacity to carry out their tasks, including the delivery of public services [19,20]. As noted by Cattivelli and Rusciano [21], "the unfair or not equitable spatial distribution of services or the scarce opportunity to access them may create locational discrimination (i.e., a discrimination imposed on certain population due to their geographical location) or income discrimination (i.e., a discrimination based on its income level)".

According to a study by Bröthaler et al. [22], in an effort to balance their budget policy (by reducing debt levels), Austrian municipalities considerably reduced their local infrastructure investments. In the long term, such a development path poses a problem to the quality of the available infrastructure. In addition to having an adverse impact on the ongoing activity of local government units, high debt levels may also pose a barrier to investments. In a context of budgetary constraints, local government investments intended to promote local development usually rely on credits or loans. The banks are required to make creditworthiness assessments; thus, they reduce the amount of loans granted to local government units at high indebtedness levels or, in some cases, are not willing to grant them loans at all. As a consequence, the existing debt considerably restricts the ability to drive future local development. Findings from other research also exist, which confirm the negative effect of municipal debt on prices in the local real estate market [23]. The above proves that local debt has a negative impact on the real local economy. As shown in a study by Standar and Kozera [24], municipal debt

often exceeds the defined threshold. Local government debt also has a growing share in the national debt structure [25], which could threaten the country's economic and financial security in the future.

The essential reason behind initiating a study on financial management issues relating to the indebtedness of Polish municipalities and its conditions was the rapid rise of public debt recorded in the local government sector over the recent years. The relationship between local government debt and economic growth is a popular discussion topic [26]. For instance, Greiner [27] and Chudik et al. [28] note that local government debt does not considerably affect economic growth. On the other hand, researchers such as Lagona and Padovano [29] and Égert [30] found an inverse non-linear relationship between local government debt and regional economic growth. Excessive indebtedness has long been of particular interest for scientists around the world [31–33]. As noted by Poniatowicz [34], no strictly defined, safe and commonly accepted debt level has yet been proposed.

This paper focuses on public debt at the local government level that, in a theoretical sense, is part of the general theories of economics and public finance. Essentially, there are two conflicting doctrines regarding debt. The orthodox doctrine considers debt to be the consequence of faulty financial management. Conversely, in the interventionist doctrine, debt is viewed as a positive development as it stimulates economic growth and makes investing possible [34].

The main purpose of this study was to assess the level of and differences in indebtedness of Polish rural municipalities, and to identify the key socioeconomic conditions of debt. The main goal is to the verify the research hypothesis that "the key reason for the growing level and diversity of indebtedness of Polish rural municipalities is the investment activity of local authorities in seeking funds from the European Union". In the pursuit of the main goal, an empirical study was carried out, which included the following stages: assessing the debt levels of the Polish local government sector; assessing the level of and differences in indebtedness of rural municipalities based on fundamental financial indicators; a synthetic assessment of debt levels of rural municipalities; and identifying the main socioeconomic conditions of indebtedness of rural municipalities.

The indicated research problem is extremely important not only on a local but also national scale due to the connections between the local government sector of public finance and the government sector. The study is the first such comprehensive approach to the problem of indebtedness of rural municipalities in Poland. In addition to the analysis of the amount, structure and dynamics of the debt of local government units, it indicates the most important factors influencing the value of debt. It should be emphasized that the assessment of the level of indebtedness and diversification may be helpful for the managers of local government units in making decisions regarding the possibility of financing tasks and selecting the source of its financing. In addition to the aforementioned practical value, the article is also cognitive and methodical. The applied methods and research scheme can be considered innovative in this area of research. The research is part of theories on rural development and local finances.

2. Materials and Methods

The empirical study was based on data from the Ministry of Finance [35] and from the Central Statistical Office (*Local Data Bank*) [36], as collected in Poland in 2007–2009 and 2015–2017. The results are expressed in Polish currency (key data was converted to euro as per the weighted average exchange rate of the National Bank of Poland [37], which varied in the range of 3.52 EUR/PLN to 4.36 EUR/PLN). These years were used in the study because Polish municipalities implemented considerable investments co-financed with European Union funds at that time. Furthermore, that period witnessed the sharpest changes in local government debt levels, especially when it comes to rural municipalities.

The study on the level of indebtedness of Polish rural municipalities and on identifying the main socioeconomic conditions of that process was carried out in three steps. The pursuit of the research objective stated in this paper started with an analysis of the development of public debt in Poland (this included identifying the problem of growing debt levels of the local government sector). Next, this study assessed the changes in total debt levels and in the total debt to total income ratio,

and the debt servicing costs in relation to total incomes and own incomes in rural municipalities compared to other LGUs in 2007–2017. Due to the presumed nature of the phenomenon covered by the study, a quartile-based TOPSIS approach was used to synthetically assess the levels of and differences in debt incurred by Polish rural municipalities. The synthetic indicator of municipal debt levels was structured based on data from 2007–2009 and 2015–2017. The values of the synthetic indicator were used as a basis in creating typological classes of debt levels of rural municipalities. This enabled tracing the evolution of the levels of and differences in debt incurred by local government units covered by the study. The identified typological classes of the debt levels of rural municipalities also provided a basis for developing a model of this process underpinned by an ordered logit structure. It allowed to determine the strength and direction of the impacts of specific socioeconomic development factors on the levels of debt incurred by Polish rural municipalities.

The research scheme was developed in accordance with the assumptions set out in [38] and as provided for by the Joint Research Centre—European Commission [39]. Six steps can be identified in the process of building a synthetic characteristic of municipal debt levels. The first step, based on substantive and statistical criteria, includes selecting simple characteristics of the objects (municipalities) and determining the way they affect the general criterion considered (i.e., debt level). Based on substantive grounds, five simple characteristics were selected to reflect the phenomenon, namely, total debt level in PLN per capita (x_1); total debt to total income ratio (%) (x_2); ratio of debt servicing expenses to total incomes (%) (x_3); ratio of debt servicing expenses to own incomes (%) (x_4); and share of maturing liabilities in total liabilities (%) (x_5). The set of simple characteristics established based on substantive grounds was subject to further statistical verification to determine their discriminatory capacity and information capacity. Based on the calculated value of the coefficient of variation, x_5 was removed from further analysis due to low variation. Next, the inverse matrix of the correlation coefficients between the variables was calculated to eliminate the ones excessively correlated with each other. Based on the analysis of diagonal entries of the matrix, none of the variables were excluded from further investigation. As a consequence, four simple characteristics were taken into consideration in the next step of this study. All of them were found to have a stimulating effect on the level of municipal debt.

The next (2nd) step of structuring the synthetic characteristic was the normalization of the simple characteristics, and used the classic standardization method [38]:

$$z_{ik} = \frac{x_{ik} - \overline{x}_k}{s_k}, \tag{1}$$

where x_{ik}—the value of characteristic k in object (municipality) i, and $\overline{x}_k$, s_k—arithmetic mean and standard deviation, respectively, for characteristic k.

The normalization of the simple characteristics was performed for the aggregate of the average figures from 2007–2009 and 2015–2017 (referred to as object years) in order to ensure comparability of results in the periods considered and to reveal the development trend followed by the complex process under consideration.

The coordinates of the reference objects are determined in the next (3rd) step of structuring the synthetic characteristic. Usually, they are defined as the positive ideal solution [38]:

$$A^+ = \left(\max_i(z_{i1}), \max_i(z_{i2}), \ldots, \max_i(z_{iK})\right) = \left(z_1^+, z_2^+, \ldots, z_K^+\right) \tag{2}$$

and the negative ideal solution:

$$A^- = \left(\min_i(z_{i1}), \min_i(z_{i2}), \ldots, \min_i(z_{iK})\right) = \left(z_1^-, z_2^-, \ldots, z_K^-\right). \tag{3}$$

However, real-world datasets may include unusual values (outliers or extreme characteristics) resulting from the particularities of the phenomenon under consideration. This is the issue encountered

when assessing the debt level of Polish rural municipalities. These observations may have a significant impact on the results of the analysis (e.g., a typological classification), which is why they require special attention. In such cases, according to empirical research by Wysocki and his team, if an assumption is made that the maximum and minimum values of the characteristics in the reference methods for linear ordering (e.g., TOPSIS) are module objects, it results in most objects being excessively distant from the ideal values of the simple characteristics (see [40–42]). For instance, if the distribution of simple characteristics has a strong right-side asymmetry, most objects will be located far away from the positive ideal solution and very close to the negative ideal solution (in TOPSIS). As a consequence, the values of the synthetic indicator will be low and concentrated in the bottom part of its range (<0, 1>). In turn, the reduced range of the synthetic indicator may entail problems with identifying the development levels of the phenomenon considered. In the reference methods for linear ordering, ideal solutions are set separately for each characteristic. Therefore, the method for the identification of outliers proposed in this paper relies on a single-dimensional approach: the quartile criterion (it is used to draw the box plots introduced by Tukey [43]) (cf. [41]). The values of a single characteristic are found to be outliers if located outside the following interval [43,44]:

$$[Q_{1k} - 1.5 \cdot IQR_k, Q_{3k} + 1.5 \cdot IQR_k], \tag{4}$$

where Q_{1k}, Q_{3k}—first and third quartile, respectively, of values of characteristic k, and IQR_k—quartile deviation for values of characteristic k.

Based on the quartile criterion (6), the coordinate of the positive ideal solution $\left(A_k^+\right)$ for characteristic k (having a stimulating effect) is defined as [41]:

$$A_k^+ = \begin{cases} \max\limits_{i=1,\ldots,N}(z_{ik}), if\ z_{ik} \in [Q_{1k} - 1.5 \cdot IQR_k, Q_{3k} + 1.5 \cdot IQR_k]\ for\ i \in [1, \ldots, N], \\ Q_{3k} + 1.5 \cdot IQR_k,\ if \max\limits_{i=1,\ldots,N}(z_{ik}) > Q_{3k} + 1.5 \cdot IQR_k \end{cases} \tag{5}$$

and the coordinate of the negative ideal solution $\left(A_k^-\right)$ is defined as:

$$A_k^- = \begin{cases} \min\limits_{i=1,\ldots,N}(z_{ik}),\ if\ z_{ik} \in [Q_{1k} - 1.5 \cdot IQR_k,\ Q_{3k} + 1.5 \cdot IQR_k]\ for\ i \in [1, \ldots, N], \\ Q_{1k} - 1.5 \cdot IQR_k,\ if \min\limits_{i=1,\ldots,N}(z_{ik}) < Q_{1k} - 1.5 \cdot IQR_k \end{cases} \tag{6}$$

Hence, the coordinate of the positive ideal solution ($A_k^+ = Q_{3k} + 1.5 \cdot IQR_k$,) and the coordinate of the negative ideal solution ($A_k^- = Q_{1k} - 1.5 \cdot IQR_k$) are assigned to all outliers of characteristic k found in intervals $[Q_{3k} + 1.5 \cdot IQR_k, \max\limits_{i=1,\ldots,N}(z_{ik})]$ and $[\min\limits_{i=1,\ldots,N}(z_{ik}),\ Q_{1k} - 1.5 \cdot IQR_k]$, respectively [41].

The coordinates of the reference objects provide a basis for calculating the distance of each object (municipality) under consideration from the positive ideal solution (A^+) and the negative ideal solution (A^-) using the Euclidean formula (Step 4) [38]:

$$d_i^+ = \sqrt{\sum_{k=1}^{K}\left(z_{ik} - z_k^+\right)^2},\ d_i^- = \sqrt{\sum_{k=1}^{K}\left(z_{ik} - z_k^-\right)^2}, \tag{7}$$

The TOPSIS method [39] was used to create the synthetic indicator (Step 5).

$$S_i = \frac{d_i^-}{d_i^- + d_i^+},\ i = 1, \ldots, N, \tag{8}$$

with $0 \leq S_i \leq 1$.

Values of the synthetic indicator calculated above provide a basis for linear ordering of rural municipalities in a non-ascending sequence. In Step 6, this was the basis for arbitrarily identifying

the typological classes of debt level of Polish rural municipalities. The following numeric intervals of the synthetic indicator S_i were defined arbitrarily: < 0.00; 0.20—*extremely low*; < 0.20; 0.40—*low*; < 0.40; 0.60—*medium*; < 0.60; 0.80—*high*; and < 0.80; 1.00—*extremely high level* of municipal debt.

In the next step of this study, the identified typological classes of the debt levels of rural municipalities became the basis for developing a model of the indebtedness process. An ordered logit model for cumulative probabilities [45,46] was used for that purpose. It allows to determine the importance (impact strength and direction) of the specific socioeconomic development factors to the level of debt incurred by rural municipalities. The analysis of the model provides a more in-depth insight into the reasons for differences in the debt levels between local government units. That model was used for the ordered variable, which consists of the typological classes of the debt levels incurred by the municipalities surveyed. The variable was combined with a system of socioeconomic indicators.

The following ordered logit model (proportional odds model) was used to identify the determinants of municipal debt levels [45,47,48]:

$$y_i^* = x_i^T \beta + \varepsilon_i \tag{9}$$

where: $x_i^T \beta = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \ldots + \beta_k x_{ki}$;

y_i^*: latent variable for municipality i; its discrete equivalents correspond to the identified classes of debt level $(j = 1, 2, \ldots, J)$;

x_i: vector of explanatory variables for municipality i (factors that affect municipal debt levels);

K_2: number of characteristics representative of the socioeconomic situation (k = 1, 2 . . . , K_2);

β: vector of parameters;

ε_i: random term for municipality i.

In this case, the modeling procedure is performed for cumulative logits, i.e., logarithms of the ratios between the probability that municipality i belongs to a category no higher than j (p_{ij}) and the probability of the opposite event ($1 - p_{ij}$). The debt category is determined by a set of exogenous variables (indicators of socioeconomic development) and by the random term. In the case of J categories (established based on the value of the synthetic feature), J—1 logit equations are created (see, e.g., [49]):

$$\text{logit}\left(p_{ij}\right) = \ln \frac{\Pr(y_i \le j)}{\Pr(y_i > j)} = \ln \frac{p_{ij}}{1 - p_{ij}} = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \ldots + \beta_k x_{ki} + \varepsilon_i \tag{10}$$

for $j = 1, 2, \ldots, J - 1$, with $p_1 + p_2 + \ldots + p_J = 1$.

This model is about interpreting the odds (risk), defined as the quotient of the probability of an event and the probability of an opposite event (odds ratio). It shows the change in odds for (risk of) an increase in debt levels in a case where variable x_i is incremented by 1, *ceteris paribus*; if $\exp(\beta_k) > 1$ $(k = 1, 2, \ldots, K_2)$: the odds (risk) will increase; if $\exp(\beta_k) < 1$: the odds (risk) will decrease. In this case, these are the odds for (risk of) moving up one class in the debt-level classification. There is only one set of estimated parameters for the explanatory variables if a proportional relation exists between all category pairs within the same group of comparisons [50,51].

3. Results and Discussion

3.1. Increase in Local Government Debt as a Threat to Local Development and Rural Areas (Theoretical Background)

In many countries, including Poland, facilitating development is the responsibility of local government. Hence, the public investment activity starts at a local level. According to economic research, there are several reasons that justify the increase in public expenses, including in local government expenditure [52], which may be divided into four essential groups: economic, sociological, political and social factors [53]. The major economic reason is technological progress, which requires that technological innovations be quickly implemented in the operating practice of the local government units themselves and their organizational entities. This means that a higher budget expenditure is needed to cover the relatively high purchase costs of the technologically advanced equipment.

Another economic factor is the involvement of local government in investment activities (mostly including infrastructural investments) to promote local development [54]. In this context, the EU integration process and the use of structural funds (which require pre-financed expenses) are aspects of great importance.

Sociological reasons for the increase in public expenditure include the rising social aspirations caused by the local population's commitment to development [55]. Other examples are certain historically driven attitudes of societies who adopt a demanding stance vis-à-vis the omnipotence of public authorities; this is still the case in countries who have only recently experienced a market transformation from the socialist system. The group of sociological reasons includes different versions of what is referred to as fiscal illusion [56].

The political reasons behind the increase in public expenditure results from the economic policy doctrine and, as a consequence, from the perceived role of central and local government institutions in the economy. While neoliberal concepts are focused on reducing the role of the state, a statist approach means the active involvement of local government in the implementation of social functions of the state [57]. In practice, this means that in the context of capitalist democracy, there is greater pressure from the society to increase public spending in order to achieve the goals desirable for the majority [58].

Social impulses that trigger an increase in public expenditure include demographic change, resulting in the emergence of an ageing population that needs to be taken care of and be socially included [59,60]. For the public sector, this means increasing the expenditure on healthcare and social care facilities or, where legally allowed, providing financial support to non-government organizations, for instance by contracting the performance of public tasks.

The causes of public debt originate from, inter alia, macroeconomic imbalances (inflation, level of total public debt); country size and the level of development (GDP per capita, income per capita); crises and external shocks; openness (trade and capital account openness); and exchange-rate regime (fixed or floating exchange rates) [61,62]. Moreover, the literature analysis includes information on the impact of defense spending on the level of public debt e.g., [63,64]. However, this relationship was not confirmed by the Sadlk-Zada and Gatto study [62], while the regression analysis conducted on a sample of 184 countries confirmed the importance of: share of GDP, unemployment, interest payments, oil rent as a share of total revenue and mineral rent as a share of total revenue.

In the context of a limited capacity to increase local government incomes, a rise in budget expenses inexorably leads to a deficit in local budgets. Because the conditions presented above are relatively stable and persist year after year, there is an unsustainable imbalance between incomes and expenses, causing the creation and accumulation of local government debt. However, a budget deficit and local government debt cannot be regarded as purely negative developments. Their scale (usually, the relative figures calculated in relation to budget incomes) and, first of all, their reasons must be considered as important factors when assessing these processes [65]. Debt incurred to finance ongoing expenditure should definitively be judged negatively, and is a prohibited practice in certain countries [66]. However, when caused by investments, the deficit or debt in the local budget cannot be viewed in strict terms. If the investments bring benefits to the local community and contribute to initiating or accelerating local development processes, they can (and in many cased should) be financed with loans (cf. [67]). This is because they drive accelerated development, which is especially experienced by economic operators who benefit from local government's investments. Fiscal benefits derived from this process will make it possible to repay the loans, and the initiated development processes will allow the local government units to more than offset the investment expenditure in the future. However, it is important to make rational investments and build economically viable facilities because otherwise overinvestment could be experienced [68,69].

Growing debt may be caused by local government units implementing ambitious investment plans; if this is the case, it is justified by the increase in assets controlled by the local government. Indeed, public investments are usually infrastructural expenditures with a long lifecycle. They can be also considered as capital expenditure used to finance hard (physical) infrastructure projects and soft

infrastructure projects (related to creating and developing human capital, innovations and R&D) [20,70]. Local government assets usually include technical and social infrastructure components that facilitate and reduce the costs of operations for businesses while also improving the standards of living for the local community. All of these elements define a picture of the municipality and thus determine the way local government units are perceived by internal and external stakeholders. In a vast majority of cases, a positive picture of the local government units is related to an adequately high development level and to the pace of the ongoing changes. This is especially true for countries that undergo economic transformation and considerably restructure the local economy as required. It should be stressed that "moral hazard theory is also relevant to how local governments borrow to finance their expenditure. In this context, moral hazard means the subsidization by taxpayers/ratepayers of unaffordable commitments entered into by their local political representatives" [71]. This theory stems from the fact that local governments spend public money with less concern than private money, additionally guided by the interest of gaining support among future voters (see [72]). The lack of prudence in the use of repayable financial instruments by the local governments is also due to the securing of their debt by the central government (see [73]).

However, a growing or excessive debt could slow down, if not stop, the local development processes. This happens when it is no longer possible to induce development as a direct consequence of extensive investment activities at the local government level. It turns out that the multiplier effects get weaker over time. High levels of municipal debt may also result in the need to impose restrictions on local budgets with respect to both ongoing and investment expenditure. Multiple legal, economic, political and organizational limitations are therefore introduced in the financing system to prevent the undesirable consequences of growing debt at local government level.

3.2. Legal Conditions for Limiting Local Government Debt in Poland and the EU

The definition of legal restrictions imposed on the local government's ability to incur debt differs between countries and is not governed by any unified rules. The methods for limiting LGU debt include quantitative restrictions on the levels of debt; limited access to the capital market, including restricting the type of lending institutions; and social control over debt levels exercised by the population.

In Poland, legal restrictions on the amount of deficit and debt of LGUs are set out in the Public Finance Act [74]. Currently, the applicable statutory limitations on local government debt include

- defining the acceptable sources used to offset the deficit as incomes derived from loans and credits; privatization of LGU assets; sale of securities issued by LGUs; budget surplus from previous years; and non-earmarked funds that are the surplus derived from the settlement of securities issued and credits and loans incurred in previous years;
- the requirement to obtain the opinion from the Regional Chambers of Audit on whether the deficit may be financed.

The Public Finance Act of 2009 [74] introduced a series of amendments regarding the local government units' capacity to incur debt. Starting from 1 January 2011, the decision-making authority of an LGU cannot accept a budget with a current account deficit. This means that the current expenses cannot exceed the current incomes that increased with the budget surplus from previous years and with the amount of non-earmarked funds. Another significant limitation imposed by the Public Finance Act of 2009 [74] consists in switching from a general method of setting LGU debt limits to a case-by-case method. The amendment entered into force on 1 January 2014 and abolished the general limits for LGU debt (set at 60% of the total income). Instead, the limit of debt was made dependent upon the LGU's capacity to repay it, measured with the operating surplus. The act states that the LGU's decision-making authority cannot accept a budget that, if implemented, would result in a situation where, in the budget year concerned and each year thereafter, the ratio between the total amount of credit and loan installments to be paid that year plus the redemption of the securities issued by the LGU (together with interest and discount) plus repayments of amounts, if any, resulting from

sureties and guarantees granted—on the one side—and the planned current budget income—on the other—exceeds the arithmetic mean of the ratio between the current income less funds allocated to tasks co-financed with European funds less current expenditure less the amounts resulting from the repayment of installments—on the one side—and the current budget income—on the other—calculated for the previous 7-year period. The above restriction can be expressed with the following formula:

$$\frac{(R+O)}{Db} \leq \frac{1}{7} \cdot \sum_{i=1}^{7} \frac{(Dbei - Wbei)}{Dbi}$$

where *R*: total amount of credit and loan installments planned to be paid in the budget year concerned plus the redemption of securities issued; *O*: interest on credits and loans, interest on and discount from securities, and repayments of amounts resulting from sureties and guarantees granted, as planned for the budget year concerned; *Db*: planned current budget income less subsidies and funds allocated to current operations; *Dbei*: current income in year preceding by *i* years the year for which the ratio is calculated, less funds allocated to tasks co-financed with European funds; *Dbi*: current income in year preceding by *i* years the year for which the ratio is calculated, less subsidies and funds allocated to current operations; and *Wbei*: current expenditure in the year preceding by *i* years the year for which the ratio is calculated, less current spending on the repayment of installments.

The economic restrictions imposed on debt primarily include the local government's capacity to incur debt, i.e., their creditworthiness. It is directly related to assessing the LGU's current financial situation and to forecasting its future financial situation [75,76]. Note that own incomes are the basic category of incomes (which may be used to repay previous liabilities) for the municipalities, powiats and cities with powiat status. Considering that own incomes represent a small share in total incomes, they can largely reduce the LGUs' capacity to incur debt. Another barrier in this group is the limited portfolio of debt instruments available in the financial market.

Political restrictions are related to the balance of power in decision-making and executive bodies of local government units, which have an impact on the decision to incur debt. Political views, as well as certain measures taken to gain or maintain power during the next term, translate into decisions on local government debt that are often driven solely by political calculations rather than being underpinned by a rational economic analysis [77].

Organizational conditions are somehow related to the local government's inherent characteristics, manifested in the fact that the authorities do not realize the need for incurring debt. However, they are not guided by cautiousness but by insufficient knowledge and a poor awareness of how financial market mechanisms operate. Nevertheless, in many local government units, these restrictions seem to have lost much of their importance over the recent years.

The principles that govern the incurrence of debt by local government units are an issue reflected in international regulations, such as the European Charter of Local Self-Government (ECLSG). Article 9 of ECLSG states that "For the purpose of borrowing for capital investment, local authorities shall have access to the national capital market within the limits of the law" [78]; this Article also provides that the liabilities incurred by local government units may only be allocated to investment expenditure, and that access to financial instruments available in the domestic capital market shall be limited.

Local government debt has attracted more and more interest since some Mediterranean EU countries started to face severe financial problems as a consequence of the financial crisis [79–81]. New papers addressing the situation in Central and Eastern Europe also started to emerge [82,83]. Despite the solutions set out in the European Charter of Local Self-Government [78], EU countries differ in regulations regarding the local government's capacity to incur debt and the ratio of local debt to GDP [82]. As the debt restrictions imposed on local government units differ relatively strongly between European Union countries, they are summarized in Table 1.

Table 1. Restrictions on the local government units' capacity to incur debt, as applicable in the European Union.

Scope of Applicable Restrictions	Solutions Adopted in EU Countries
Purpose of debt	Investments only: Austria, Belgium, Denmark, Estonia, France, Greece, Spain, the Netherlands, Ireland, Luxembourg, Germany, Slovakia, Sweden, UK, Italy
	Both for ongoing operations and investments: Czech Republic, Hungary, Finland (balance required within a 3-year planning period)
Credit or loan approval	Required: Austria, Cyprus, Denmark, Spain, Ireland, Latvia, Malta, Germany, Slovenia
	Not required: Czech Republic, Estonia, Hungary
Upper debt ceiling	35% of annual income: Lithuania 40% of annual income (long-term liabilities) or 20% of annual income (short-term liabilities): Cyprus 60% of annual income: Estonia 60% of annual current income in the previous budget year: Slovakia
	Local government units must comply with the upper debt ceiling set each year on a case-by-case basis by the supervising authority: UK The central government set maximum debt ceilings corresponding to a maximum percentage of annual incomes, budget expenses or total investment volume: Denmark Differs between the federal states: Austria
Upper ceiling for annual debt servicing costs	10% of annual income in the previous budget year: Slovenia 12.5% of annual financial transfers in the current year or 10% of previous year's investment expenditure: Portugal 20% of annual income: Estonia, Lithuania 25% of annual income in the previous budget year: Slovakia 25% of operating income: Spain 70% of current income: Hungary
Upper ceiling for new credits and loans	10% of annual income in the previous budget year: Slovenia 20% of annual budget income: Lithuania

Source: Compilation based on [84,85].

The compilation presented above demonstrates the considerable heterogeneity of local government debt restrictions applicable in the EU. In the vast majority of countries, liabilities may be incurred only in order to cover investment expenditure whereas ongoing budget needs cannot be financed with debt. Furthermore, in many countries (especially in the old EU-15), local government units may take out a loan only upon approval by the competent institution. The greatest differences exist between the maximum limits for local government debt. Nevertheless, in most countries, these levels are set as a percentage of the annual income (from 35% in Lithuania to 60% in Slovakia). In addition to total debt limits, various ceilings are applicable to annual servicing costs of local government debt. Some countries (Slovenia and Lithuania) also established regulations for new credits and loans. Some other ones impose a total ban on foreign currency credits (UK, Austria, the Netherlands, Ireland and Germany).

Many countries restrict the local government's capacity to incur debt by requiring them to publish information on local debt levels. This is compulsory in Belgium, France, the Netherlands, Spain, Ireland, Luxembourg, Germany, Sweden, Switzerland, UK and Italy.

3.3. Indebtedness of Polish Local Government Units

The indebtedness of local government units (LGUs), i.e., local public debt, means a financial liability of public authorities of the local government sub-sector towards operators from outside that

sub-sector that is to be repaid. As indicated by authors, which include Vammalle and Hulbert [20] and Standar and Kozera [24], debt is among the key drivers of financial risk faced by local government units. Local indebtedness does not only affect the LGU itself as the debtor, but as a component of public debt, it poses a risk for the society and the economy. The essential reason behind initiating a study on financial management issues relating to the indebtedness of Polish municipalities was the rise of public debt recorded in the local government sector over the recent years. This was particularly noticeable in 2009–2011 where local debt grew at a clearly higher rate than the entire public debt at the country level. In 2017, the total amount of public debt was PLN 961.9 billion (EUR 222.9 billion), which is over PLN 420 billion (EUR 98.6 billion) higher than what was recorded in 2007 (growth by more than 80%). In that period, local government debt increased from PLN 24.5 billion (EUR 6.5 billion) in 2007 to PLN 69.5 billion (EUR 16.3 billion) in 2017, i.e., nearly tripled. As a consequence, the share of local government debt grew sharply in the country-level public debt structure: from 4.9% in 2007 to 7.8% in 2017 [86–88].

In Poland, a large share of local government debt is made up by basic local government units (municipalities) who perform the broadest scope of public tasks assigned to the local government sector. In 2007, their debt amounted to PLN 10 billion (EUR 2.5 billion), compared to nearly PLN 25 billion (EUR 5.9 billion) in 2017 [86–88]. In 2017, there were 2478 municipalities in Poland, of which rural units (over 60% of the total number) and urban units (12%) formed the largest and the smallest group, respectively [36].

In order to show the scale of debt incurred by the local government units covered by this study, the following basic indicators were used as a reflection of this process: debt per capita; debt to total income ratio; and the ratio of debt servicing costs to total income. The development of these indicators in the Polish local government sector in 2007–2017 is presented in Figures 1–3. Research findings suggest that, of all the LGUs, the highest debt levels in PLN per capita were recorded in cities with a powiat status, especially in metropolises. Poland has 12 metropolises (largest urban districts), namely, Białystok, Bydgoszcz, Gdansk, Katowice, Krakow, Lublin, Łódź, Poznań, Rzeszów, Szczecin, Warsaw and Wrocław [89]. In addition to being at the highest level throughout the study period, their debt also grew at the fastest pace. Indeed, in 2017, the debt of metropolises was over PLN 2908 per capita (EUR 683 per capita), i.e., over half more than the average level recorded in a city with powiat rights and nearly three times more than the average figure for rural municipalities. Conversely, the lowest debt levels were reported by voivodships (PLN 135.5 per capita, EUR 31.8 per capita) and powiats (PLN 201.7 per capita, EUR 47.4 per capita in 2017). However, their scope of tasks is much narrower than that of a municipal government (Figure 1).

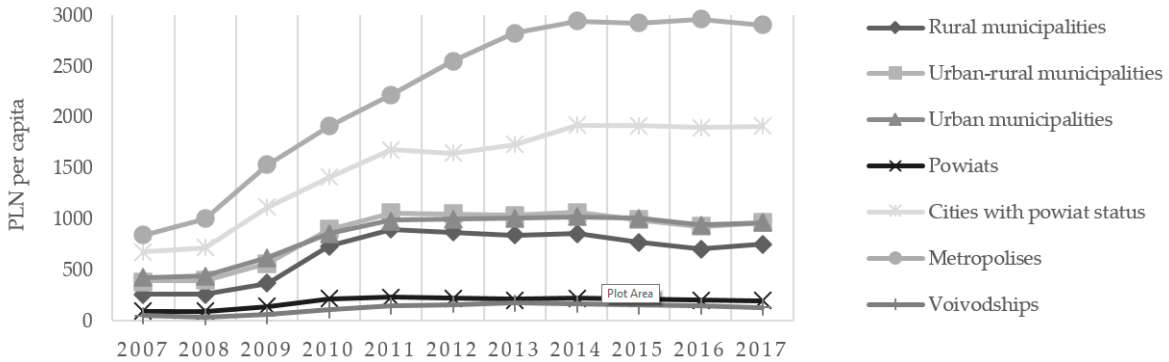

Figure 1. Debt levels of Polish local government units in 2007–2017 (PLN per capita). Source: Own calculations based on data from the Ministry of Finance [35].

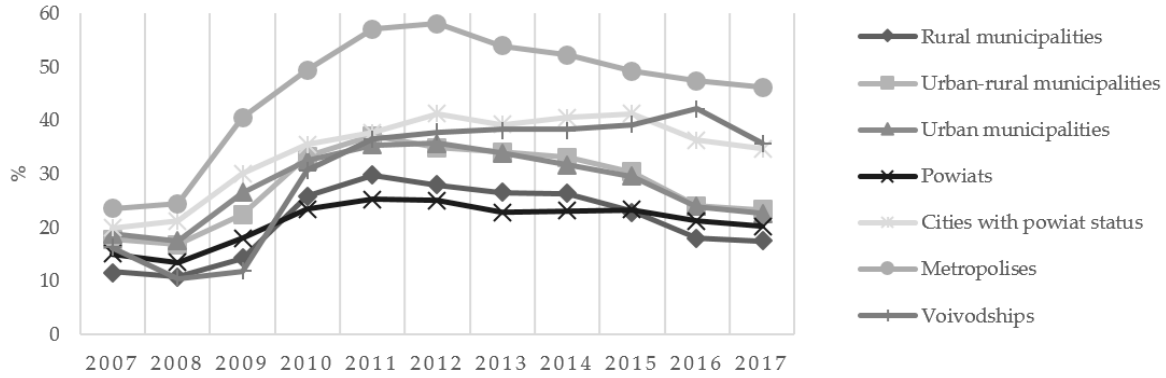

Figure 2. Ratio of total debt to total income in Polish local government units in 2007–2017 (%). Source: Own calculations based on data from the Ministry of Finance [35].

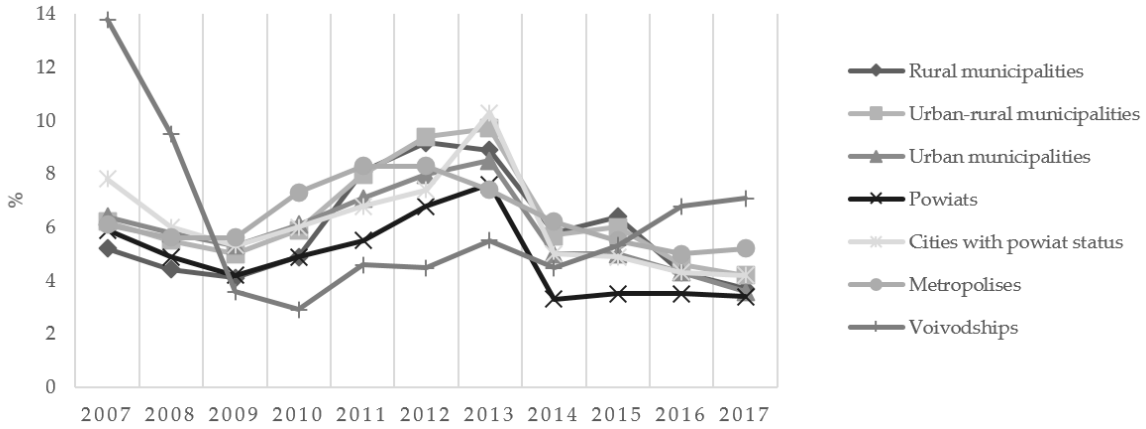

Figure 3. Ratio of debt servicing costs to total income in Polish local government units in 2007–2017 (%). Source: Own calculations based on data from the Ministry of Finance [35].

In the group of municipal government authorities, the highest levels of debt were found in rural and urban-rural municipalities whereas rural municipalities reported the lowest levels (Figure 1). In 2017, the average total debt of urban and urban-rural municipalities was PLN 968.3 and PLN 963 per capita (EUR 227.4 and EUR 228.2 per capita), respectively, which is ca. 30% higher than in rural municipalities. Note however that rural municipalities recorded the highest growth rate of debt. Indeed, their debt figures nearly tripled over the study period, going from PLN 267.7 per capita (EUR 70.8 per capita) in 2007 to PLN 751.9 per capita (EUR 176.6 per capita) in 2017.

Note that all types of local government covered by this analysis recorded a considerable increase in debt levels: from over 2 times in powiats to nearly 3.5 times in metropolises. A particularly strong growth trend is noticeable in the initial years of this analysis. In turn, no major changes were recorded in the last 3 years. The fastest growth pace was witnessed in 2009–2010 as the amount of debt increased by a half during one year (Figure 1). This was related to the public finance crisis and the implementation of large investments under Union programs that (due to the LGU's own contribution and the principle that the project is refunded only upon completion) stimulated the use of debt instruments. A large increase in public sector debt during the recent financial crisis was also observed in other countries [62,90].

The second indicator used in assessing the indebtedness process is the ratio of total debt to total income of the local government units (Figure 2). The highest debt levels were recorded in metropolises and cities with powiat rights. Note that, in 2011–2012, the average level of that ratio in metropolises was only 2–3 percentage points below the statutory limit. Such a high level poses a risk of excessive indebtedness, which can result in restricting the investments or even sending local government units into a debt spiral. Although high, the debt of cities with powiats rights was maintained at a relatively

safer level of up to 2/3 of the statutory limit. Elevated levels of that ratio were also recorded in voivodship government units, although the debt was quite low when converted to per capita figures.

Note that although as many as 107 municipalities (ca. 7% of the total number) did not use any financial debt instruments at all in the initial period; that number halved in the final period. As shown by the analysis of the maximum values of the ratios considered, excessive debt becomes a growing problem. Indeed, in 2007–2009, only 1 municipality had a debt-to-total-income ratio above the statutory limit of 60%. However, in 2015–2017, this was the case for 29 units, including 3 with an extremely high ratio (over 100%). In the Ostrowice municipality, such an elevated debt level combined with a small income-generating potential pushed them into a spiral of debt. On 1 January 2019, the municipality of Ostrowice was dissolved due to financial problems. Its territory and assets were merged into two local government units: Drawsko Pomorskie and Złocieniec. This was the first dissolution of a municipality in Poland. Note also that three periods can be identified based on the analysis of debt levels measured with the total-debt-to-total-income ratio: the period ending in 2010, marked by consistent growth; 2010–2012, a period where the ratio was maintained at a high level; and 2013–2017, a period where it followed a downward trend. When comparing the two debt ratios, note that, despite the considerable rise in debt levels per capita (which sometimes became even several times higher), the debt-to-total-income ratio is on a decline.

The last indicator used in assessing the indebtedness process is the ratio of debt servicing expenses to total income (Figure 3). The fact that municipal debt grew until 2010 and remained at an elevated level in 2010–2012 resulted in increased debt servicing costs being recorded in 2011–2013. After 2013, the ratio of municipal debt servicing expenses to total income started to reduce, and reached the lowest level in 2017. The average level of that ratio did not exceed the statutory limit in any of the local government groups considered. Voivodship-level units reached a near limit in 2007 whereas cities with powiat status reported relatively elevated ratios in 2013. When comparing the generalized results for all types of local government units, it may be concluded that the highest debt servicing costs were recorded by metropolises and urban-rural municipalities, followed by cities with powiat status and voivodship-level local government. In turn, the lowest levels were found in powiats. Regarding this ratio, rural municipalities had a good standing, similar to that of their urban peers. The average level of the ratio in 2007–2017 was 5.9%. Note that, in 2012–2013, the debt servicing expenses incurred by these units were safe, though relatively high. In 2017, the ratio of debt servicing expenses to total income was barely 3.7%, providing a large safety margin and the ability to use debt instruments in the next years.

The growing municipal debt should not always be viewed as a negative development. As shown by this study, in 2007–2017, the rise in municipal debt was accompanied by a consistent growth in municipal investment expenditure, which was also related to the use of European Union funds. Studies carried out in other countries also confirm the increase in debt related to the financing of investment expenditure [62]. However, a decline in municipal investment activities has been observed since 2012. The reasons behind the restriction of investment expenses by municipal self-government could include the economic slowdown and its impact on local finance, manifested through a smaller amount of own income [24,91–93]. Another reason for the decline in local government investments was the amendment to legal regulations on the LGUs' ability to incur new liabilities, which entered into force in 2014.

3.4. Assessment of the Levels of and Differences in Debt Incurred by Polish Rural Municipalities

In Poland, rural municipalities form the largest group of municipalities.; rural areas also make up over 90% of the national territory, and rural municipalities alone are home to 11 million people, i.e., 30% of the total population [36]. These units also exhibit the greatest heterogeneity in their functions. As shown in studies, including by Kozera and Głowicka-Wołoszyn [94], these municipalities represent basic functions characteristic of rural areas, i.e., agricultural functions. However, more and more they shift to functions that are characteristic of other administrative types: service and residential functions. This is particularly true for rural municipalities located near larger urban centers (especially

metropolises) due to reasons such as the progressing suburbanization processes [7]. As a consequence, local populations' needs differ across rural municipalities, which have different functional types and fulfill different scopes of tasks. The change in the importance and role of rural municipalities results in an increase in the local community's needs, including in the area of social and technical infrastructure. This contributes to the growing number of investments aligned with the needs of the new residents, investors or tourists, which require considerable amounts of financial resources to be mobilized. Municipal funds derived from budgetary incomes are often not enough to cover all expenses planned in the budget. At the same time, municipalities (including rural ones) implement more and more investments, including those co-financed with European Union funds, in an effort to become more attractive to new residents and investors. In a context of limited own incomes, rural municipalities must rely on repayable sources of financing (often by accessing funds delivered by the EU) to address the needs of the local community. On the one hand, repayable funds allow rural municipalities that are less financially autonomous than their peers of other administrative types (cf. [95]) to operate in a situation where their income do not match the costs of tasks they fulfill, but also to maintain incomes at a high level. Investment expenditure at the municipality level results in improving the standards and conditions of living for the local community (among other benefits), while also driving local development. Taking long-term goals into account and creating conditions for an inclusive development that addresses the needs of different stakeholder groups is considered a priority in current research on local development [96]. However, on the other hand, excessive indebtedness exposes municipalities (especially those at lower levels of own income potential) to a greater financial risk [24].

The assessment of the level and diversity of debt of rural communes in Poland was carried out in two stages. In the first stage, a one-dimensional analysis was carried out based on the values of the selected financial indicators, and the studied phenomenon was evaluated using basic methods of descriptive statistics (Table 2). The conducted research has shown that, in the years 2015–2017 in comparison to the years 2007–2009, the overall level of debt of rural communes has increased in terms of the average level of debt per capita and the share of total liabilities in total revenues. In the same period, the average burden on the total revenues of rural communes with expenditures on debt service slightly increased. Although the average level of debt of the studied communes increased, it was at a safe level, constituting a third of the statutory limit, similarly to the indicator reflecting the debt service level. It is worth noting that, while in the initial period of analysis, as many as 107 communes (about 7% of these entities) did not use debt financial instruments at all but by the end the number of such local governments decreased by half. The analysis of the maximum values of the analyzed indicators indicates an increasing problem of excessive debt because, while in the years 2007–2009, only in the case of one commune the share of debt in total revenues exceeded the statutory limit of 60%; in the years 2015–2017 it was already 29 entities, of which the level of debt of three entities should be considered as very high (above 100%). In the case of Ostrowice Commune, such large debt combined with a low revenue potential led to a debt spiral. Importantly, the increasing level of debt and the costs of servicing it is accompanied by a decrease in diversification among rural communes, as indicated by the calculated values of the coefficient of variation. At the same time, the debt diversity for 50% of local governments quantified by the interquartile range has increased. In the case of debt per capita, this range increased from PLN 397.3 (EUR 102.5) in 2007–2009 to PLN 812.1 (EUR 190.3) in 2015–2017. On the other hand, the share of total debt in total revenues in the corresponding periods increased from 16.2% to 19.6%. This means that an increasing number of communities is using debt financial instruments on an increasing scale.

Table 2. Descriptive statistics of the value of the selected debt indicators of rural communes in Poland in the years 2007–2009 and 2015–2017.

Specification	Total Debt Level in PLN per Capita		Share of Total Debt in Total Revenues in (%)		Burden of Debt Service Expenditure on Total Revenues (%)	
	2007–2009	2015–2017	2007–2009	2015–2017	2007–2009	2015–2017
Minimum	0.0	0.0	0.0	0.0	0.0	0.0
Lower quartile	119.8	365.6	5.1	9.8	2.0	2.6
Median	278.9	729.2	11.7	18.8	3.8	3.9
Upper quartile	517.1	1177.7	21.3	29.3	6.1	5.7
Maximum	4264.9	30,172.5	83.6	405.7	20.3	59.8
Positional coefficient of variation (%)	71.2	55.7	69.2	52.0	54.2	35.6

Source: Own calculations based on data from the Ministry of Finance [35].

Debt of local government entities is a complex phenomenon; therefore, in the second stage of the study, the diversity of rural commune debt levels was evaluated synthetically on the basis of the values of the synthetic measure calculated using the TOPSIS method. Based on the constructed values of the synthetic measure, five typological classes of the debt level of rural communes in the analyzed years were distinguished. On their basis, the differences in the scale of this phenomenon among rural communes and its change in the years 2015–2017 in comparison to the years 2007–2009 was assessed. The results are shown in Tables 3–6.

The finding from empirical research is that the general level of indebtedness of rural municipalities was higher in 2015–2017 than in 2007–2009 (Table 2). In 2007–2009, the median for the defined synthetic indicator of municipal indebtedness was 0.380, compared to 0.513 in 2015–2017. Hence, this research revealed not only that rural municipalities report increased levels of general indebtedness but also that they become more heterogeneous in how they incur debt. This is reflected by the decreasing coefficient of variation for the synthetic indicator, which was 48.3% in the first period vs. 34% in the second.

Table 3. Descriptive statistics of the synthetic indicator of the debt levels of Polish rural municipalities in 2007–2009 and 2015–2017.

Specification	2007–2009	2015–2017
Minimum	0.000	0.000
Lower quartile	0.205	0.324
Median	0.380	0.513
Upper quartile	0.572	0.673
Maximum	1.000	1.000
Positional coefficient of variation (%)	48.3	34.0

Source: Own calculations based on data from the Ministry of Finance [35].

The values of the synthetic indicator served as a basis for identifying five classes of the debt level of rural municipalities. The finding from empirical research is that, in 2007–2009, most rural municipalities (over half of them) recorded extremely low (24.2%) or low (28.3%) levels of debt. In turn, only one-fifth of all rural municipalities were at high (15.9%) or extremely high (5.5%) levels. In the study period, there was a particularly noticeable increase (by 12 percentage points) in the share of rural municipalities at high levels of debt and a considerable decline (by 11.3 percentage points) in the share of rural municipalities at extremely low levels of debt. As a consequence, in 2015–2017, more than one-third of all rural municipalities were at a high or extremely high level of debt (Table 4).

Table 4. Typological classification of the Polish rural municipalities by level of debt in 2007–2009 and in 2015–2017.

Specification	Typological Class/*Municipal Debt Level*				
	I	**II**	**III**	**IV**	**V**
	Extremely Low	**Low**	**Medium**	**High**	**Extremely High**
2007–2009	24.2	28.3	26.1	15.9	5.5
2015–2017	12.9	21.8	28.9	27.9	8.6
Change (percentage points)	−11.3	−6.6	2.8	12.0	3.2

Source: Own calculations based on data from the Ministry of Finance [35].

In 2015–2017, slightly less than 13% of all rural municipalities in Poland reported an *extremely low* level of indebtedness (Class I). These municipalities had an average per capita debt of PLN 71.1 (EUR 16.8), which represents 2% of total incomes, compared to the respective average figures of PLN 730 (EUR 171) per capita and 18.8%. Extremely low levels of debt were recorded mainly in rural municipalities representative of the intensive agriculture type and extensive agriculture type (16.3% and 13.5%, respectively, of all municipalities of that type). In turn, low levels of debt were characteristic of 22% of all rural municipalities (Class II), with an average debt figure of PLN 372.6 (EUR 87.3) per capita, i.e., five times more than in Class I (which reported extreme low levels of debt). In these municipalities, the ratio of debt servicing expenses to own income was 8.3%, i.e., over 6 percentage points more than in rural municipalities at extremely low levels of debt. Low levels of debt were mostly found in agricultural municipalities with a developing residential function (nearly 24% of all municipalities of that type) and in ca. one-fifth of rural municipalities of other functional types (Tables 5 and 6).

Table 5. Intra-class values of the simple characteristics of the debt levels in Polish rural municipalities (average values, medians).

Specification	Typological Class/Debt Level					Total
	I	**II**	**III**	**IV**	**V**	
	Extremely Low	**Low**	**Medium**	**High**	**Extremely High**	
2007–2009						
Debt level per capita (PLN)	46.5	215.6	398.2	654.4	1028.6	278.9
Total debt to total income (%)	2.0	9.1	16.6	27.1	41.0	11.7
Ratio of debt servicing expenses to total income (%)	0.9	2.9	5.0	7.5	10.2	3.8
Ratio of debt servicing expenses to own income (%)	2.5	9.0	16.0	24.0	29.8	11.3
2015–2017						
Debt level per capita (PLN)	71.1	372.6	723.0	1196.0	1507.3	729.2
Total debt to total income (%)	2.0	10.0	18.8	30.4	39.1	18.8
Ratio of debt servicing expenses to total income (%)	0.7	2.7	3.9	5.1	7.5	3.9
Ratio of debt servicing expenses to own income (%)	2.2	8.3	12.0	15.7	23.2	11.5

Source: Own calculations based on data from the Ministry of Finance [35].

In 2015–2017, medium levels of debt were characteristic of nearly 29% of all rural municipalities (Class III). Their per capita debt figure was PLN 723 (EUR 169.4), i.e., almost 19% of the total income, and their ratio of debt servicing costs to own income was 12%. Medium levels of debt were primarily recorded in rural municipalities, which embarked on a multipurpose development path, i.e., rural municipalities with a developing residential, service and tourism function (nearly 34% of all

municipalities of that type), and in representatives of the agricultural type with a developing residential function (nearly 31% of municipalities of that type) (Tables 5 and 6).

Table 6. Characteristics of Polish rural municipalities grouped by debt level and functional type in 2015–2017 (% of rural municipalities of each functional type).

Functional Type	Debt Level					Total Number of Municipalities of the Type Concerned
	I	II	III	IV	V	
	Extremely Low	Low	Medium	High	Extremely High	
Intensive agriculture	16.3	21.5	28.9	25.7	7.7	26.0
Agricultural type with a developing residential, service and tourism function	10.7	20.4	31.4	28.9	8.6	18.0
Agricultural with a developing residential function	11.3	23.9	27.9	27.2	9.7	27.3
Extensive agriculture	13.5	21.2	28.6	26.9	9.9	23.5
Residential type with an industrial and service function	7.4	19.8	27.2	43.2	2.5	5.2

Source: Own calculations based on the study findings shown in Table 5 and on the author's own research on the identification of functional types of rural municipalities, as presented in a paper by Kozera and Głowicka-Wołoszyn [94].

In 2015–2017, almost 28% of all rural municipalities (Class IV) were at high levels of debt. Their average total per capita debt figure was PLN 1196 (EUR 280.2) (i.e., over 60% more than the average level for all rural municipalities) and represented as much as 30% of their total income. In that period, high levels of debt were mostly found in rural municipalities representative of the residential type with an industrial and service function (over 43% of all municipalities of that type). In turn, extremely high levels of debt were recorded in 8.6% of all rural municipalities (Class V). Their average debt-to-total-income ratio was 38%, i.e., over 20 percentage points above the average figure for rural municipalities. In these municipalities, the ratio of debt servicing expenses to own incomes was also as much as 23.2%, compared to 11.5% as the average level for all rural municipalities. Extremely high levels of debt were mostly found in agricultural rural municipalities with a developing residential function (nearly 10% of all municipalities of that type) and in representatives of the extensive agriculture type (nearly 10% of all municipalities of that type) (Tables 5 and 6).

3.5. Identifying the Main Determinants of Debt Levels in Polish Rural Municipalities

The purpose of this study was to assess the hierarchy of importance and the impact strength of the determinants of debt levels in Polish rural municipalities. The indebtedness process of rural municipalities was modeled using an ordered logit model with a discrete dependent variable that takes values from a countable finite set arranged according to a defined hierarchy. Hence, that model was used for the ordered variable that consists of the typological classes of the debt levels incurred by the municipalities surveyed, as discussed earlier in this paper. The variable was combined with a system of socioeconomic indicators. The models were used in assessing the impact of over 30 demographic, social, economic and financial characteristics that provide a picture of rural municipalities.

Table 7 presents the estimated parameters of an ordered logit model of the debt levels in rural municipalities. Parameter estimates were used to calculate the odds ratios (*RRR*, relative risk ratios), which indicate whether there are greater ($RRR > 1$) or smaller ($RRR < 1$) odds for (risk of) a change in the level of debt incurred by rural municipalities due to a specific socioeconomic characteristic. The calculated odds (risk) ratios are interpreted as follows: the more their values are distant from one, the stronger the impact of the variable considered on the differences in debt levels between rural municipalities.

Table 7. Estimation results for the parameters of the ordered logit models for debt levels of Polish rural municipalities in 2007–2009 and 2015–2017.

Explanatory Variables	Coefficient	Standard Error	Wald *z* Statistic	Significance Level *p*	Odds (Risk) Ratio
		2007–2009			
Share of operating surplus in total incomes (%)	−0.137	0.012	−11.80	0.000	0.872
Share of investment expenditure in total expenditure (%)	0.061	0.009	6.62	0.000	1.063
Share of population served by a sewerage network (%)	0.014	0.003	4.88	0.000	1.014
Net migration rate per 1000 population	0.028	0.009	3.29	0.001	1.028
Share of EU funds in total incomes (%)	0.079	0.025	3.21	0.001	1.082
Share of incomes derived from property tax in own incomes (%)	−0.019	0.007	−2.92	0.003	0.981
Share of agricultural tax in own incomes (%)	−0.019	0.007	−2.83	0.005	0.981
Share of own incomes in total incomes (%)	−0.015	0.006	−2.55	0.011	0.985
		2015–2017			
Share of operating surplus in total incomes (%)	−0.079	0.011	−6.77	0.000	0.924
Share of EU funds in total incomes (%)	0.102	0.019	5.27	0.000	1.107
Number of operators entered to the REGON register per 10,000 population	0.001	0.000	3.24	0.001	1.001
Share of population served by a sewerage network (%)	0.006	0.001	2.92	0.003	1.006

Source: Own calculations performed in Stata 15 based on data from the Ministry of Finance [35] and from the Central Statistical Office [36].

From the perspective of the significance level (*p*) and the Wald statistic (*z*), the main determinants of the debt levels in rural municipalities in 2007–2009 were as follows: the share of operating surplus in total income (%); the share of investment expenditure in total expenditure (%); and the percentage of total population served by a sewerage network (%). In 2007–2009, the increase in the share of operating surplus in total income caused a reduction in the risk of increased debt levels. In turn, investment activity (an increase in the share of investment expenditure in total expenditure) exposed the rural municipalities to a risk of moving to a higher debt level. A positive current result (difference between current income and current expenditure), defined as the operating surplus, suggests the local government unit has the potential and the capacity to repay its liabilities and to finance the investment expenditure. Research by Kluza [81] indicates that the Polish LGUs, including rural municipalities, demonstrate outstanding investment performance even though their role in the economy in terms of budgets and redistribution functions in the public sector is of smaller importance than the EU average [97]. Studies by Zioło [98], Standar [99] and Standar and Kozera [24] also suggest that external financing has an important role in supplementing own funds and subsidies used for investment purposes.

In 2007–2009, major determinants of debt levels in rural municipalities also included the net migration rate and the share of EU funds in the total municipal income (%). In the study period,

rural municipalities with higher net migration rates were observed to demonstrate a higher risk of increasing their debt levels. Over the recent years, Poland has witnessed increased suburbanization processes whose direct consequences primarily include the social restructuring and changes in the demographic situation of suburban areas. Suburbanization definitely has an impact on the local finance of rural municipalities affected by that process, including both on incomes and on budget expenses. Similar patterns were observed by authors such as Carruthers and Ulfarsson [100], Wu [101], Wixforth [102] and Goffette-Nagot and Schaeffer [103]. Studies by Benito and Bastida [104], Cabasés et al. [105], Feld et al. [106] and Ehalaiye et al. [71] have also shown the impact of, inter alia, taxes and own revenues and investment expenditure on debt levels. On the one hand, an increase in the demographic potential of rural areas drives an increase in the rural municipalities' own income, i.e., greater budget revenue derived from personal income tax and property tax. On the other hand, as new residents move into rural areas, the needs of the local community increase, especially with regard to the technical and social infrastructure; it is largely the responsibility of the local government units to implement the relevant investments.

This study also found that rural municipalities who accessed EU funds were at a higher risk of increased debt levels. This is because implementing an EU project requires the municipalities to guarantee funds to for the whole project rather than only deliver their own contribution. The beneficiary receives a refund only upon completing the project, which may affect its liquidity. The ability to implement a project that involves a small own contribution may also provide an incentive to carry out multiple investment projects that do not necessarily address the actual needs, or may even result in overinvestment. Poland's accession to the European Union and the ability for LGUs to use Union funds (especially in 2007–2013) undoubtedly contributed to local development, primarily by making many rural municipalities a more attractive place to live and invest in. However, an increase in debt levels was another consequence.

In 2015–2017, the list of major determinants of debt levels incurred by rural municipalities was already shorter than in 2007–2009. In that period, the share of operating surplus in total incomes (%) and the share of EU funds in total incomes (%) were the factors with the strongest impact on the risk of increased debt levels incurred by rural municipalities. Furthermore, just like in 2007–2009, the increase in the share of the operating surplus in total income (%) resulted in reducing the risk of increased debt levels in the local government units considered. A similar relationship between surplus and debt has also been proven by Benito and Bastida [104]. The studies carried out in New Zealand also confirm the increase in the debt of local governments caused by investment activities, especially in the case of low interest rates [71]. Conversely, an increased proportion of EU funds in the budget drove an increased risk of higher debt levels incurred by rural municipalities. Furthermore, rural municipalities with a higher number of registered economic operators faced a greater risk of increased debt levels. Hence, the study allowed to confirm the research hypothesis advanced in this paper that "the key reason for the growing level and diversity of indebtedness of Polish rural municipalities is the investment activity of local authorities in seeking funds from the European Union".

4. Conclusions

Today, the growing levels of debt may be regarded as one of key problems facing the Polish public finance sector. It captures the attention of researchers from Poland [34,98,107], and from all around the world [18,22,31–33]. This is because, on the one hand, the Polish local government have witnessed a considerable increase in their income potential over the recent years due to absorption of European Union aid. On the other hand, they experienced the public finance crisis that reduced their budget income [24,79–81,92]. Therefore, municipal authorities (which are burdened with most public tasks) sought other financing options for their investments, including repayable funds.

The analyses carried out in this paper demonstrated that, in 2007–2017, the debt generated by the Polish local government sector (including by rural municipalities) was on an upward trend. In that period, local government debt increased from PLN 24.5 billion (EUR 7.3 billion) in 2007 to PLN

69.5 billion (EUR 16.3 billion) in 2017, i.e., nearly tripled (moving from 4.9% to 7.8% of total national debt). The consequences of the rising levels of debt include greater debt servicing costs incurred by all types of municipalities. Although the general levels of debt in the rural government units were relatively good compared to other LGUs, that group proved to be the most heterogeneous in this regard, and included units at risk of over-indebtedness. However, their situation deteriorated worryingly in the study period. Indeed, this study found that, in 2007–2009, most rural municipalities (over 50%) recorded extremely low or low levels of debt while only one-fifth were at high or extremely high levels. In the study period, there was a particularly noticeable increase (by 12 percentage points) in the share of rural municipalities at high levels of debt and a considerable decline (by 11.3 percentage points) in the share of rural municipalities at extremely low levels of debt. As a consequence, in 2015–2017 more than one-third of all rural municipalities were at a high or extremely high level of debt. The research also showed that a very high level of debt was characteristic mainly for rural communes of the agricultural type with a developing residential function and communes of the extensive agricultural type.

The modeling procedure, based on the ordered logit model, demonstrated that the amount of EU funds accessed and the operating surplus were significant financial determinants of debt levels incurred by Polish rural municipalities, and that the former had a negative impact and the latter a positive impact on debt levels recorded by the LGUs surveyed. Hence, it may be concluded that the risk of over-indebtedness was present in rural municipalities in a generally less favorable financial standing, i.e., those with a limited investment capacity. Over-indebtedness was also reported by LGUs that invest massive amounts of money into socioeconomic development by accessing subsidies from the EU. In 2015–2017, the financial factors of the risk of excessive indebtedness facing the rural municipalities were similar to those identified in 2007–2009. Hence, the study allowed to confirm the research hypothesis that "the key reason for the growing level and diversity of indebtedness of Polish rural municipalities is the investment activity of local authorities in seeking funds from the European Union." As Satoła [108] notes, effective acquisition and absorption of funds from EU Structural Funds poses a major organizational and financial challenge for local government entities but also provides a great opportunity to dynamize the development processes. A decentralised delivery of public goods in line with the local scale of need preferences can determine the transformation of the local economy. External financial resources can create conditions for sustainable economic development provided that they are properly targeted and effectively applied.

In turn, major socioeconomic determinants of indebtedness of rural municipalities include the inflow of new residents and the development of entrepreneurship that emphasize the extremely important role of attractiveness to investors and of the location rent. Therefore, this study confirmed the great role of location and of the suburbanization effect for the group of municipalities covered by this study. These findings are consistent with what was discovered by authors such as Carruthers and Ulfarsson [100], Wu [101], Wixforth [102] and Goffette-Nagot and Schaeffer [103].

In the context of the rapidly growing debt levels of rural municipalities, and considering the amended regulations for the rural municipalities' capacity to incur new liabilities (which entered into force in 2014), local authorities fear whether they are able to fully use the resources derived from EU funds allocated to Poland. For many rural municipalities, high levels of debt and poor capacity to invest (low potential to generate own income) may become a barrier to local development. It seems that in the current and in the upcoming financial perspectives, the human factor of local government units (referred to as human capital) will be a particularly important determinant of adequate debt management practices and of local development in rural areas. In the context of limited own funds and a poor capacity to incur new liabilities, it will be extremely important for rural municipalities to thoroughly examine all of their planned investments in terms of long-term costs and potential benefits.

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