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Solvency and Debt of Rural Communes vs. Their Residents' Standards of Living: A Polish Case Study

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Abstract: The purpose of this paper is to present the multidimensional dependencies between the budgetary solvency and debt of Polish rural communes on one side, and the residents' standards of living on the other. Local government units' budgetary solvency and debt (one of the key components of their financial condition) are important determinants of their efficient functioning oriented at addressing the needs of local communities as much as possible. The literature on the subject reveals a cognitive gap in the research into the standards of living and ways of driving social well-being, which is manifested in the dearth of empirical studies on how the components of local governments' financial standing impact residents' standards of living. Due to the multifaceted nature of the categories under consideration, a canonical analysis procedure was carried out to identify the linkages between them, and three statistically significant canonical roots were identified. This study demonstrates that if the values of variables relating to budgetary solvency and the debt levels of Polish rural municipalities (communes) are known, they have the potential to explain over 29% of the variance in the set related to the residents' living standards. Hence, the components of local governments' financial conditions are important, yet not the sole determinants of the population's standards of living. The findings from such analyses could be used indirectly, e.g., by local authorities in the context of creating their development strategies and selecting measures designed to transform the socioeconomic structure of territorial units in accordance with what their residents need.

Keywords: standards of living; sustainable development; rural areas; budgetary solvency; local government debt; canonical analysis



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1. Introduction

In 2020, the number of people living in extreme poverty in Poland grew by nearly 380,000 on a year-to-year basis (in relative terms, it went up from 4.2% to 5.2%). Today, the problem has grown to affect one out of every ten rural dwellers [1]. It is as if all residents of Salzburg, Austria (a population of 378,000 according to OECD [2]); Plzeň, Czech Republic (355,000); Parma, Italy (352,000); or two relatively large Polish cities such as Toruń and Olsztyn (ca. 199,000 and 171,000, respectively) fell below the headline in as little as one year. In 2020, over 41% of the Polish population lived in households whose living expenditures were below what is defined as the line of poverty (PLN 3280 (ca. EUR 700) per month in a household of four). In the context of these considerations, note that as regards Poland, poverty is clearly more severe in rural areas (with nearly 56% of the population being affected by it) than in cities (ca. 32%) [1]. In this context, also note that rural poverty differs in nature from urban poverty. In rural areas, it mostly means people are unable to address their cultural, educational, or leisure needs, whereas accommodation is less challenging. Conversely, cities face an additional problem of the working poor who do not earn enough money to pay their rent or satisfy other basic needs [3].

The financial condition and type of local government units is one of the factors that may considerably contribute to differences in the standards of living (and in poverty, a strictly related category) between them. In this context, it is worth noting that unlike in other

countries, Polish LGUs play a very important role in the hierarchy of power; this is reflected in the very high levels of GDP being redistributed through local government budgets (according to Eurostat [4], it was 14.8% in 2020, compared to the Union average value of 11.6%). In Poland, the local government (especially communes) should be statutorily required to address the needs of local residents (in both quantitative and qualitative terms) as far as possible. However, there are noticeable differences in how the local population's needs are addressed, both between regions and between urban and rural areas. The proper functioning of communes is determined by their budgetary solvency and debt levels—the factors that drive their financial conditions. This is all the more important because, as noted by B. Filipiak [5], despite the development of numerous methods for assessing the financial conditions of local government units, practice often shows that the capacity to absorb debt is the very basic criterion in assessing it. Of all Polish communes (identified based on the country's administrative division), rural units form the largest group and considerably differ from one another in their functions (from typically agricultural to service-oriented, commercial, and residential ones). In accordance with the Central Statistical Office data [6], over 40% of the Polish population (15.36 million people) lived in rural areas as of the end of 2020. As today's rural communes become complex in institutional, economic, and social terms, rational financial management at the commune level (and generally in local government units) has a positive impact on local economic operators, institutions, and communities. In a rapidly changing environment—and in view of the growing competition between local government units (focused on attracting and/or keeping investors and residents or on applying for external funds)—it becomes important to monitor their financial capacities and to assess the rationality of the measures implemented to enhance the standards of living. Debt management seems to be a particularly important part of financial management at the local government level. Also, it grows in importance in view of adverse economic phenomena (e.g., the 2022 energy crisis or the persistently high inflation rates witnessed in Poland and in many other countries), as it translates into the capacity to generate local income budgets while also determining the LGUs' capacity to incur more debt.

In that context, an extremely important role is played by local authorities that are responsible for multidimensional sustainable (stable) development (including economic and social aspects) and for making the right use of regional potential (including natural assets) in order to meet the needs of the local population to the greatest possible degree. This can be reflected in a number of ways, including the initiatives taken to develop renewable energies (which, in addition to environmental effects, provide economic and other benefits that translate into residents' standards of living). The fundamental condition for sustainable development is to guarantee high living standards to both the present and the future generations while using the available natural resources in a rational manner. This is because the standards of living are quite widely equated with the degree of addressing broadly defined human needs more (see [7]). At the same time, the only way to address vital human needs is by using natural resources. As the former are unlimited and the latter are finite, there is a need to take measures (including at the local government level) aimed at a rational use of what is derived from nature. Today, more and more emphasis is being placed on the fact that some human diseases are significantly related to local environmental pollution. The population's willingness to live in a sound and healthy environment puts greater pressure on the local (and central) government, pushing them to invest in the development of renewable energies or in the replacement of traditional heating equipment, for instance. This is all the more important since, according to a report by the Jagiellonian Institute, smog causes the premature death of ca. 44,000 people in Poland each year [8]. It is believed that in "old" Union countries (EU-28), atmospheric pollution is accountable for 15% to 28% of deaths (1.85 million people per year) from cardiovascular diseases (the upper boundary being related to "other non-communicable diseases"). However, considering the general scenarios where atmospheric pollution causes vascular damage, the actual percentage of deaths caused by it can be closer to the upper boundary than to the lower

boundary. This means that it can exceed 20%, making atmospheric pollution a greater health risk factor than tobacco smoking [9]. As empirically demonstrated, air pollution not only has an impact on breathing problems but also on depressive disorders, physical changes in the brain, premature aging affecting the nervous system, stroke risk factors, fetal death, and more [10], all of which ultimately have effects on the standards of living. Water pollution also carries significant risks to human health and life; bacterial or parasite infection in water can contribute to issues such as typhoid, meningitis, or viral hepatitis. An inefficient use of natural resources drives (often irreversible) environmental degradation, whereas the “depreciation” of natural capital makes it less likely for future generations to attain high standards of living. Hence, these issues are of particular importance when seeking an effective way to implement the sustainable development framework, which, at its core, intends to improve the standards (or quality) of living for present and the future generations by optimizing the mix of (at least) three kinds of capital used: the economic, social, and natural capitals.

However, the effectiveness of local government measures designed to enhance the population’s living standards depends on their budgetary solvency and debt levels. The literature on the subject usually views the standards of living [11–13] and the local government’s financial condition [14–16] as two separate topics. Papers focusing on a concurrent analysis of both of these categories are extremely rare. Hence, there seems to be a cognitive gap in the economic research on the interaction between the standards of living, on one side, and the local government’s budgetary solvency and debt levels (as the main components of their financial condition), on the other. At the same time, such an analysis is also a way of contributing to the “prospective” line of research on rural development (with improvements to the residents’ standards of living being viewed as one of the main identifiers of development). Research on the standards of living and their determinants becomes particularly important in view of today’s rapidly and continuously changing environment and demographic and social transformations (including changes in beliefs and ideals), and because their quantifying sub-indicators strongly differ between genders, age groups, education levels, and places of residence, for instance. What also makes the issues addressed in this study so important is that ensuring high standards of living represents the supreme goal of every sustainable development policy at local, regional, or national management levels (which is also a factor of relevance in stimulating sustainable rural development). Regional- and local-level sustainable development measures are primarily focused on the local population, which makes enhancements to their living standards an important proxy for sustainable local development. This is of particular importance for rural areas in the context of the role they play in implementing the sustainable development concept (and because of the risks involved in the delivery of public goods to the rural population). It seems that the conclusions from this kind of studies could be used indirectly, e.g., by local authorities in charge of local and regional development in preparing their development strategies and selecting measures designed to transform the socioeconomic structure of territorial units (including rural ones) in accordance with what their residents need (while bearing in mind that social needs grow, and the resources available to local government units are limited—which, in turn, strengthens the need for the rational management of public resources).

Therefore, this paper seeks to pinpoint the multidimensional linkages that exist between the population’s living standards and the budgetary solvency and debt levels of local government units. A sophisticated method for statistical data exploration, canonical analysis, is used to attain that goal. Also, the secondary scientific goal is to encourage the adoption of this econometric method, which is quite rarely employed by representatives of economic sciences. A canonical analysis allows for the determination of the simultaneous impacts of multiple independent variables (in this case, those relating to the solvency and debt of rural communes) on a set of dependent variables (in this case, those relating to the residents’ standards of living), and enables the presentation of some analytical indicators to show which of the variables from the two sets have the strongest relationships and

functional dependencies between them. Using tools such as multiple regression models (although widely employed in the literature) and analyzing each explained variable separately could involve the risk of losing relevant information on interactions in the set of explained variables. In turn, the author finds it insufficient to rely solely on a classical correlation analysis (e.g., the Pearson correlation) between pairs of variables as it fails to address the relationships inside the sets of variables that are covered. However, rather than explaining this calculation method in full detail, the author intends to show how useful it is. The empirical studies rely on data retrieved from a survey carried out by a specialized company with presidents (heads) and vice presidents of Polish rural municipal councils. This study was performed in January and February 2022 as part of the research project no. 2021/05/X/HS4/00137, and it was financed with resources of the National Center for Science (Poland). This paper features a theoretical part (Section 2), which includes a review of the definitions of the phenomena considered. The next part (Section 3) discusses the sampling method, describes the set of variables used, and provides a synthetic overview of the methodology. This is followed by Section 4, which presents the findings from the author's study. The last two sections summarize the results and indicate the possible paths for future research.

2. Literature Review

Saying that the “standards of living” is an umbrella term seems to be a truism. This is largely because it is investigated under many quite diverse scientific disciplines, including sociology, philosophy, economics, physiology, or psychology.

One of the most common definitions cited in the Polish literature on the subject is the one presented by C. Bywalec, who views living standards as the degree of addressing human needs through the consumption or use of services and tangible goods [17]. In his later works, he defined it slightly more broadly as the degree of satisfying human needs as a consequence of consuming material goods and services and enjoying the value derived from social and natural environments. He considered it to be synonymous with the “quality of life” [18]. B. Chan Yin Fah claims that the standards of living depend on the use or consumption of goods [13]. Similarly, a quite extensive definition was provided by M. Piekut [19], who claims that the standards of living mean a welfare level attained by individuals or societies based on the goods and services they can consume and on the resources accessible to them. Quite a broad definition of the standards of living was provided by B. Dańska-Borysiak [20], who views them as the degree of meeting the essential needs, and as living a stable, comfortable life. Whether the standards are high or low depends not only on the extent of meeting those needs itself, but also on the efforts undertaken to meet them. The efforts include the time spent working (and related inconveniences), the capacity for an individual to make enjoyable use of their free time (e.g., accessing cultural and recreational services), and the quality of social relationships. Another broad view of this issue was proposed by R. Aro [21]. He defines the standards of living as the availability of physical resources, which are believed to be necessary for an individual to live and enjoy their life, such as food, clothing, shelter, safety, and basic services, as well as the level of wealth, tangible goods, and essential necessities. N.Y. Ting and N.T. Pey [22] adopt a similar approach and present living standards as wealth and physical comfort enjoyed by an individual or a community. Today, according to M. Barreiro-Gen, there are three main scopes of defining that term [12]:

- Standards of living defined as the utility of life (according to A.C. Pigou, the utility of life is determined by aspects such as “economic welfare”, “quality of life”, “real income standards”, and “material wealth”, which are considered as being more or less synonymous; however, in accordance with the modern version of that approach, utility is equated with making wishes come true);
- Standards of living viewed as economic security or “wealth”;
- Standards of living viewed as a kind of freedom (the most complex approach where, in accordance with A. Sen's concept, economic benefits or utility are poor substitutes

of life, and the standards of living mean the freedom to do something and the capacity to live a good life).

It is easy to see that the category of living standards is inextricably linked to the theory of needs. In the context of these considerations, it must be emphasized that some human needs can be met on a case-by-case basis, which requires efforts to be made by each individual. This is related to the functioning of a private market economy and the production of a large number of diverse goods, which are sold and purchased by interested parties. Next, there are public needs addressed through common efforts between the government, commune, or other territorial community. Obviously, the delivery of public goods that satisfy a part of human needs is related to the fact that not all goods can be produced by private operators that are active in the free market. The market refuses to produce certain goods, such as national defense, internal security for the citizens, or goods reflected in the activities of care institutions; these are the outcomes of the public (or local government) sector [23]. Poland reinstated its local government structures in 1990, but only at the level of communes. In 1999, it transitioned to a three-level structure. Today, the local (first) level consists of 2477 self-reliant municipalities (communes) (including 302 urban units, 1537 rural communes, and 638 urban-rural communes) and 380 districts (equivalent to Kreis in Germany and Austria and to okres in the Czech Republic and Slovakia), whereas the NUTS-2 regional level is represented by sixteen voivodeships. Each of these units is responsible for certain statutory tasks and is vested with dedicated financial resources. The scope of responsibilities of Polish communes is statutorily governed under a dedicated Act (for a broader description, see the Local Government Act of 8 March 1990). It includes, without limitation, matters related to [24]: orderly development; property management; environmental and nature protection; water management; communal roads, streets, bridges, and squares; water and sewage systems; commune-level waste water treatment and disposal; heat, gas, and electricity supply; health protection; social assistance; local public transport; housing development at the commune level; public education; culture; public order and the security of citizens; and family support policy.

Hence, it can be assumed with no major reservations that the sustainable development level of local government units has an indirect or direct effect on residents' standards of living. Also, there is mutual feedback between the level of sustainable development and the financial standing of LGUs (which the author believes to be mostly driven by the amount and structure of income and expenditure, budgetary solvency, financing for services and investments, and debt levels) (cf. [25–28]) (Figure 1).

Also, there are reasonable grounds for saying that better standards of living of the population might contribute to budgetary solvency or, generally, to increasing the local government's income. There are several reasons behind it; one of them is that LGUs derive a share from personal income paid by natural persons (i.e., local residents) (in Poland, that share is 39.34% for communes, 10.25% for districts, and 1.60% for voivodeships). However, higher standards of living may be conducive to higher expectations from the residents for higher-quality public services and investment standards.

However, note that not all expenditure made at the local government (especially commune) level is related to improving residents' standards of living; this can only be achieved by spending money on addressing their needs. When comparing Maslow's popular pyramid of needs against the budgetary classification of expenditure at the local government (especially commune) level, it can be concluded that the following expenses affect the standards of living: transport, housing management, public security and fire protection, education and upbringing, healthcare, public utilities and environmental protection, culture and protection of national heritage, physical culture, sports, and tourism. Some of these expenditures will have either a direct (e.g., extending and repairing the road network and the construction of photovoltaic farms) or indirect (e.g., increased spending on the organization of cultural events or the purchase of books for the community library) impact on improving the standards of living. Every resident will view the above areas of

expenditure through the prism of their age, education, and needs, and will thus be affected by them in different ways (cf. [29]).

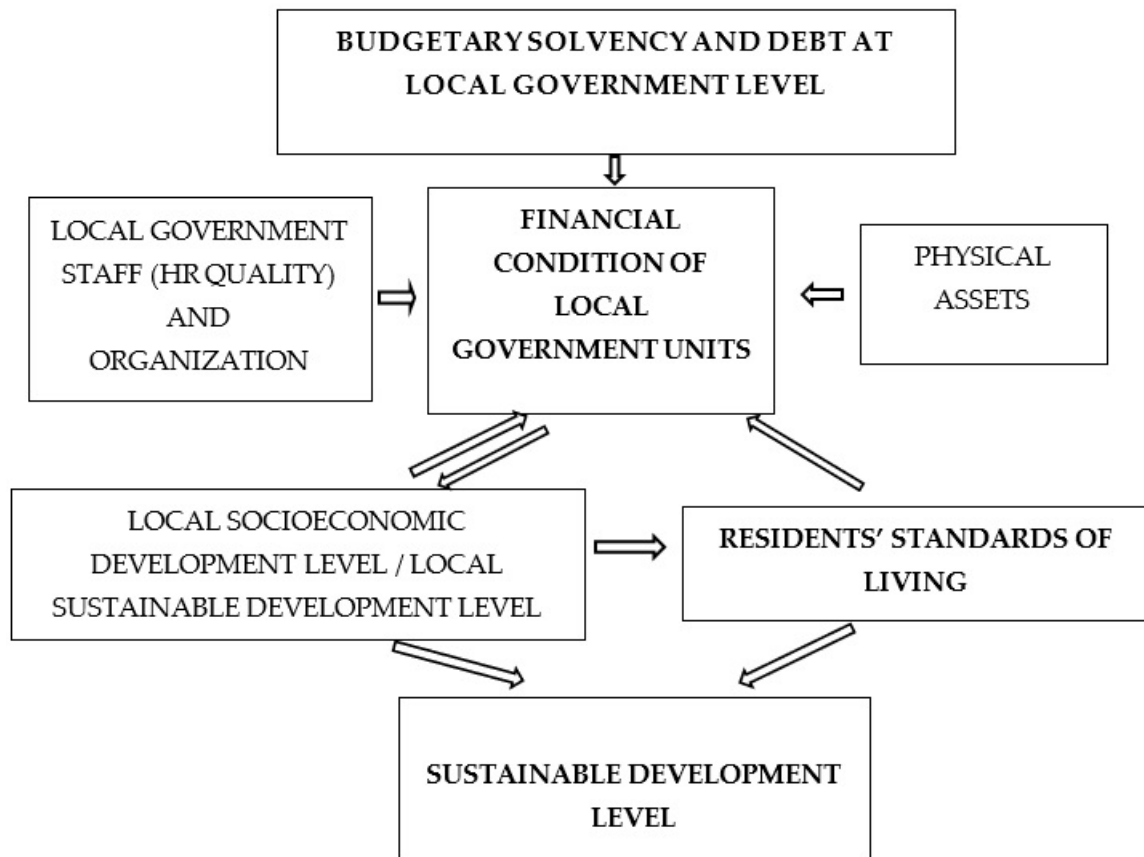


Figure 1. Budgetary solvency and debt at the commune level vs. the residents' standards of living. Source: author's own study.

Some local needs are met through public systems, and therefore, LGUs and other official bodies are somehow pushed to place the focus on allocating financial resources and on collecting sufficient funds to offset the expenditure. Thus, local governments' budgetary solvency and debt are of particular importance in this context.

Solvency is defined as a situation where the value of assets of an individual or an organization exceeds that of their liabilities [30]. Sometimes, solvency is considered together with liquidity, defined as having enough cash to fully cover expenses as they arise. That approach is often used when assessing the economic and financial standings of enterprises. J. Gadawska [31] believes that solvency is always related to liquidity. The loss or deterioration of current liquidity threatens the capacity to generate profits because it means business operations have smaller profitability. Solvency is described not only by the ratios between specific kinds of assets and liabilities, but also by the proportion between the capacity to generate cash and the demand for it. However, these terms are not the same. For an economic operator, the loss of liquidity results in insolvency [32].

In the case of local government units, becoming insolvent may contribute to the disorganization of the system for delivering public services owed to the citizens. It can also result in local or regional authorities attempting to burden the central government (and the entire group of citizens contributing to public income streams of the state budget) with the financial consequences of their decisions [33]. Budgetary solvency provides information about whether the budget is structurally balanced, i.e., if the incomes are equal to or greater than the expenditure at the end of the budget period [34]. A similar approach was presented by C.S. Maher et al. [15], who view it as the LGU's capacity to collect enough income within the budget cycle to meet unexpected expenses. Another interesting definition from the

perspective of these considerations is the one by I. Ritonga et al., in which budgetary solvency is perceived as the local government units' abilities to generate enough income to finance the current or desired level of services. In turn, long-term solvency is the local government's capacity to pay all of their expenses, including both recurrent expenses and those that will arise and become payable in the years to come [26]. A similar definition was provided by X. Wang et al. [35], according to whom budgetary solvency means the LGU's ability to generate enough income to finance the current or desired level of services. Quite a similar definition was provided by B.S. Jimenez [36]. He views the budgetary solvency of local government units as their capacity to meet their service responsibilities (which is of particular importance to ensuring adequate standards of living for the residents) and other financial obligations within a fiscal year. S. Santis [37] emphasizes that budgetary solvency is the local government's capacity to earn enough income to cover its expenses (as required under the law) without incurring a deficit. L. Dennis [25] proposed using an operational ratio (showing the degree to which actual income is sufficient to finance actual expenditure), and another one describing the income from property tax and intra-government transfers in quantifying budgetary solvency. Next, M. Stanny and W. Strzelczyk [16] proposed the following set of indicators to be used in assessing budgetary solvency in operational terms: the budget surplus per capita; the ratio between total income and total expenditure; property income plus operating surplus in relation to investment expenditure; and the ratio between operating surplus and total income. Conversely, I. Ritonga [14] put forward four indicators for measuring this category: Ratio A = (total revenue – special allocation fund revenue)/(total expenditure – capital expenditure); Ratio B = (total revenue – special allocation fund revenue)/operational expenditure; Ratio C = (total revenue – special allocation fund revenue)/personnel costs; and Ratio D = total revenue/total expenditure. In turn, according to S.S. Spencer [38], the most general metric of budgetary solvency at the local government level is the ratio of total income to total expenditure. A high value means the local government unit is in a better position to respond to exogenous shocks. Next, A. Wiyanti and A. Halimatussadiah [39] proposed that the budgetary solvency of local government units should be quantified with variables relating to the amount of their own income streams, unexpected expenditure, capital expenditure, and consumption expenditure.

The needs of the local community keep changing and growing; at the same time, there is a great demand for funds from local government units. In these conditions, in addition to budgetary solvency, local government debt becomes an increasingly important problem in the context of the rational management of public finance (as debt grows, the budget deficit also grows).

Local government units incur debt both to secure the current liquidity of the budget and to finance investments. It is worth noting that some countries of the Old European Union (e.g., Austria, Denmark, and Germany) prohibit local government units from incurring debt to finance their running costs.

M. Poniatowicz and M. Jastrzębska [40] note that central authorities may exert different impacts on the generation of debt at the local government level. Examples include limits on general levels of debt imposed from above on LGUs; strict review, authorization, and approval of the local government's credit operations by central authorities; and administrative restrictions on the LGUs' abilities to incur debt in international markets (e.g., in Mexico, where international loans are prohibited, or in India and Bolivia, where the terms and conditions of every international loan must be approved by central authorities). An extreme case of restrictions consists of central authorities prohibiting the local government from incurring any debt. Examples include Chile, where the local government subsector is not allowed to take out any loans at all, whether for current expenses or investments [40]. Pursuant to the applicable Polish Public Finance Act [41], local government units may take out loans and issue securities to cover their budget deficit in the transition year; finance a planned budget deficit; repay earlier debt securities, loans, and credits; and provide advance financing for measures financed from the EU budget. When deciding to incur debt

for the current expenditure, the local government should bear in mind that, in accordance with the provisions of the aforesaid Act, loans that are taken out and securities that are issued to finance the expenditures listed above (Article 89) shall be repaid or redeemed in the year they were taken out or issued. Otherwise, local government units could become trapped in what is referred to as the vicious cycle of debt. Poland has prudential procedures in place to secure the local government against excessive debt. First of all, they include a rule that requires the current result to be at least balanced (meaning that the planned and effected current expenses cannot exceed the planned and collected current revenues plus the budgetary surplus from previous years and spare funds). Also, there is the LGU-specific debt repayment index (which depends on an LGU's operating result and on how efficiently they manage their assets); in 2014, it replaced the previously applicable limits for the total amount of debt and debt servicing expenses. This is all the more important since the local government's debt is part of the public deficit, and excessive debt at the local government level puts the whole public finance system at greater risk.

The most frequent reasons why local government units incur debt primarily include not having an operating surplus, no longer being creditworthy, and having problems in maintaining current liquidity. Communes also become excessively indebted because they incur new loans that bear high interest rates. This is the case, for instance, for units with relatively high levels of debt who want to complete specific investments but do not have enough funds to do so. Relying on repayable income in LGUs' operations can have the following consequences, without limitation [42]: the investment lifecycle may be shortened in an effort to reduce the total implementation cost of the investment; the need to make frequent and significant adjustments to the level of local taxation may be avoided, which would adversely affect the conditions for local economic activity and distort the allocation of resources (in terms of both time and place); and operational costs may be reduced (for instance, the replacement of old facilities, machinery, and vehicles as part of a single operation financed with repayable funds may not only bring social benefits in the form of higher-quality services, but also reduce their running costs). At this point, note the findings from a study by A. Kozera et al. [43]. Namely, the key reason behind the growing amount of, and heterogeneity in, the debt of rural communes in Poland is the investment activity engaged in by local authorities who access European Union funds.

The literature on the subject views debt incurred by local government units from a quite different perspective. It presents the following arguments against using the local budget's own income to finance capital expenditure: the burden on existing taxpayers may prove to be too much for them; the assets created through capital expenditure will serve future users (taxpayers), which makes it desirable that they partially bear the related costs; and inflation reduces the value of money over time—and if the repayment is deferred, both the real burden of debt and its real servicing costs may prove to be smaller for future taxpayers than for current ones [32,40,44]. "Intergenerational equality" is often brought as an argument in assessing the conditions for incurring debt at the local government level. Accordingly, public investments financed with debt instruments not only involve spending public funds when the investments are implemented, but also carry certain costs and benefits for future generations. In this context, it is worth citing the views of P. Krugman, a Nobel laureate, who claims that neglecting public investments causes more damage to future generations than passing on the debt servicing costs to them. According to him, "fiscal policy is, indeed, a moral issue, and we should be ashamed of what we are doing to the next generation's economic prospects. But our sin involves investing too little, not borrowing too much—and the deficit scolds, for all their claims to have our children's interests at heart, are actually the bad guys in this story" [45]. At this point, it is worth providing a synthetic list of several original theories and concepts developed to explain budgetary deficit and its derivative process of growing public debt, including in the local government subsector [46]:

- A. Wagner's law of growing public expenditure (as expenditure grows and is not covered by income, it puts pressure on increasing public debt);

- The theorem of public debt neutrality (by R.J. Barro): the belief that increased public expenditure is less harmful to the economy when financed with debt than with increased taxation;
- Politicians having a deficit bias because of their short-term political interests;
- The political business cycle theory: an increase in budget expenditure and a growing deficit in election periods;
- The shared resource pool problem: influential groups put pressure on spending more and increasing the deficit;
- Debt ratcheting: surpluses are “consumed” in good times, and there is accelerated growth in debt in bad times;
- The subordinate entities of local government units (e.g., public healthcare centers) being tempted to abuse public funds.

One of the factors that may significantly contribute to the heterogeneity of social phenomena, including the standards of living and poverty (a household is deemed to experience poverty if they spend less than the defined poverty threshold), is the place of residence. A study on household budgets carried out by the Polish Central Statistical Office found rural dwellers to be the most severely affected by poverty. Conversely, the smallest economic poverty rates were recorded in the biggest cities (with a population of no less than 200,000). The extreme poverty threshold is determined based on the subsistence minimum, which means that one’s needs are addressed to an extremely small degree; individuals at lower consumption levels struggle to survive and put their mental and physical development at risk. In 2020, extreme poverty affected every tenth rural resident (slightly less than 10%), i.e., it was four times more frequent in rural areas than in urban households (over 2%). Also, there is relative poverty (with a threshold set at 50% of the average monthly spending of a Polish household) and official poverty (with a threshold corresponding to income levels, which, pursuant to applicable legal regulations, make individuals eligible for financial social aid). As regards these two definitions, the differences between urban and rural areas were also significant, yet not that big (by a factor of three). In 2020, less than 7% and less than 5% of the urban population lived in relative poverty and official poverty, respectively. In rural areas, the respective ratios were 20% and nearly 16%. The smallest cities recorded the following economic poverty rates in 2020: extreme poverty: over 4%; relative poverty: over 10%; and official poverty: almost 8%. In turn, the following poverty indexes were reported in the biggest cities (with a population above 200,000): extreme poverty: 1–2%; relative poverty: ca. 4–5%; and official poverty: ca. 2–3% [1].

It would be difficult not to agree with U. Grzega, who points out the differences in the standards of living between urban and rural dwellers and between country regions (e.g., highly urbanized industrial zones vs. other areas). Depending on where they live, people have different structures of needs and ways of addressing them, and they differ in the share of the market and natural consumption in individual consumption. Also, they experience different availabilities of public consumption goods and services. The share of urban residents in the country’s total population entails consequences for the economic and social policy. An increase in the urban population means growing demands for dwellings and for catering, cultural, recreational, and other services. Living in a city usually means having one’s educational, cultural, and leisure needs addressed to a greater degree. However, the excessive concentration of people in cities can have adverse health effects (related, for instance, to pollution and noise), while also affecting security (e.g., road accidents due to increased traffic), which reduces the standards of urban living [47]. It is also worth noting that the countryside has a less developed technical, communication, and housing infrastructure and faces barriers to accessing services and state-of-the-art technologies. But on the other hand, rural areas enjoy an extraordinary value, which is also of importance to urban dwellers, namely, the natural environment. Agriculture has a particular role in rural resources and in contributing to the unique rural landscape (a value in itself). Also, it exerts an important impact on non-agricultural activities and on the comfort of rural living, i.e., on social well-being [48].

3. Materials and Methods

A survey was carried out by a specialized company with heads (referred to as presidents) and vice presidents of commune councils (which represent the commune-level control and legislative authority) from early January to late February 2022, based on the CATI approach. Primary data retrieved from the survey were published by the author in RepOD, an open data repository (for the link, see the Data Availability Statement section). Below, you may find a link to all questions and replies collected in this study. The site also allows for the variants to be filtered.

The sample size formula for finite population was used to calculate the minimum size of the sample covered by this study (cf. [49,50]). The size of the sample (interviewee) group was $N = 2477$ (i.e., the total number of communes, as mentioned earlier). The confidence interval and the maximum permissible error values were set at 95% and 6%, respectively. For this dataset, the sample should consist of no less than 241 items. The stratified random sampling method was used to ensure representativeness across the entire population of communes (the sample was structured pro rata to the number of communes of each type (urban: 29, rural: 150, urban-rural: 62) and to the number of communes in the voivodeship (16 regions in Poland). The sizes of the samples retained were prorated to that of corresponding strata. After the stratification, random sampling without replacement was used within each stratum. The cost of the survey carried out by a specialized company was a non-statistical criterion used in determining the sample size. This paper focuses solely on the results derived from a group of 150 rural communes.

Ten indicators relating to the budgetary solvency (ISD1-ID3) and debt (ISD4-ISD10) of local government units were used in identifying the relationships between the categories concerned (cf. [14,25,28,51]). Their list and synthetic descriptions are presented in a tabular form (Table 1).

In turn, 21 variables were retained in total to determine the population's living standards, as viewed by representatives of local authorities (1: very low, 7: very high) (cf. [52–57]): SL1: quality and availability of public healthcare; SL2: public security; SL3: ability for the population to make enjoyable use of their free time; SL4: conditions of education (primary schools) for minors; SL5: skill enhancement opportunities for adults; SL6: availability of nursery places; SL7: natural environment quality (cleanness); SL8: noise (the smaller the value, the higher the nuisance); SL9: general esthetics of green areas and buildings in the commune; SL10: qualitative and quantitative condition of roads; SL11: buses, trains, and other communication links; SL12: street lighting; SL13: development of water pipelines and sewerage infrastructure; SL14; development of the gas distribution network; SL15: rating of services relating to sports and culture; SL16: development of the telecommunication network; SL17: rating of tourism facilities; SL18: situation in the local labor market; SL19: service availability (shoemaker, beautician, hairdresser, home appliance repair, tailor); S20: conditions for shopping (which includes the availability of discount stores, the total number of shops, and how diversified they are); S21: social security (ability to access financial and other support offered by a public institution).

Table 1. Indicators of budgetary solvency and debt at commune level.

Indicator	Formula	Description
ISD1: self-financing ratio of the commune	$W_{ISD1} = \frac{N_o + D_m}{W_m}, \quad (1)$ with: N_o —operating surplus; D_m —property income; W_m —property-related expenditure	The degree to which the local government finances their investments with their own funds (in other words, the self-financing capacity). The greater the proportion, the smaller the risk of insolvency due to excessive costs of debt servicing.
ISD2: share of operating surplus in total income	$W_{ISD2} = \frac{N_o}{D_o}, \quad (2)$ with: D_o —total income	A positive current result, referred to as the operating surplus, implies that the LGU has the potential and is able to repay their liabilities (and to finance investment expenditure). Also, this ratio determines how much new debt the unit could incur in proportion to its income. The higher the ratio, the greater the capacity to invest or increase running costs.
ISD3: ratio of operating surplus and income from property sold to total income	$W_{ISD3} = \frac{N_o + D_{Sm}}{D_o}, \quad (3)$ with: S_m —income from property sold	When negative, the ratio reveals that the local government unit fails to generate an operating surplus, and the income from the property sold is not enough to cover the operating deficit.
ISD4: total commune debt level	$W_{ISD4} = \sum Z_o, \quad (4)$ with: Z_o —total liabilities	Cumulative level of a local government unit's debt, as generally perceived by local authorities, without taking the population into account.
ISD5: total liabilities per capita	$W_{ISD5} = \frac{Z_o}{L}, \quad (5)$ with: Z_o —liabilities grouped by debt instruments; L —population of the local government unit	A heavy burden of debt per capita in an LGU suggests it has a smaller financial capacity to fulfill its tasks. However, the usual reason why it incurs liabilities is because it needs to use external funds in financing investments. Thus, high debt per capita ratios may be recorded in LGUs that actively invest and are capable of ensuring greater income in the future.
ISD6: share of total liabilities in total incomes	$W_{ISD6} = \frac{Z_o}{D_o}, \quad (6)$	It shows the amount of liabilities grouped by debt instruments as a proportion of total incomes (amount of total liabilities in relation to total incomes).
ISD7: long-term liabilities to total incomes	$W_{ISD7} = \frac{Z_D}{D_o}, \quad (7)$ with: Z_D —long-term liabilities	The ratio between long-term (over 12 months) liabilities and total incomes of local government units.
ISD8: share of debt servicing expenses in total incomes	$W_{ISD8} = \frac{O + R}{D_o}, \quad (8)$ with: O —interest on loans; R —capital payments on loans	The ratio between debt servicing expenses (payment installments on loans plus interest) and total incomes.
ISD9: ratio of debt servicing expenses to own income	$W_{ISD9} = \frac{O + R}{D_w}, \quad (9)$ with: D_w —own incomes	The ratio is structured so as to exclude incomes derived from subsidies and grants (which may be earmarked). The higher it is, the greater the risk for a local government unit to become insolvent.
ISD10: share of maturing liabilities in total liabilities	$W_{ISD10} = \frac{Z_w}{Z_o}, \quad (10)$ with: Z_w —maturing liabilities	When greater than zero, the ratio represents the LGU's failure to timely meet its liabilities (obviously, for a local government unit, the lack of liquidity implies a delay in repaying its liabilities). The higher it is, the larger the scale of that phenomenon.

A canonical analysis was carried out to identify the linkages between the sets of variables representing the standards of living and the Polish communes' solvability and debt levels (as viewed by representatives of local authorities). In accordance with this method, the assessment of dependencies between two sets of preselected variables boils down to analyzing the relationships between two new types of variables (referred to as canonical variates or canonical roots). These new, synthetic variables are weighted sums of elements from the first and the second set; the weights are generated so as to maximize the correlation between the two weighted sums (the first type of variables is a linear function of the first set of variables; similarly, the second set of variables is a linear function of the second set) (for more, see [58–60]). The method is viewed as a generalization of linear multiple regression to two sets of variables; when considering two linear combinations,

$x = [x_1, x_2, \dots, x_p]^T$ and $y = [y_1, y_2, \dots, y_q]^T$, the objective is to maximize the following expression:

$$r_l = \frac{(w_x^T R_{xy} w_y)}{\sqrt{(w_x^T R_{xx} w_x w_y^T R_{yy} w_y)}}, \quad (11)$$

where R_{xx} : correlation matrix for explanatory variables; R_{yy} : correlation matrix for explained variables; R_{xy} : correlation matrix between both types of variables; w_x, w_y : weights for first-type and second-type canonical variates; r_l : canonical correlation coefficient.

The theoretical section of this paper sought to underline that the categories covered by the study are of a multifaceted nature, and it is difficult (if not impossible) to quantify them using a single variable. Therefore, it seems to be more reasonable to rely on the canonical analysis, a multidimensional exploration technique, than on any other (more traditional) econometric methods. Conversely, it would be unjustified to restrict the study to a “classic” correlation analysis (e.g., the Pearson correlation formula) between pairs of variables. Although widely employed in empirical studies, it fails to address the relationships inside the sets of explained and explanatory variables.

The starting point for the canonical analysis is to determine the total number of pairs of canonical variates, which will then be subject to an in-depth investigation. Note that while the first generated pair of canonical roots (which synthetically describe the relationships between the sets considered) explains most relationships between them, it does not give 100% clarification. Each successive pair of generated canonical variates explains other dimensions of relationships (of smaller importance). The Wilks’ Λ (Wilks’ lambda) test was performed to examine the statistical significance of canonical correlation. The test statistic for a set of $s-k$ variables was used to check the pairs of canonical variates for significance as per the following formula [61]:

$$\Lambda_k = \prod_{l=k}^s (1 - r_l^2) \quad (12)$$

where s : number of canonical variates, and k : number of “removed” (previously tested) canonical roots.

If, at a given level of significance, the test statistic falls below the critical value, then at least one coefficient of canonical correlation is statistically significant. The statistic follows the χ^2 distribution.

The essential canonical analysis was preceded via a routine verification of the internal structure of variables used in the model. Both sets of variables underwent the outlier detection procedure (outliers might be due to transcription errors, for instance) which could distort the outcomes of the canonical analysis. This was carried out using the 3 sigma rule (cf. [62,63]), which removes any observations outside the interval (mean $- 3 \times$ standard deviation; mean $+ 3 \times$ standard deviation). Once identified, the outliers were substituted with the average values calculated for the voivodeships where they are located. In this analysis, the procedure described above had to be run six times with respect to the set of variables representing the living standards (four times due to the values being smaller than the interval’s lower boundary, and two times for the communes’ budgetary solvency and debt (because of the values being above the upper boundary of the defined interval)).

Sub-variables used in the canonical analysis should follow a normal distribution. In analyzing socioeconomic phenomena, it is extremely difficult to guarantee the normality of all variables, and therefore, it makes more sense to use that econometric tool for descriptive purposes than for statistical inference. The normality of the distribution of each sub-variable was assessed based on the Shapiro–Wilk test. If some variables were found not to follow the normal distribution, the Box–Cox transformation (based on the λ coefficient) was

used to make an approximation of the normal distribution. The analytical form of the transformation is as follows [64]:

$$y_i^{(\lambda)} = \begin{cases} \frac{y_i^\lambda - 1}{\lambda}, & \text{for } \lambda \neq 0, \\ \log y_i, & \text{for } \lambda = 0. \end{cases} \quad (13)$$

The lambda transformation parameter is determined through the maximum likelihood estimation (the default searching interval is $[-5, 5]$). The maximum number of iterations was set at 40, and the translation parameter was 0 for all variables.

For each canonical root generated, the canonical analysis included calculating mean squared factor loadings, referred to as variances extracted in the literature on the subject. They show the percentage of variance in input variables, which is explained by canonical variates, and can be presented as the following analytical formula:

$$\overline{R_{u_l}^2} = \frac{1}{q} \sum_{j=1}^q c_{jl}^2, \quad (14)$$

or

$$\overline{R_{v_l}^2} = \frac{1}{m - q} \sum_{j=q+1}^m d_{jl}^2, \quad l = 1, 2, \dots, s, \quad (15)$$

where q : number of base variables; c_{jl} : canonical factor loading for base variable j and first-type canonical variate l ; and d_{jl} : canonical factor loading for base variable j and second-type canonical variate l .

If the mean value, as described above, is multiplied by the squared canonical correlation, it results in what is referred to as the redundancy index. It tells how much the mean variance in a given set of variables can be explained by a canonical root (when another set of variables is given).

A single confidence level of $\alpha = 0.05$ was used for the purposes of this canonical analysis.

3.1. Results of Surveys

According to the official data from the Ministry of Finance [51], in 2020, the self-financing ratio described above (Table 1) was below 100% in 273 rural communes (out of 1533), and over 200% in 383 units, with the average level for all rural communes being nearly 203% (cf. Table 2). In 221 rural units, the ratio of operating surplus to total income was below 10% (with an average of 8.60%). In 303 rural LGUs, the share of total liabilities in total income went above 30% (and exceeded 60% in 14 of them); 34 units had a share of debt servicing expenses in total incomes of more than 10% (and over 50% in 2 of them). In accordance with the Central Statistical Office data [65], 274 rural units (17.9% of total rural communes) recorded a deficit.

Next, the study focused on analyzing statistical data derived from the author's research performed with a random group of presidents and vice presidents of rural commune councils. The collected empirical materials suggest (Table 3) that representatives of local authorities declare sustainable development to be the key concept (more than 57% of replies) that guides their decision making on how to improve residents' standards of living (taking account of their commune's financial capacity). This does not come as a big surprise because currently—as mentioned in the theoretical section of this paper—ensuring high standards of living is the supreme objective of sustainable development policies at all governance levels (national, regional, and local). Local and regional sustainable development efforts are mostly focused on the regions' populations, which means that improvements in the standards of living provide a reliable reflection of regional (and local) sustainable development. According to the second most frequent reply (nearly 29% of respondents), the authorities seek maximum improvements in the living conditions of local residents, taking into account the financial capacity of their LGU.

Table 2. Selected statistical data relating to budgetary solvency and debt levels in Polish rural communes (as of 2020).

Specification	AV	Med.	MIN	MAX
Self-financing ratio (operating surplus and property incomes to property expenditure)	202.70	143.10	22.00	9624.60
Share of operating surplus in total incomes (%)	8.60	8.10	−3.30	43.90
Share of operating surplus and income from property sold in total income (%)	9.20	8.60	−2.10	46.20
Total liabilities per capita (PLN)	1145.93	951.49	0.00	9965.76
Share of total liabilities in total incomes (%)	19.10	16.50	0.00	91.50
Ratio between debt servicing expenses and total income (%)	3.40	2.90	0.00	63.80
Ratio between debt servicing expenses and own income (%)	9.90	8.10	0.00	276.30
Ratio between maturing liabilities and total liabilities (%)	0.50	0.00	0.00	100.00

Symbols: AV—average value; Med.—median; MIN—minimum value; MAX—maximum value.

Table 3. Concepts that inspire commune-level authorities' decisions regarding the standards of living (taking account of their unit's financial capacity).

Specification	Percentage
Sustainable development concept	57.33
International and European integration	2.00
Maximum improvements to the living conditions for local residents	28.67
Activity-based budgeting	5.33
Quality management at LGU level	1.33
Multipurpose development	4.00
Development of a civic society	0.67
Other	0.67
Total	100.00

Neither multipurpose development nor activity-based budgeting were among the top concepts that authorities take into consideration when adopting measures that impact residents' standards of living. Of all the concepts listed, especially the small percentage of respondents who indicated activity-based budgeting (5.3%), this comes as a certain surprise (because it may be viewed as, at least, an auxiliary tool that drives the efficiency of public spending). Indeed, activity-based budgeting is generally considered to be one of the major components of the New Public Management concept promoted by the OECD (for more, see [66]). It consists of implementing a market approach to public services, analyzing the results of public spending, and adopting a long-term orientation (linking the spending to planned goals and to customized tasks using specific metrics in order for central and local administrators to effectively and efficiently deliver public services) [67–69]. In turn, the multipurpose development concept (which triggered so many discussions on rural modernization and socioeconomic transformation) was indicated only by less than 4% as the factor that guides their measures that are aimed at stimulating local residents' standards of living. In accordance with that concept, rural development processes may be “catalyzed” by optimizing the diversity of rural economic activity. In the literature on the subject (for more, see [70,71]), multipurpose development usually means embedding more and more new non-agricultural functions in the rural economic area (which may address a series of environmental, economic, social, or cultural needs of the whole society). That process consists of diversifying the rural economy, shifting away from having a single function (producing mainly agricultural raw materials), and placing emphasis on the sustainable use of agricultural land.

An even smaller percentage of respondents indicated the development of a civic society (less than 1.0%) and quality management at the LGU level (slightly above 1.3% of the total replies). It is difficult to disagree with the fact that today, the development of a civic society is a desirable process. It can be an efficient way of solving a number of social problems (having an impact on the standards of living) based on the concomitance principle. J. Tomczyk defines civic society as a network of voluntary movements, associations, or groups that are able to collaborate, self-organize, provide self-help and care, and take volitional action committed to the common good. It is independent from the government, and it is formed by individuals who share a similar system of norms and values and base their activities on solidarity, trust, cooperation, dialog, and consensus [72]. It could seem that quality management at the LGU level is a concept of particular importance in the context of measures implemented to address the residents' collective needs. This is the very consequence of how the quality of public services is defined, i.e., as a value that contributes to enhancing the quality of our lives and enriching our culture. In a way, it also represents the degree of meeting collective and individual needs [73]. In that context, it is worth noting that the problem with using quality management methods in the public sector is that it essentially differs from other industries, including in work ethics and operational standards (which are much more complicated than in the private sector). Moreover, the public sector views the customer from a different angle, and the relatively frequent alternation of power makes it truly difficult to maintain the continuity of strategies in place or management methods. This gives rise to serious problems with quality management in public institutions [74].

The representatives of local authorities believe that the key barriers to investments focused on improving residents' standards of living (Table 4) are insufficient financial resources (79%), the reliance on external funding streams (61%), and the excessive requirements of operators who are in charge of implementing the investments (43%). Inadequate staff qualifications were relatively rarely identified as a barrier to investment implementation (4.0%), and the same is true for the handover of power (7.33%). This is all the more surprising because, as noted by M. Poniatowicz, local authorities are often naturally reluctant to make long-term decisions. At the same time, the handover of local power is the reason why private partners involved in implementing investments must take into account the political risk related to it. Indeed, new authorities may have different opinions on the investment concerned, which deteriorates the investment climate [75].

Table 4. Barriers to the implementation of investments aimed at improving the standards of living for commune residents (up to 3 could be picked).

Specification	Rural Commune
Absence of consensus among the residents as to whether the investment is justified	4.00%
Reliance upon external sources of financing	61.33%
Insufficient financial resources (misalignment between the needs and income streams)	78.67%
Requirements of operators in charge of implementing the investments	42.67%
Unclear division of responsibilities between local, regional, and central authorities	9.33%
Handover of local power	7.33%
The way the state is governed (e.g., centralization of certain areas, vitiated central administration)	8.00%
The need to take environmental protection into account	12.00%
Legal requirements	18.00%
Inadequate staff qualifications	4.00%
Lack of undeveloped areas (especially land with access to utilities)	6.00%
Other	0.00%

Another topic covered by the study was the hierarchical arrangement of measures taken by local authorities to improve residents' standards of living. Of the six key measures indicated by the respondents, as many as three are environmentally oriented (Table 5), which is consistent with pursuing a development policy along the lines of sustainable

development. Presidents and vice presidents of rural commune councils found measures taken to extend and improve the quality of roads to be the highest priority (nearly 45%). A similar percentage of respondents viewed them as extremely important. Improving the quality of public healthcare services and making them more available in rural areas was identified as the second most important measure, with over 38% and 61% of presidents and vice presidents of commune councils considering it to be a priority or extremely important, respectively. Ranked next were environmental measures mentioned earlier: supporting renewable energies (indicated as a priority by 32% and as extremely important by 53% of respondents) and general improvements to environmental cleanliness (30.7% and 56.7%, respectively).

Table 5. Importance of steps undertaken to improve the standards of living, as assessed by representatives of local authorities (%).

Aspects Relating to the Standards of Living	Irrelevant/Not Important	Of Minor Importance	Of Medium Importance	Extremely Important	Priority/of Relevance
Accessibility and quality of public health services	0.00	0.00	0.00	61.33	38.67
Public safety	0.00	6.67	12.00	68.00	13.33
How people spend their free time	0.00	0.00	12.00	72.00	16.00
Educational opportunities for children and young people	1.33	3.33	7.33	62.00	26.00
Skill enhancement opportunities for adults	2.67	8.67	42.67	38.00	8.00
Availability of nursery places	8.67	8.67	16.00	50.67	16.00
Level of computerization and digitization at schools	4.67	4.67	5.33	59.33	26.00
Cleanliness of the natural environment	0.67	2.67	9.33	56.67	30.67
Acquisition of energy from renewable sources	0.00	6.00	8.67	53.33	32.00
Percentage of recycled waste	0.67	6.00	40.67	25.33	27.33
Quality of atmospheric air	0.00	0.00	37.33	37.33	25.33
Noise reduction	9.33	14.00	13.33	50.00	13.33
Area of forested land	16.00	16.67	17.33	44.00	6.00
Esthetics of buildings and green areas	6.00	12.67	24.67	47.33	9.33
Road network and its quality	0.00	1.33	9.33	44.67	44.67
Sidewalks	0.00	0.67	15.33	54.67	29.33
Bicycle paths	4.00	11.33	16.00	54.00	14.67
Parking lots and parking spaces	10.67	8.67	28.67	46.00	6.00
Traffic connections	2.00	3.33	25.33	58.00	11.33
Street lighting system	5.33	8.67	14.00	61.33	10.67
Water and sewerage infrastructure	2.67	4.00	28.00	40.67	24.67
Gas supply network	0.00	11.33	34.67	41.33	12.67
Portfolio of sports and cultural services	0.67	6.00	34.67	48.67	10.00
Broadband Internet access	0.67	7.33	38.67	47.33	6.00
Tourist base	6.67	17.33	21.33	50.67	4.00
Area of land under investment projects	3.33	10.00	14.67	62.67	9.33
Number of enterprises	3.33	9.33	14.67	58.00	14.67
Availability of selected services (hairdresser, beautician, shoemaker, tailor, home appliance repair)	23.33	14.00	18.00	41.33	3.33
Shopping conditions (including an increase in the total number of stores)	24.67	10.67	15.33	48.67	0.67
Social security	2.67	4.67	17.33	63.33	12.00
Number of public housing units	30.67	9.33	10.00	37.33	12.67
Quality of public housing	20.67	13.33	15.33	35.33	15.33

In the context of these considerations, particular importance must be attached to the development of renewables (e.g., wind, biomass, and solar radiation), most of which follow a yearly renewal cycle (or longer, as in the case of geothermal resources). According to estimations, 6.4 to 12.7 million people in Poland (out of a total population of 38 million) are affected by energy poverty (a situation faced by a household that must allocate more than 10% of their income to keep sufficient heating, i.e., 21 °C in main rooms). The problem is particularly severe for self-employed households, rural households, pensioner households, and lone-parent families. The development of renewable energies, especially in the form of a dispersed system, may contribute to optimizing the use of local energy resources thanks to its local nature and versatility [76].

This is all the more important since energy poverty has an effect on overall poverty and on social exclusion. Indeed, energy poverty has the following consequences: (1) a negative effect on physical health, which mostly affects socially vulnerable people (children, the elderly, and chronic sufferers); (2) a negative effect on mental health (people affected by energy poverty are prone to mental health issues); (3) the degradation of buildings (for instance, humidity in dwellings may rapidly contribute to structural degradation, and improper insulation of windows, walls, or doors contributes to increased loss of heat); (4) excessive debt (low-income households cannot afford to pay electricity bills, causing them to incur debt; therefore, the need to pay more money for energy decreases the income that could be used to buy other basic goods); and (5) increased carbon emissions (a building's poor energy standard entails an increased consumption of energy needed to heat it, and thus contributes to greater carbon emissions) [77].

Of all the measures aimed at improving the standards of living, the representatives of local authorities covered by this study attached the least importance to increasing the number of publicly owned apartments (30.7%), improving the conditions for shopping (24.7%), improving the availability of selected services, such as hairdressing, tailoring, and home appliance repair (23.3%), and improving the quality of publicly owned apartments (20.7%).

In the context of the considerations to be carried out, it is worth analyzing whether there are differences among the indicators relating to the indebtedness and solvency of rural municipalities and the standard of living of the inhabitants in various regions of the country—the northwestern region (covering Zachodniopomorskie, Lubuskie, Wielkopolskie, Pomorskie, and Kujawsko-Pomorskie voivodships); the southwestern region (Dolnośląskie, Opolskie, Śląskie, and Łódzkie); the northeastern region (Warmińsko-Mazurskie, Podlaskie, and Mazowieckie); and the southeastern region (Podkarpackie, Małopolskie, Świętokrzyskie, and Lubelskie). For this purpose, an ANOVA (analysis of variance) was carried out based on the Kruskal–Wallis test (Table 6).

Among the isolated areas determining the solvency and indebtedness of local governments, no statistically significant differences were found in the isolated macro-regions. Among the extracted detailed factors determining the standard of living of the inhabitants, no statistically significant differences were found (at the significance level of $p < 0.05$) at the level of the 4 macro-regions for most (13 out of 21) variables. Statistically significant differences occurred, among others, in the case of the SL3 (describing conditions for attractive leisure activities), SL5 (opportunities for adults to improve their qualifications), SL9 (aesthetics of buildings, green areas in the municipality), SL12 (street lighting), or SL15 variables (assessment of sport and cultural attractions).

Table 6. Differentiation of the indicators considered at the level of the 4 macro-regions.

	I			II			III			IV			ANOVA	
	A	DO	Vs	A	DO	Vs	A	DO	Vs	A	DO	Vs	K-W Test	p-Value
Indicators of budgetary solvency														
ISD1	3.14	4.00	36.22	3.09	2.00	43.32	3.55	4.00	20.06	3.38	4.00	40.08	3.70	0.30
ISD2	3.07	4.00	35.52	3.31	4.00	39.25	3.33	3.00	33.26	3.10	4.00	40.54	1.23	0.75
ISD3	2.90	2.00	34.69	2.91	3.00	34.69	3.03	2.00	35.47	2.75	2.00	45.66	0.98	0.81
Indicators of debt of self-government														
ISD4	3.74	4.00	30.16	3.49	4.00	41.38	3.73	4.00	22.52	3.28	4.00	39.11	2.66	0.45
ISD5	3.60	4.00	28.85	3.40	4.00	38.55	3.79	4.00	23.57	3.25	4.00	39.88	3.48	0.32
ISD6	3.69	4.00	27.09	3.46	4.00	39.28	3.76	4.00	21.07	3.30	4.00	38.94	2.91	0.41
ISD7	3.76	4.00	24.78	3.49	4.00	41.38	3.79	4.00	18.38	3.30	4.00	38.94	3.25	0.35
ISD8	3.45	4.00	30.82	3.34	4.00	44.10	3.79	4.00	27.81	3.00	4.00	44.66	6.11	0.11
ISD9	3.55	4.00	33.06	3.20	4.00	47.82	3.79	4.00	24.48	3.05	4.00	47.51	6.39	0.09
ISD10	3.57	4.00	29.10	3.37	4.00	42.61	3.64	4.00	29.02	3.03	4.00	43.32	4.90	0.18
Living standard indicators														
SL1	2.90	2.00	32.98	3.17	3.00	35.45	2.91	4.00	40.64	2.83	4.00	38.35	1.67	0.64
SL2	5.00	5.00	14.65	5.14	5.00	19.53	4.91	5.00	14.73	5.23	5.00	20.09	4.33	0.23
SL3	3.19	3.00	26.12	3.69	4.00	22.58	3.67	4.00	22.27	3.63	4.00	16.15	9.01	0.03 *
SL4	4.24	5.00	23.19	4.97	5.00	26.49	4.48	5.00	20.95	4.43	5.00	27.03	8.61	0.04 *
SL5	2.67	2.00	42.77	2.74	3.00	45.38	3.52	4.00	27.66	3.10	4.00	38.52	12.05	0.01 *
SL6	2.24	1.00	52.97	2.34	1.00	69.40	2.39	3.00	50.02	2.20	1.00	62.78	0.98	0.81
SL7	4.88	5.00	19.31	4.69	5.00	19.89	4.85	5.00	17.20	5.00	4.00	23.09	1.56	0.67
SL8	3.26	3.00	35.87	3.06	3.00	44.13	3.58	4.00	27.11	3.55	4.00	24.66	4.40	0.22
SL9	4.62	5.00	15.82	5.29	5.00	15.61	4.79	5.00	17.90	4.98	5.00	17.91	11.99	0.01 *
SL10	3.98	3.00	25.14	4.37	4.00	24.24	3.85	4.00	21.66	4.18	4.00	24.19	5.11	0.16
SL11	2.93	3.00	27.60	3.37	3.00	28.85	3.42	3.00	26.35	2.90	3.00	35.61	9.87	0.02 *
SL12	4.05	5.00	23.76	4.91	5.00	21.72	4.33	3.00	28.65	4.70	5.00	25.59	12.32	0.01 *
SL13	4.24	4.00	20.06	4.29	5.00	28.05	4.18	4.00	18.38	4.35	4.00	25.79	1.56	0.67
SL14	4.05	5.00	35.34	4.51	5.00	34.14	4.03	4.00	27.38	3.95	4.00	38.44	3.56	0.31
SL15	3.95	5.00	29.01	4.66	5.00	23.26	3.88	4.00	33.34	4.28	5.00	25.94	10.60	0.01 *
SL16	4.76	5.00	14.53	5.26	5.00	15.54	4.73	5.00	17.76	4.90	5.00	20.04	8.19	0.04 *
SL17	3.00	2.00	49.39	3.51	5.00	52.73	3.45	2.00	41.63	3.23	2.00	52.78	2.17	0.54
SL18	4.05	5.00	27.26	3.83	4.00	26.49	4.30	4.00	15.89	3.83	4.00	26.40	7.14	0.07
SL19	3.71	4.00	32.18	4.23	4.00	26.95	4.21	4.00	20.35	4.23	4.00	21.09	5.39	0.15
SL20	4.05	5.00	27.80	4.51	4.00	30.57	3.85	4.00	24.41	3.85	4.00	26.01	5.67	0.13
SL21	4.57	5.00	16.13	5.03	5.00	20.17	4.73	5.00	17.76	4.90	5.00	17.78	4.70	0.20

Symbols: I—northwest region (Zachodniopomorskie Voivodeship, Lubuskie Voivodeship, Wielkopolskie Voivodeship, Pomorskie Voivodeship, and Kujawsko-Pomorskie Voivodeship); II—southwest region (Dolnośląskie, Opolskie, Śląskie, and Łódzkie); III—northeast region (Warmińsko-Mazurskie, Podlaskie, and Mazowieckie); IV—southeast region (Podkarpackie, Małopolskie, Świętokrzyskie, and Lubelskie). A—mean, DO—dominant, Vs—coefficient of variation (in %), K-W test—Kruskal–Wallis test. * Statistically significant result.

3.2. Canonical Analysis

In the next stage, the study moved to the canonical analysis described above. The number of canonical roots found during the research procedure equals the number of variables contained in the smaller sets of those that are covered by the analysis (in this case, 10). As mentioned earlier, an in-depth analysis of the interactions between the phenomena considered was carried out only for the statistically significant canonical variates (as identified by Wilks' lambda test) (Table 7).

Table 7. Removing successive roots based on Wilks' lambda test.

Removed Root	Canonical Correlation	χ^2 Test Value	Number of Degrees of Freedom for the χ^2 Test	p Likelihood for the χ^2 Test	Wilks' Lambda Statistic
0	0.8849	648.6579	210	0.0000	0.0553
1	0.5619	306.3751	180	0.0000	0.2547
2	0.5327	221.3788	152	0.0002	0.3722
3	0.4033	146.6229	126	0.1015	0.5197
4	0.3813	106.8623	102	0.3516	0.6206
5	0.3156	71.6603	80	0.7356	0.7262
6	0.2722	48.1641	60	0.8640	0.8065
7	0.2476	30.9158	42	0.8963	0.8711
8	0.2092	16.7402	26	0.9167	0.9280
9	0.1718	6.7148	12	0.8759	0.9705

Based on the critical value for the level of significance (0.05), an in-depth analysis was performed for the first three canonical roots. As regards the calculations, note the quite high value and high statistical significance of the canonical correlations (especially the first one). These values are interpreted as the correlation between the weighted sums in each set (the weights are determined for successive canonical roots). The first canonical correlation coefficient was over 0.88, which testifies to a quite strong correlation between the pairs of weighted sums. Hence, it is reasonable to assume that the model established in this procedure (whose weights and factor loadings are presented in a tabular form below) provides a reliable description of the datasets under consideration. A weak correlation could be interpreted as a wrong structure of the model or the absence of relationships between the sets considered. The values for the other statistically significant canonical variates were smaller (0.56 and 0.53, respectively).

The weights calculated in the canonical analysis (often interpreted in the same way as beta coefficients in multiple regression) show the specific contribution that each sub-variable makes to the generated weighted sum; the higher the absolute value, the greater the (positive or negative) contribution. The calculations suggest (Table 8) that for the first generated canonical root, the ISD2 (0.9659) and SL10 (0.9640) variables have the greatest (absolute) weights in the first and second sets, respectively. This means that the correlation between the ratio of operating surplus to total incomes and the quantitative and qualitative conditions of roads (as viewed by representatives of local authorities) had the greatest impact on (contribution to) the first canonical variate. In turn, the variable relating to the ratio between the maturing liabilities and total liabilities (0.8852) and the one reflecting the esthetics of buildings and green areas in the commune (0.4322) had the greatest impacts on the creation of the second canonical root. Finally, once more, the ratio between maturing liabilities and total liabilities (ISD10) from the first set and shopping conditions (SL20) from the second set had the greatest influence on the creation of the last statistically significant canonical root.

From the perspective of the defined research goal, it is important to determine the canonical factor loadings as they tell how much the canonical variates are correlated with the items of each set of sub-variables. When it comes to the set of variables relating to the budgetary solvency and debt rating of local government units, the first canonical variate has the highest factor loading for the variable ISD2, i.e., the ratio between operating surplus and total incomes (0.9889); the next (i.e., second) canonical variate has the highest factor loading for the variable ISD1 relating to the commune's self-financing (−0.6042); finally, the third canonical variate has the highest factor loading for ISD10, the variable relating to the ratio between maturing liabilities and total liabilities (−0.6866). In the second set of variables, the greatest factor loading (0.9883) for the first canonical variate is carried by the SL10 variable, relating to the qualitative and quantitative conditions of roads in the concerned LGU; for the second one, it is carried by SL11 (−0.6136), the variable relating

to the rating of transport links in the unit concerned; and for the third one, it is carried by SL20 (0.6145), the variable reflecting the conditions for shopping.

Table 8. Canonical weights and factor loadings.

Variables Representing the Factors that Determine the LGUs' Budgetary Solvency and Debt Levels		Canonical Weights			Factor Loadings		
		Canonical Variates *					
		U1	U2	U3	U1	U2	U3
	ISD1	0.0018	−0.5711	−0.2386	0.4821	−0.6042	−0.2376
	ISD2	0.9659	0.5872	0.6159	0.9889	0.0260	0.0538
	ISD3	0.0190	−0.5360	−0.2836	0.6323	−0.4584	−0.2182
	ISD4	−0.0487	−0.2438	0.5680	0.1225	−0.3679	−0.0358
	ISD5	0.1714	−0.1280	0.4488	0.3119	−0.2918	−0.2351
	ISD6	0.0297	−0.0890	0.1726	0.3193	−0.2632	−0.3099
	ISD7	−0.0441	0.0981	−0.1973	0.2818	−0.1401	−0.3123
	ISD8	−0.0114	−0.5454	−0.0174	0.2946	−0.3238	−0.4422
	ISD9	0.0206	−0.0792	−0.6033	0.3747	−0.2082	−0.5873
	ISD10	0.0214	0.8852	−0.8798	0.3327	0.0724	−0.6866
Variables Relating to the Population's Standards of Living		Canonical weights			Factor loadings		
		Canonical variates *					
		V1	V2	V3	V1	V2	V3
	SL1	−0.0568	−0.1497	0.1304	0.1259	−0.3993	0.0650
	SL2	−0.0209	−0.2731	−0.1805	−0.2298	−0.1115	0.1206
	SL3	0.0189	−0.1020	−0.1614	0.2464	−0.4945	0.0046
	SL4	−0.0075	−0.1612	0.2791	0.1011	−0.5015	0.3994
	SL5	0.0827	−0.2359	−0.0518	0.3391	−0.4614	−0.1551
	SL6	−0.0511	−0.1262	−0.1601	0.2641	−0.4935	−0.2943
	SL7	0.0062	0.0602	0.2929	−0.2258	0.1256	0.2849
	SL8	−0.0281	0.0978	−0.1177	0.1227	−0.1678	−0.1881
	SL9	−0.0535	0.4322	−0.1527	−0.0526	−0.0198	0.2090
	SL10	0.9640	0.2536	0.2980	0.9883	−0.0332	0.0636
	SL11	−0.0425	−0.2715	−0.2949	0.2094	−0.6136	−0.2272
	SL12	−0.0444	−0.1553	0.3126	−0.0487	−0.4649	0.3989
	SL13	0.0225	−0.1359	−0.3800	0.1592	−0.4865	−0.1210
	SL14	0.0016	−0.2551	−0.2176	0.2163	−0.5107	−0.2008
	SL15	0.0089	0.0265	0.1282	0.0579	−0.4111	0.3471
	SL16	0.0507	0.1673	−0.1645	0.4299	−0.2529	−0.1242
	SL17	0.0190	−0.2351	0.0487	0.2066	−0.4607	0.0445
	SL18	0.0062	−0.1008	0.0538	0.2592	−0.4091	0.1336
	SL19	0.0215	−0.1180	0.1042	0.2288	−0.5971	0.1778
	SL20	−0.0637	−0.1069	0.5251	−0.0683	−0.3218	0.6145
	SL21	−0.0078	−0.1503	0.1996	0.1376	−0.5280	0.2902

* Table 7 includes only statistically significant variables.

The greater the value of a factor loading (in absolute terms), the more it means when interpreting the relationships. In the relevant literature, the researchers differ in their opinions on how to select the factors' critical values for each variable that requires an in-depth analysis. For instance, J. Zwierzchowski and T. Panek [61] recommend that only the variables with a squared coefficient of correlation above 0.50 should be subjected to interpretation. In contrast, G. Więcek and A. Sękowski [78] believe that only the variables for which the value of the charges (and not their squares) is greater than 0.30 (in absolute value) should be considered. For the purpose of this analysis, the critical value is assumed to be 0.40.

Under the above assumptions, the examination of factor loadings (Table 8) for the first canonical root provides grounds for concluding (based on the ratings given by representatives of local authorities) that growth in all three indicators of budgetary solvency

(ISD1–ISD3) entails improvements in the qualitative and quantitative conditions of roads (SL10) and in the development level of the telecommunications network (SL16).

When analyzing the values generated for the second statistically significant canonical root (the factor loadings and canonical weights), it can be noted (based on what the representatives of local authorities declare) that growth in the commune's self-financing ratio and in the ratio between operating surplus plus the income from property sold and total income drives an improvement in the rating of conditions for enjoyable use of free time; education opportunities for children and youth; skill enhancement opportunities for adults; and the availability of nursery places. Also, as the above financial ratios grow, there are improvements in the rating of the commune's transport links; street lighting; development of the water and sewerage infrastructure; the rating of cultural and sports services; and the development of the gas network. Moreover, ISD1 and ISD3 are positively correlated with the rating of tourism facilities, the condition of the local labor market, social security, and the availability of selected services (including hairdressers and beauticians).

Based on the canonical weights and factor loadings generated for the last statistically significant canonical root, there are grounds for concluding that wherever there is growth in the ratio between debt servicing expenses and own income (ISD9), the ratio between debt servicing expenses and total income (ISD8), and the ratio between maturing liabilities and total liabilities (ISD10), the shopping conditions tend to deteriorate. However, the impact of local authorities on that area is somehow restricted. First and foremost, they have the ability to establish a local development plan, invest in technical (including transport and energy) infrastructure, and prepare land for investment projects in an effort to encourage undertakings (including sellers) to pursue an economic activity in their territory (rather than to create conditions for a comfortable shopping experience in each store).

The analyses also included calculating the extracted values of variance and the redundancy indexes described earlier in this paper (Table 9).

Table 9. Extracted variances and redundancies.

Specification	Set of Variables Representing the Factors That Determine the LGUs' Budgetary Solvency and Debt Levels		Set of Variables Used in Assessing the Residents' Standards of Living	
	Variance Extracted	Redundancy	Variance Extracted	Redundancy
1st canonical variate	0.2242	0.1755	0.0887	0.0694
2nd canonical variate	0.1039	0.0328	0.1720	0.0543
3rd canonical variate	0.1369	0.0388	0.0652	0.0185

What these calculations show is that the canonical variate of the highest statistical significance extracts less than 9% of variance in the set reflecting the living standards of the population (as viewed by the heads of commune councils) and over 22% in the second set (relating to the determinants of LGUs' budgetary solvency and debt levels). The second root generated in the canonical analysis extracts over 17% of variance in the set relating to the residents' situation and slightly above 10% in the 2nd set (referring to selected aspects of local government units' financial standing). In turn, the last statistically significant canonical variate extracts less than 7% and less than 14% of variance, respectively.

As regards the set of input variables relating to the local government's budgetary solvency and debt level (as viewed by representatives of local authorities), less than 7%, 5.5%, and 1.9% of variance in the set pertaining to the residents' living standards can be explained, respectively. In turn, based on the first three statistically significant canonical roots, the set of input variables relating to the residents' standards of living can be used in explaining over 17.5%, 3.3%, and less than 4% of variance in the second set.

The analysis also included calculating the total redundancy, which is viewed as the mean percentage of variance explained with another set of variables (using all generated canonical variates). What these calculations demonstrate is that if the values of the variables

representing the budgetary solvency and debt levels are known, they may explain more than 29.37% of variance in the set representing the residents' standards of living.

Figure 2 below presents the dispersion graphs for statistically significant canonical variates. They depict the relationships between the values of newly created synthetic variables relating to the rural communes' solvency and debt levels (the abscissa) and the residents' standards of living (the ordinate).

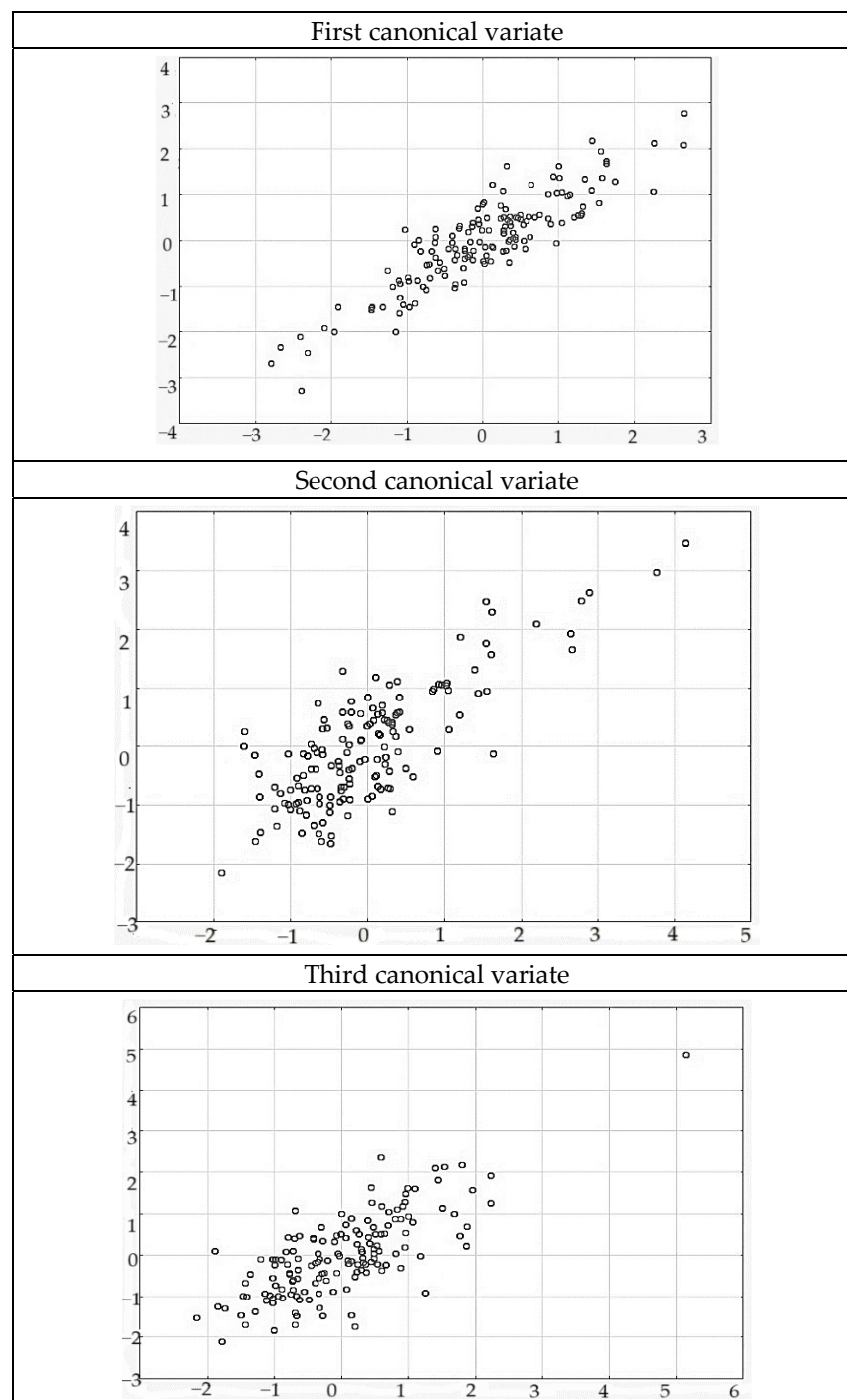


Figure 2. Dispersion graph for statistically significant canonical roots.

As regards the first statistically significant canonical variate, there is little dispersion of points representing the objects (random group of Polish rural communes) covered by the study. The points are clearly positioned along a positively sloped straight line. This

means that the generated pair of canonical variates tells much about the co-variability of the two sets of input variables (the first relating to the local government's solvency and debt levels, and the second describing the residents' standards of living). It can be assumed that as the values of the causative group grow (in this case, the variables relating to the local government's financial standing), the total values of consequences also grow, and the relationship is clearly linear, as reflected in the graph above. As regards this canonical variate, the closeness of most points in the graph could suggest that the input variables are structured quite similarly. As shown on the dispersion diagram for the other canonical variates of statistical significance, while the points (objects) covered by this analysis also surround a line with a positive slope, they are more dispersed around it. Hence, these pairs of canonical variates tell considerably less about co-variability compared to the first pair. Also, the last statistically significant canonical variate exhibits one outlier.

4. Discussion

The analysis of factor loadings and canonical weights highlights the existence of a usually weak, mostly negative relation between the components of the standards of living and the rating of debt levels at the rural commune level. To a certain degree, this may contradict the findings by K. Beer-Toth and B. Daffloon [79], who noted that the LGUs' debt is conducive to modernization efforts in the local economy and drives the creation of new jobs. They claim that debt not only makes it easier for local government units to meet their tasks, but also provides alternative streams of financing if their own funds turn out to be insufficient. According to A. Rosner and M. Stanny, indebted LGUs only apparently find themselves in a disadvantageous situation. They carried out an analysis of rural communes and found the above conclusion to be too simplistic. While some indebted communes struggle to cover their running costs, others actively invest [80]. Note, however, that local government units incur debt not only because of investments (and their willingness to use Union funds for purposes that include investments), but also due to the need to cover current expenses. In local government units, the growing levels of debt (and the risk of insolvency) may contribute to reducing the capacity to finance investments, and thus, directly or indirectly restrict the way they impact the improvements in the standards of living. Between 2001 and 2010 (Figure 3), the local government subsector saw an increase by nearly five times in the debt levels, largely because of their ability to absorb Union funds, which requires them to make their own contribution. In turn, between 2011 and 2016, the LGUs' debt remained at a stabilized level of ca. PLN 68 billion, but it grew quite consistently over the next years, reaching PLN 90.6 billion at the end of 2020 [81].

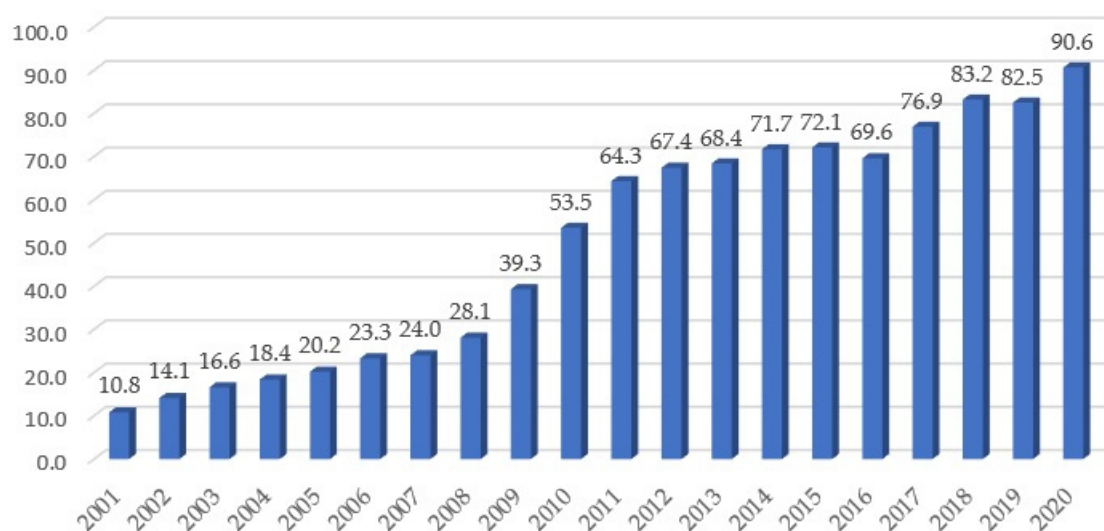


Figure 3. Debt of the local government subsector in the 2001–2020 period (PLN billion). Source: author's own compilation based on [81].

The procedure focused solely on rural LGUs. However, A. Bieniasz et al. demonstrated that the average financial situation of Polish communes (measured with a synthetic metric) does not differ between commune types. Rural units enjoy a much smaller financial autonomy than other LGUs. Also, they report a considerably higher amount of current transfers per capita, and they differ from other LGU types (urban–rural units in particular) in the amounts of debt per capita and operating surplus (of which each is highly variant) [82]. In turn, according to A. Standar, most units (70%, all types combined) of the Wielkopolskie voivodeship find themselves in a medium financial situation (measured using the TOPSIS method). The most advantageous financial standing is enjoyed by LGUs located in the immediate neighborhood of large cities. Conversely, being a remote commune usually means having a restricted revenue potential and thus a smaller capacity to invest [83].

The above theoretical considerations and the results of the author's research suggest that the components of local government units' financial condition (budgetary solvency and debt) are important but not the sole determinants of the residents' standards of living. While the solvency and debt of local government units (or, in broader terms, their financial standings) and the population's living standards are quite widely addressed in the literature on the subject, they are explored as separate topics; it is not common to consider them in combination with one another. Nevertheless, it is still worthwhile to refer to other authors' findings relating more or less to both the standards of living (or similar categories) and the financial conditions of LGUs (or matters related to local-level governance). For instance, A. Carmelli [84] empirically identified the linkages between the fiscal conditions of Israeli LGUs in 1997 and 1998 and the levels of employment and education in 2001. What his research shows is that the earlier fiscal situation of local governments exerted a strong effect on their later development in the area of employment and education, which consequently affected the standards of living of their residents. Between 2008 and 2010, B. Cuadrado-Ballesteros et al. [85] carried out a study on a sample of 76 Spanish towns and discovered that the population of financially sound LGUs have a higher quality of life. Also, the authors indicate that as the local government's financial condition deteriorates, their capacity to provide public services that require financial liabilities also deteriorates. As part of another study, K-Y. Lee and Y. Cho [86] discovered a linkage between how residents are satisfied with public services, their social satisfaction in general, and how much they trust the local government. Surveys were carried out with 980 people living in Jeonbuk, Korea, and structural equation models were used to demonstrate that being satisfied with public services directly or indirectly influences local residents' overall satisfaction. Note especially that satisfaction with public security had both a direct and indirect effect on community satisfaction. In this context, note also the interesting conclusions from a study by B. Siregar and N. Pratiwi [87], who analyzed 1003 financial reports from Indonesian LGUs for the period of 2009–2013 and demonstrated that the statuses and administrative ages of LGUs and the number of duly authorized financial managers have significant positive impacts on the LGUs' financial autonomy. At the same time, local financial independence has a significant positive effect on the Human Development Index.

The insolvency of local government units may have negative economic, social, and political consequences, including a disorganization of the system for addressing the collective needs of a territorial community. Also, it may contribute to pressure on central authorities to provide support for LGUs in financial difficulties (if the central authorities succumb to that pressure, expected support may become one of the key drivers of attitudes of local-level decision makers in the future). This, in turn, may lead to a considerable deterioration of the central budget balance, and to increases in public debt, in refinancing the costs of previous debt, in inflation, and more. Furthermore, the insolvency of LGUs may adversely affect the situations of their creditors, causing them to incur losses due to a permanent or transitory unavailability of financial resources. Also, for a number of creditors, an insolvable local government unit could mean losing an important buyer of goods and services or a partner who uses their financial services [44].

It therefore seems indisputable that incurring unreasonable debt at the local government level makes LGUs financially unstable and, thus, inefficient in how they perform their tasks. Also, it may affect their eligibility for Union funds (which, in turn, may be used to implement investments that improve residents' standards of living). Making the local government units' access to Union funds dependent on providing their own contribution resulted in them becoming indebted (and in a steadily growing amount of liabilities). According to a report delivered by the Supreme Chamber of Control on the efficiency of implementing recovery programs in Polish local government units, the main reason behind the deterioration in the LGUs' financial standing was the "investment boost" related to the availability of aid funds. Units who wanted to implement investment projects needed to make their own contribution, often financed with loans or bonds. This increased their debt levels and had a detrimental effect on their financial indicators [88].

However, with the above in mind, note that the growth in LGU debt should not always be viewed as an adverse development. As emphasized in the literature on the subject, debt incurred at the local government level may be considered not only as a negative process, but also as a positive, profitable, or constructive approach. In other words, when assessing debt levels and trends, one should consider not only its value, but also its intended purposes. A situation where the local government incurs debt to cover their running costs can be referred to as bad debt. Conversely, good debt means incurring debt to finance investments. It becomes more and more essential to analyze the structure of expenditure on assets because not every investment expenditure (e.g., landscaping elements and fountains) drives local development, and therefore, it seems economically unreasonable to finance it with debt. In turn, debt that is used in financing income-generating projects (which enable its repayment) is considered to be economically viable. Also, public debt may be of a destructive or constructive nature. The latter has positive impacts that boost development, while the former represents undesired indebtedness, which restricts development opportunities and may even result in insolvency (cf. [40,89,90]).

The results of this study suggest that a quite strong statistical relationship exists between the categories considered. The calculated redundancy index (over 29%) is moderately high. This can be compared with another research project [91] carried out for all commune types in Poland. It used 35 sub-metrics (relating, e.g., to incomes, expenditure, or debt), and found that if the values of variables representing the financial condition are known, they can explain 32.34% of the variance in the set related to the living standards of the residents. To summarize, it needs to be emphasized once more that a joint analysis of economic categories relating to the standards of living and to selected components of the local government's financial condition (as addressed in this paper) is extremely rare in the literature on the subject. Such studies also add value by using a canonical analysis, which is a sophisticated method for exploring statistical data that perfectly fits the purpose of analyzing complex and multidimensional phenomena such as the standards of living. These results could be refined by continuing the research procedure with another set of input variables of a different size (and/or with a larger sample, which would also make the findings more reliable). Carrying out similar analyses in an international context could also be a valuable part of further research. Note, however, the limited comparability of local government units between countries (even within the European Union alone, they demonstrate historical particularities and are based on different legal frameworks). Further research could also include cointegration and causality tests (e.g., the Granger test) between sub-variables relating to the standards of living and to different aspects of the LGUs' financial standings (e.g., based on secondary data published by statistical offices). However, this was not carried out due to restricted datasets (the time series being too short). Also, it would be worthwhile to modify the set of input variables and the way of structuring their weights (e.g., based on the Delphi method).

5. Conclusions

The residents' standards of living are stimulated by initiatives taken at the local government level, which can result both from imposed legal regulations and from the very nature of the local government. LGUs are the ones that are vested with an important role, which consists of pursuing a rational investment policy and elaborating (local and regional) development strategies. It appears self-evident that the scope, duration, and efficiency of measures put in place significantly depend on the LGUs' financial conditions. As a consequence, local government units' budgetary solvency and debt (being among the key components of their financial conditions) are important determinants of their efficient functioning oriented at addressing the needs of local communities as far as possible. Today's financial problems that local government units may struggle with (including the effects of tax changes in Poland, increased prices of energy carriers—largely due to the Russian invasion on Ukraine—and high inflation) increasingly often impede the fulfillment of public tasks and make it more difficult to meet financial liabilities. In view of the increasingly broader scope of tasks carried out by the local government, legal instruments (referred to as the LGU-specific debt index) were put in place in Poland to restrict the level of debt incurred by LGUs and prevent an excessive increase in liabilities. However, at the same time, it reduces the local government's capacity to invest (e.g., in infrastructure enhancements or renewable energies), which is reflected in the degree to which the needs of the local population are addressed. In the future, in order to prevent the stall of investments aimed at improving the standards of living, LGUs may find themselves forced to use hybrid financing streams, such as public–private partnerships.

Both the residents' standards of living and the budgetary solvency and debt levels of local government units are complex and multifaceted categories. With the above in mind, this paper does not claim to provide an exhaustive description of the topics it addresses. The author realizes that quantifying the categories under consideration in a comprehensive way is difficult and may give rise to certain doubts (e.g., in the selection of sub-variables), which is not exceptional in economic sciences. However, in this kind of analysis, it seems reasonable to promote the use of sophisticated data exploration methods such as canonical analysis (even though it involves some difficulty in interpreting the results because of several reasons, including the large number of indexes calculated).

The representatives of local authorities expressed their views on the categories considered in a survey questionnaire. The data collected served as a basis for a canonical analysis, which is quite a rare procedure. The results of the Wilks' lambda significance test laid grounds for an in-depth analysis of three out of a total of ten generated canonical variates. The correlation between (a) the ratio of operating surplus to total incomes and (b) the qualitative and quantitative conditions of roads contributed the most to the creation of the first (most statistically significant) canonical variate. The investigation suggests that the statistical relationship between the phenomena considered is quite strong. The resulting models of the canonical analysis enabled a redundancy analysis, which, in turn, concluded that if the values of the variables relating to the budgetary solvency and debt rating of Polish rural LGUs are known, they may explain more than 29% of the variance in the set representing the living standards of residents.

The results of the above analyses could be of indirect assistance to local authorities, for instance, to bodies in charge of sustainable development at the local and regional levels. The findings from this study may be used in assessing the condition of assets; adjusting local budgets; examining the condition of public service infrastructure in quantitative and qualitative terms (which seems to be particularly important in rural areas); assessing the development potential; and redefining the priorities for local development (e.g., by ensuring that the scope and quality of services is aligned with what the population expects). Therefore, the findings from this study may provide a basis for decision making related to both socioeconomic and fiscal/budgetary policies. This is because the residents' standards of living can (and should) be viewed as a reference point for other strategic measures taken by local authorities depending on their financial conditions.

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