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## IDENTIFYING THE CHANGES AND DISPARITIES IN INCOME BETWEEN RURAL MUNICIPALITIES OF THE WIELKOPOLSKIE VOIVODSHIP<sup>1</sup>

Key words: total income, own income, external income, convergence/divergence income, rural communes

**ABSTRACT.** The purpose of the paper is to identify the changes and disparities in the income of rural municipalities of the Wielkopolskie Voivodship. As the main source materials, this paper relied on the Local Data Bank of the Central Statistical Office and on Municipal Budget Reports (RB-27s) of the Ministry of Finance. The analysis period was 2010-2017. The variable of focus in this study is total income and its components. The relationships between income categories were assessed using the Pearson correlation coefficient. Also, this paper used basic measures of descriptive statistics and the decile ratio. The analysis of variance (the Kruskal-Wallis ANOVA on ranks) was carried out to verify the statistical significance of results, taking into account the functional type of municipalities (determined using the cluster analysis). The functional type was found to have an effect on income disparities in the group of municipalities surveyed. Also, the income gap between municipalities tended to narrow. The income potential of rural municipalities of the Wielkopolskie Voivodship rose by 54% in 2010-2017. This is the consequence of a consistent increase in own income and considerable growth in external income related to the introduction of the Family+ programme. Municipalities are improving their wealth because they derive more and more funds from their share in personal income tax while accessing smaller amounts from sources typical of rural local governments, such as agricultural and forestry taxes. This is related to progressing suburbanization processes which are currently taking place in Poland.

### INTRODUCTION

Income means the positive effects of using productive input (land, labor, physical capital and financial capital) in the management process. Income is among the basic economic categories used to assess the financial situation of municipalities, enterprises or family farms. In practice, these operators differ in how they determine their income; some of them are required to use the definitions provided for in legal regulations [Owsiak 2015]. No formal or legal definition of budget income exists for the public sector (including local government units); the legislator indicates the sources of income and defines them as such.

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<sup>1</sup> This publication was co-financed from resources of the National Center for Science, allocated pursuant to decision DEC-2013/11/D/HS4/03884.

A reference to income categories can be found in three basic legal acts [Kotlińska 2009]. Pursuant to Article 167, Para. 2 of the Constitution of the Republic of Poland, income of local government units is “own income plus general subsidies and targeted grants from the state budget”. Article 3 of the Act on Income of Local Government Units lists the sources referred to above and supplements them with further options for accessing capital: “non-repayable funds from international sources, funds allocated from the European Union budget, and other funds as defined in separate regulations”. In turn, Article 235 of the Public Finance Act of August 27, 2009 divides income into current income and property income [Journal of Laws, 2016.1870].

The division of income into own and external income is of particular importance. Own income is derived from the municipality’s own activity, it reflects its wealth and independence from external sources of financing, and provides a greater degree of discretion in spending [Dylewski et al. 2010, Wiśniewski 2011]. Their sources include: local taxes and fees (e.g. property tax, agricultural tax, forestry tax), income derived from the property of a local government unit (LGU), and shares in proceeds from personal income taxes (PIT) and corporate income taxes (CIT)<sup>2</sup>. In turn, external income is derived from grants and general subsidies (Article 4 of the Act on Incomes of Local Government Units).

It should be emphasized that recently income has been characterized by major changes, influenced by the economic situation and acquired EU funds [Głowicka et al. 2018, p. 184, Kozera 2018, p. 105]. On average, income of rural municipalities differs from income earned by other types of municipalities. This is because most of them are rural in nature, and therefore fail to collect as much income from local taxes as urban local governments do [Standar 2013, Satola et al. 2019]. Having smaller income could make the implementation of investment problematic. As Małgorzata Jaremkó notes [2011, p. 123], “in accordance with the balanced budget principle, budget income is the basic source of financing for planned expenditure of local government units”. A smaller income potential<sup>3</sup> naturally results in restricting options for investment, even if investment is supposed to be financed with repayable funds or co-financed by the EU. This is a fundamental problem, considering the extent of Union aid allocated to local government units and the magnitude of related investment (for a broader description, see Paweł Swianiewicz and Julita Łukomska [2015]).

The level of municipal income is affected by endo- and exogenous factors. Important endogenous determinants include geographic location (natural resources, labor market resources etc.) [Zawora 2010, Głowicka-Wołoszyn, Wysocki 2014]. In turn, important exogenous determinants include the macroeconomic policy [Głowicka i in. 2018, Kozera 2018] and certain processes taking place in the country, e.g. suburbanization [Zawora 2010]. The problem is not the income gap itself, because it is a natural thing, but whether income converges or diverges. Without adequate financial resources, it is impossible to invest; and without investment, it is impossible to develop. Therefore, the analysis of proportions between income and income trends should be regarded as a crucial problem.

<sup>2</sup> It is debatable whether the share in state taxes should or should not be classed as own income. For more information, see e.g. Maria Kosek-Wojnar and Krzysztof Surówka [2007], Elżbieta Chojna-Duch and Elżbieta Komberger-Sokołowska [1998].

<sup>3</sup> For more information on income potential see Romana Głowicka et al. [2018], Agnieszka Kozera [2018].

## MATERIAL AND METHODS

The purpose of the paper is to identify the changes and disparities in the income of rural municipalities of the Wielkopolskie Voivodship. The proportions between total, own and external income were presented in order to meet the objective defined above. Due to the availability of data on external income, the analysis period was 2010-2017. The study focuses on rural municipalities located in the Wielkopolskie Voivodship. Their financial performance figures were grouped by functional type. The reason of substance for choosing the group and range of operators specified above is that rural municipalities exhibit a great diversity of functions they perform, which has an effect on their income. The source materials were retrieved from the Local Data Bank of the Central Statistical Office and Municipal Budget Reports (RB-27s) of the Ministry of Finance. The figures were recalculated and expressed at 2017 prices to eliminate the impact of inflation on financial performance. Selected descriptive statistics were used to present heterogeneity. The decile ratio (D9/D1, the ratio between the 9<sup>th</sup> and 1<sup>st</sup> decile of the distribution of income) was also calculated. Relationships between income categories were assessed using the Pearson correlation coefficient. The second step of this study consisted of identifying the functional types of local government units considered and presenting the results grouped accordingly. The selection of simple characteristics and the research procedure were based on methodology by Agnieszka Kozera and Feliks Wysocki [2015]<sup>4</sup>. The municipalities were classified using the Ward method and the k-means method. As a next step, this paper presents the importance of a municipality's functional type impact on income categories considered. This was done using the ANOVA variance analysis. The assumption that the dependent variable follows a normal distribution was not met for all groups compared<sup>5</sup>. Hence, the Kruskal-Wallis test on ranks (a non-parametric one-way analysis of variance) was performed [Stanisz 2006, 2007]. The statistical analyses outlined above were carried out using the STATISTICA 13.3 suite.

## RESULTS OF THE STUDY

Between 2010 and 2017, the total income of rural municipalities of the Wielkopolskie Voivodship rose by 54%, from PLN 2,639 million to PLN 4,055 million (Table 1). Income grew consistently by several percent each year, except for 2016 when a sharp decline was experienced (by over 21% compared to the previous year). That growth was driven by greater transfers from the state budget. Indeed, over that period, the amount of funds delivered in the form of grants grew from PLN 563 million to PLN 1,083 million. These funds were allocated to current expenditure (as opposed to investment), i.e. state administration tasks.

<sup>4</sup> The construction of functional types included the following stages: selection of simple features describing functional types, standardizing the values of simple features, classifying municipalities using the Ward and k-medium method (5 classes), identifying functional types of municipalities and their spatial delimitation.

<sup>5</sup> The Shapiro-Wilk test was used to verify this assumption.

Table 1. Total, own and external income in selected categories of rural municipalities of the Wielkopolskie voivodship in 2010–2017 (PLN million, 2017 constant prices)

Specification	Income [mln PLN]									
	2010	2011	2012	2013	2014	2015	2016	2017		
Total income	2,639.12	2,725.15	2,791.26	2,817.60	2,894.73	3,094.09	3,755.58	4,055.05		
Own income	1,174.84	1,216.53	1,251.05	1,289.31	1,388.57	1,513.54	1,605.02	1,695.43		
Tax revenue: agricultural tax	46.56	47.66	63.99	68.50	69.68	67.93	66.25	64.28		
Tax revenue: forestry tax	6.51	7.03	8.24	8.14	7.51	8.39	10.70	10.44		
Tax revenue: property tax	350.63	358.61	374.22	399.68	423.67	449.87	482.44	504.81		
Share in taxes which are state budget revenue: personal income tax	336.96	368.67	386.19	413.81	462.17	526.55	591.67	659.94		
Share in taxes which are state budget revenue: corporate income tax	32.31	26.20	19.96	22.62	23.93	34.26	38.74	40.69		
Other own income	401.86	408.36	398.45	376.55	401.61	426.55	415.21	415.26		
External income	1,464.28	1,508.63	1,540.21	1,528.30	1,506.16	1,580.55	2,150.57	2,359.63		
Total subsidies:	964.61	942.00	970.64	973.32	966.37	1,017.53	1,067.46	1,061.74		
- including the educational part	673.49	673.73	692.27	694.27	705.95	744.56	778.03	767.31		
Total grants:	499.68	566.62	569.57	554.97	539.79	563.02	1,083.11	1,297.89		
- including investment grants	59.84	143.55	156.93	128.52	80.58	98.32	44.05	72.17		
Targeted grants from the state budget allocated to state administration tasks:	367.31	343.03	330.15	326.66	344.65	356.97	938.17	1,124.92		
- including investment grants	0.08	0.03	0.12	0.43	0.36	0.04	0.45	0.08		
- section 855: family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,033.45		

Source: own elaboration based on Central Statistical Office data [GUS 2019] and the Ministry of Finance data [MF 2019]

Naturally, rural municipalities perform an agricultural function. However, there are some noticeable changes taking place in rural areas, leading to a shift from their rural nature towards the development of residential or industrial functions. This transformation is also reflected by changes in the mix of own income. In 2010, own income amounted to PLN 1,175 million, and rose by a total of PLN 520 million (44%) by 2017, reaching PLN 1,695 million. As regards own income of the municipalities surveyed, the key role is played by tax property and the share in central personal income tax, rather than by agricultural and forestry taxes. Although the proceeds from agricultural tax grew considerably between 2010 and 2014, they followed a consistent downward trend afterwards. Generally, they accounted for barely ca. 4% of own income. But compared to other administrative types of municipalities, this is still relatively the highest share [GUS 2019]. That source of income was found to be replaced by proceeds from personal income tax. In the study period, the amount of funds derived from personal income tax grew each year, from PLN 337 million in 2010 to PLN 660 million in 2017 (a total growth rate of nearly 100%). In the 2017 mix of own income, the share in personal income tax accounted for 39% of own income, compared to 29% in 2010. The increase in own income is proof of financial independence and an advance in wealth of LGUs.

The second most important category of own income is proceeds from property tax, which also grew steadily from PLN 351 million in 2010 to PLN 505 million in 2017. Despite an increase by PLN 154 million, these funds represented a constant share of ca. 30% in the mix of own income. Other categories of own income did not make a considerable contribution to the total amount.

In addition to funds derived from own activity, municipalities also access external funds. In rural local government units based in the Wielkopolskie Voivodship, external funds grew from PLN 1,464 million to PLN 2,360 million over the study period (a growth rate of nearly 50%). However, note that it was actually caused by a single increase in this category of income which took place in 2016 vs. 2015. Despite these developments, the share of external income in total income only grew slightly, from 54% in 2010 to 58% in 2017.

External funds consist of subsidies and grants. As provided for in the Act on Income of Local Government Units, a subsidy is an income equalization instrument, playing a compensatory and balancing role, and is allocated to local government units with lower population density and smaller proceeds from taxes. The third component of the municipal subsidy is the educational part which depends on educational services offered in the municipality. In the study period, the educational part of the subsidy accounted for 70% of the total subsidy, and grew slightly from PLN 673 million to PLN 767 million, i.e. by 14%. Other parts of the subsidy remained at a quasi-constant level, varying in the range of PLN 291 million to PLN 294 million, causing a decline in their share in the total mix of external income. This means that in the study period, rural municipalities of the Wielkopolskie Voivodship had fewer reasons to access additional funds from the state budget.

It was quite the opposite for total grants disbursed over the study period. A considerable increase in their amount, from PLN 500 million to PLN 1,298 million (by 160%) can be observed between the two extremities of the time interval. However, as revealed by a year-by-year analysis, this increase was caused by a greater amount of targeted grants being allocated from the state budget to current state administration tasks. Each year,

a similar amount of funds was allocated to investments. The increase in the amount of grants referred to above was caused by the implementation of the Family+ programme which started in 2016 in accordance with the Act on State Support for Child-raising. The Regulation of the Minister of Finance of July 25, 2016 (amending the Regulation on the detailed classification of income, expenditure, revenue and payments and funds originating from international sources) established a new section of budget classification (855: Family)<sup>6</sup> in order to ensure “a unified recording of funds related to support for families as a specific social group.” In 2017, it was included for the first time as a separate category in the Local Data Bank of the Central Statistical Office. It turns out that in 2017, rural municipalities of the Wielkopolskie Voivodship obtained a total of PLN 1,033 million allocated to that category, including PLN 697 million absorbed by section 85501 (67% of funds allocated to section 855). This accounts for as much as 29% and 17% of external income [MF 2019].

When analyzing the mix of income, note that the greatest contribution was made by section 756 (Income from legal persons, natural persons and other entities not having a legal personality and expenditure related to collection thereof)<sup>7</sup> and section 758 (Miscellaneous settlements)<sup>8</sup>. The analysis of sources of income in 2010 and 2017 reveals the importance of funds allocated under the Family+ programme. In 2017, they accounted for as much as 25% of total income [GUS 2019] (Figure 1).

The comparison of total income and external income reveals that total income varies strongly while external income is much more homogeneous. When looking at the range of total income in the categories considered, it may be concluded that own income collected by the municipalities have an impact on the income gap. Municipalities such as Przykona, Suchy Las, Tarnowo Podgórne and Powidz have the largest amounts of total income (the 2010-2017 median was over PLN 6,000 per capita) and, thus, the highest own income (over PLN 4,500 per capita). In turn, local government units with the smallest income potential include Kościelec, Ostrów Wielkopolski, Koźminek and Żelazków (the 2010-2017 median was PLN 2,500-2,600 per capita). Depending on the year, the Pearson coefficient between these two categories was 0.8 to 0.9 (at  $p = 0.05$ ). In turn, the correlation between total income and external income was 0.2 and proved to be statistically significant (at  $p = 0.05$ ) in only one year (2011). In other years, no correlation was found to exist between total income and external income. The above findings reflect the importance of own income in creating the income potential of municipalities.

Selected indicators of income disparities are presented in Table 2. Note the important gaps between own income and a greater homogeneity of total income and external income.

<sup>6</sup> The new section mostly includes budget classification subsections previously recorded as “852: Social assistance” and “853: Other social policy tasks”. It includes benefits related to the implementation of the “Family 500+” government programme, family support expenditure, and expenditure related to the Large Family Card.

<sup>7</sup> In this subsection, income is composed of agricultural tax, forestry tax, property tax, transport tax, and civil law transaction tax (collected by the Tax Office). In the budget, it was planned separately for legal persons and natural persons.

<sup>8</sup> This subsection includes the balancing part of the general subsidy, the educational part of the general subsidy, and the compensatory subsidy.

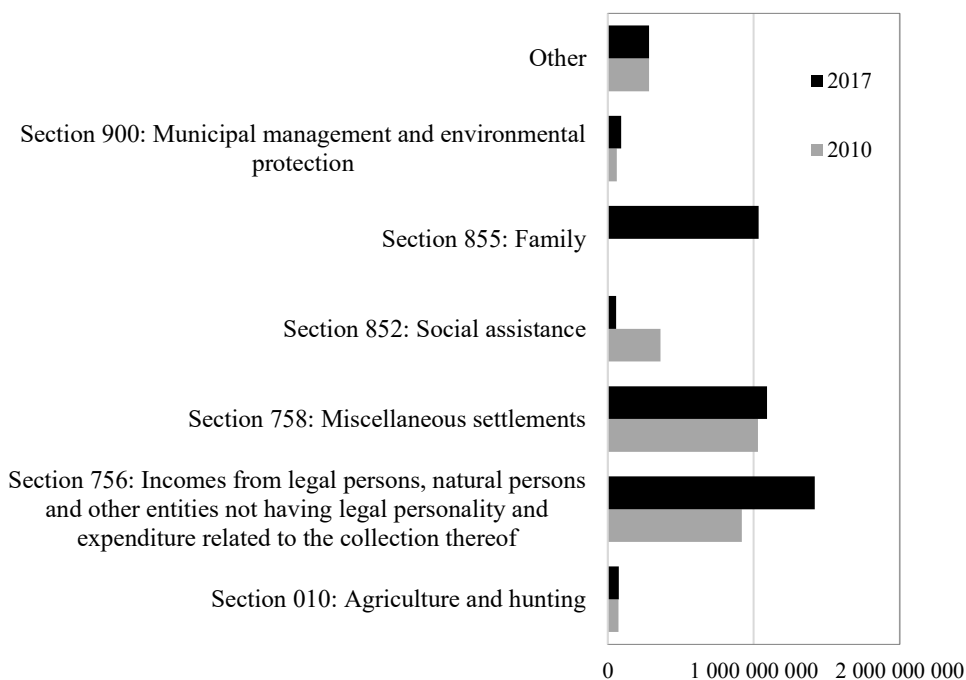
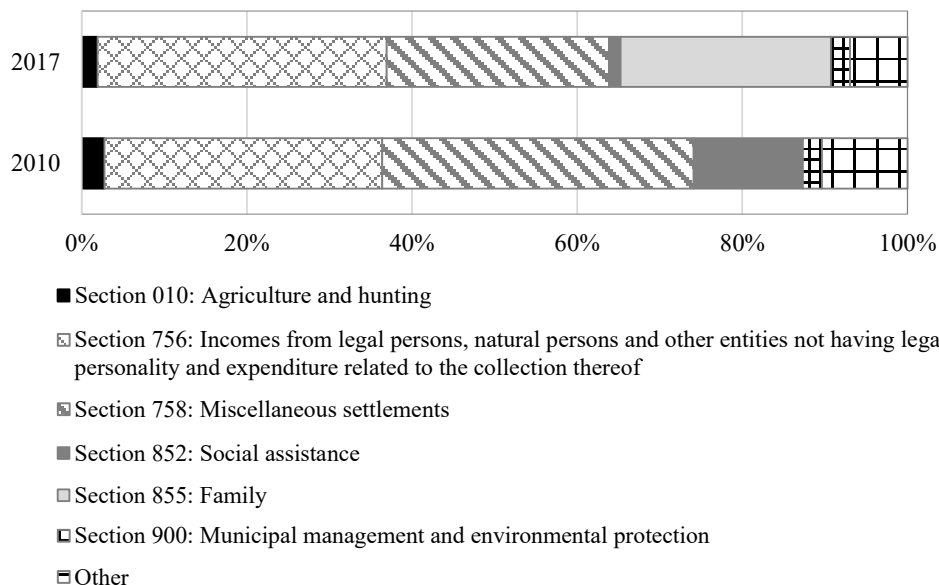


Figure 1. Total income of rural municipalities of the Wielkopolskie voivodship split in accordance with the sections of the Budgetary Classification (2017 constant prices)

Source: own elaboration based on Central Statistical Office data [GUS 2019] and the Ministry of Finance data [MF 2019]



Table 2. Selected descriptive statistics and coefficients of unequal distribution of total income, own income and external income of rural municipalities of the Wielkopolskie voivodship in 2010-2017 (per capita, 2017 constant prices)

Variable	Unit	2010	2017	2010	2017	2010	2017
		total income		own income		external income	
Mean	PLN	3,100.79	4,499.43	1,232.26	1,700.30	1,868.52	2,799.13
Median		2,918.61	4,342.08	963.97	1,476.35	1,861.75	2,804.44
Minimum		2,062.22	3,724.84	463.91	813.45	650.04	1,745.51
Maximum		6,878.57	8,039.17	5,921.68	5,802.37	3,709.22	4,134.29
10 <sup>th</sup> percentile		2,601.26	3,934.60	638.01	1,048.44	1,300.19	2,225.78
90 <sup>th</sup> percentile		3,569.95	4,930.80	1,909.91	2,421.49	2,361.40	3,385.09
90/10 percentile ratio	times	1.37	1.25	2.99	2.31	1.82	1.52
Coefficient of variation	%	25.7	15.15	73.85	48.5	25.1	16.38

Source: own elaboration based on [GUS 2019]

What should also be emphasized is the trend followed by each category in 2010-2017, resulting in the gap narrowing. This is confirmed both by the 90/10 percentile ratio and the coefficient of variation. When analyzing minimum and maximum levels, note that income disparities are reduced through an increase in income of the poorest local government units accompanied by a deceleration in income growth in the wealthiest ones.

The “residential and service” type of municipalities was characterized by a statistically significantly<sup>9</sup> better financial performance in terms of total income and own income, and by a statistically significantly poorer performance in terms of external income. The financial performance of that group of municipalities was so different from other types identified that it needed to be confirmed through a post-hoc analysis for all years and all income categories covered by this study. In 2010 and 2017, representatives of the “residential and service” type recorded an amount of PLN 4,148 and PLN 5,502, respectively. The amounts recorded at the same time for representatives of the “agriculture and tourism” type were lower by ca. PLN 300 and PLN 500, respectively. Other types of local government units reported much lower amounts of total income. However, agricultural municipalities were the ones to experience a faster growth of income. This means certain processes took place that equalize income potential.

The mean level of own income for representatives of the “residential and service” type was significantly different from levels recorded in other groups: ca. PLN 1,000 higher than in the “agriculture and tourism” group and even PLN 2,000 higher than in other

<sup>9</sup> Due to size limitations of this paper, the author decided not to present the levels of the KW test. All results were statistically significant at  $p = 0.05$ . Similar conclusions were obtained by the team of Romana Głowicka et al. [2018] and Agnieszka Kozera and Feliks Wysocki [2015]. The communes closest to large centers were characterized by the most favorable results. Location rents, entrepreneurship and population density were important.



Table 3. Level and growth of total, own and external income grouped by functional type of rural municipalities of the Wielkopolskie voivodship in 2010 and 2017 (2017 constant prices)

Function	Total income			Own income			External income		
	2010	2017	2017/ 2010	2010	2017	2017/ 2010	2010	2017	2017/ 2010
	PLN		%	PLN		%	PLN		%
Residential and service	4,147.96	5,501.97	132.64	3,168.31	3,435.00	108.42	979.65	2,066.96	210.99
Agriculture and nature	3,023.17	4,362.06	144.29	962.98	1,461.98	151.82	2,060.19	2,900.08	140.77
Agriculture and tourism	3,868.53	5,010.40	129.52	2,016.71	2,118.68	105.06	1,851.82	2,891.71	156.16
Highly intensive agriculture	2,944.19	4,433.93	150.6	1,043.10	1,547.28	148.33	1,901.09	2,886.64	151.84
Agriculture with the residential and service function	3,018.86	4,425.74	146.6	1,150.83	1,640.17	142.52	1,868.03	2,785.57	149.12

Source: own elaboration based on [GUS 2019]

groups. Interestingly, own income of representatives of the “agriculture and tourism” and “residential and service” types changed only slightly, at a rate comparable to the inflation rate, whereas in other types it was ca. 40-50%.

It was quite the opposite for indicators and growth rates of external income. The groups of municipalities at lower levels of external income reported better performance figures and smaller changes, which is consistent with the principles of support delivered in the form of subsidies.

## SUMMARY AND CONCLUSIONS

The purpose of this paper was to identify the changes and disparities in income between rural municipalities of the Wielkopolskie Voivodship. The following conclusions could be drawn from this study:

1. The income potential of rural municipalities of the Wielkopolskie Voivodship rose by 54% in 2010-2017. This is a consequence of a consistent increase in own income and considerable growth in external income related to the introduction of the Family+ programme. Funds allocated under the programme are delivered to the beneficiaries through the municipal budget. When excluded from the analysis of external income, this category reveals the true extent of its change (which was slight though positive).

2. Own income of rural municipalities of the Wielkopolskie Voivodship rose by 44% in 2010-2017. This means a general improvement in the wealth of that group of local government units, and a considerable increase in their financial independence, resulting in greater discretionary powers for their authorities.
3. Analysis of own income of the surveyed group of local government units allowed to present changes in their structure. Municipalities are improving their wealth because they derive more and more funds from their share in personal income tax while accessing smaller amounts from sources typical of rural local governments, such as agricultural and forestry taxes. This is related to progressing suburbanization processes which are currently taking place in Poland. The share in personal income tax is currently the most important contributor to own income, and largely exceeds income derived from property tax.
4. The functional type was found to have an effect on disparities in total, own and external income per capita. This is especially true for representatives of the “residential and service” type whereby income was statistically significantly different from amounts earned by other functional types. These municipalities exhibited better performance in terms of total income and own income, and poorer performance in terms of external income. An important finding is that the differences between the types of municipalities identified tended to become narrower in each income category.
5. There was a decrease in inequalities in the distribution of total, own and external income per capita. This evidences a favorable income convergence process followed by rural municipalities. The above are important developments which could become a basis for equalizing development levels, since income is the basic source of funds for investments which lay the foundation for changes.

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## IDENTYFIKACJA ZMIAN I NIERÓWNOŚCI DOCHODOWYCH GMIN WIEJSKICH WOJEWÓDZTWA WIELKOPOLSKIEGO

Słowa kluczowe: dochód ogółem, dochody własne, dochody obce, konwergencja/dywergencja dochodowa, gminy wiejskie

### ABSTRAKT

Celem artykułu jest ocena zróżnicowania i zmian poziomów dochodów gmin wiejskich. Zakres terytorialny objął województwo wielkopolskie. Podstawowym materiałem źródłowym były bazy BDL GUS oraz sprawozdania budżetowe gmin (Sprawozdanie RB-27s) Ministerstwa Finansów. Analizę przeprowadzono dla lat 2010-2017. Badaną zmienną był dochód ogółem oraz jego składowe. Pomiedzy kategoriami dochodów zbadano zależność za pomocą wskaźnika korelacji Persony. Wykorzystano także podstawowe miary statystyki opisowej oraz wskaźnik zróżnicowania decylogowego. W celu zbadania statystycznej istotności uzyskanych wyników zastosowano analizę wariancji (test ANOVA rang Kruskala-Wallis). W analizie uwzględniono typ funkcjonalny gmin, do którego wyznaczenia posłużyła analiza skupień. Stwierdzono, że typ funkcjonalny wpływa na zróżnicowanie dochodów badanej grupy gmin. Zaobserwowano zjawisko wyrównywania się nierówności dochodowych pomiędzy gminami. W latach 2010-2017 potencjał dochodowy gmin wiejskich województwa wielkopolskiego wzrósł o 54%. Jest to efekt systematycznie wzrastających dochodów własnych oraz znacznego wzrostu dochodów obcych, który związany był z wprowadzeniem programu Rodzina+. Zwiększanie bogactwa własnego gmin związane jest z uzyskiwaniem coraz większych środków z tytułu udziałów w PIT oraz mniejszych ze źródeł typowo związanych z samorządami wiejskim, takimi jak podatek rolny i leśny. Wiąże się to z postępującym w Polsce zjawiskiem suburbanizacji.

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