Spatial analysis and assessment of effectiveness of selected social services

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Abstract

The aim of the article is to implement a new approach to assess the effectiveness of selected social services on the example of statistical data from the Social Welfare Centre in the city of Zgierz (Poland). The analysis was conducted in two ways – it concerned: 1) spatial differentiation analysis and 2) the assessment of the effectiveness of granting social services. In most analyses of spatial distribution for the assessment of the intensity of the social assistance, the indicators compare the structure of people receiving benefits in relation to the total population. The Authors propose the use of the Multiplicative Indicator of Poverty Intensity (*MIPI*), which consists of 4 components: the number of people living on a given street, the number of beneficiaries of social assistance and the number and the amount of social services granted. Assessment of the effectiveness of social assistance is treated in an extended way than the commonly-used approach expressing the ratio of the number of beneficiaries in relation to the actual number of people in need. The dynamic approach was also taken into account, which allowed determining changes in the effectiveness of social assistance and residence allowances. In the conclusions we have indicated the directions for further research that may be the basis for creating a more effective social policy.

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1 Introduction

The period of transformation of Polish economy after 1989 caused a rapid pauperization of a part of society. This was related to the failure in adaptation to changes in both economy and social reality (Warzywoda-Kruszyńska and Grotowska-Leder, 1996; Cyrek, 2017; Krzysztofik et al., 2017; Rapeli et al., 2018). The phenomena of poverty, social exclusion and social support have become a significant problem within the framework of social policy

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(Grotowska-Leder, 2010). In Poland, the poverty can be classified according to its three categories:

- relative poverty – total household expenditure less than half of average households' expenditure (in 2016, it covered 13.9% of population),
- statutory poverty – covers expenditures lower than the amount entitling to apply for social assistance benefits, resulting from the Act on Social Assistance (in 2016, it covered 12.7% of population),
- extreme poverty – lack of satisfaction of the needs resulting from the existence minimum (in 2016, it covered 4.9% of population).

An important area of research on poverty is the spatial analysis of this phenomenon. This direction of research allows identifying the poverty enclaves (Sapiro, 2016). Moreover, from a practical point of view, a simultaneous and significant problem is the effectiveness of social policy. Analysis and evaluation of the performance of social policy could support decision making to counteract more efficient the poverty.

The purpose of this paper is to apply the *Multiplicative Indicator of Poverty Intensity* (*MIPI*). The proposed indicator includes: a) the number of people living on a given street, b) the number of beneficiaries and c) the value of the aid granted. The second aim of the research was the assessment of the effectiveness of granting social assistance and housing allowances. The analyses were mostly made on the example of the beneficiaries of the city of Zgierz (Lodz province) in years 2010-2016, however the estimates of *MIPI* concerned the final period of analyses.

The paper consists of two sections. First section contains the analysis of poverty intensity. In this section we present our own *MIPI* indicator. The assessment of the effectiveness of granted social assistance and housing allowances is presented in following section.

2 Analysis of poverty intensity

The analysis of the intensity of poverty was made on the basis of databases provided by the Social Welfare Center in the city of Zgierz (Poland). The released data is from 2016. Only the non-permanent benefits were considered for analysis: designated benefits, periodical benefits (usually granted for 3 months) and meals benefits. However, the benefits granted for a longer period of time, i.e. permanent benefits, care services and placement in social assistance homes have been omitted.

For defining the poverty enclaves, most commonly the relation of beneficiaries (B) benefiting from social assistance to the total number of citizens (C) – (B/C) indicator is used

(Warzywoda-Kruszyńska and Grotowska-Leder, 1996). However, this approach reveals its biggest drawback. Several associated with and at the same time important factors, such as: number of social services granted and the monetary value of services are excluded from the analysis. The issue mentioned emphasis the necessity for more complexed approach, which at the same time could give possibilities for adjustments.

In order to analyze the poverty intensity the *Multiplicative Indicator of Poverty Intensity* was constructed. There were 4 input data to calculate *MIPI* estimates:

- number of citizens (*C*) living in a certain location,
- number of beneficiaries receiving the benefits living in a certain location (*B*),
- number of social services for the beneficiaries living in a certain location (*S*),
- amount of money spent on social service for beneficiaries living in a certain location (*A*).

Then the following 3 indicators were calculated, as follows:

- *B*/*C* – percentage of beneficiaries (*B*) benefiting from social assistance in relation to the total number of citizens (*C*),
- *S*/*C* – number of benefits (*S*) admitted *per* citizen,
- *A*/*C* – amount (*A*) of the benefits provided *per* citizen.

The *Multiplicative Indicator of Poverty Intensity* (*MIPI*) is the expression of 3 indicators:

$$MIPI = \frac{B}{C} * \frac{S}{C} * \frac{A}{C}.$$

Let us consider the case of Szeroka Street, with C = 62 citizens, B = 34 beneficiaries, S = 498 social services and A = 55 123 PLN, the three components amounted to: *B*/*C* = 54.8%, *S*/*C* = 8, A/C = 889.1 and *Multiplicative Indicator of Poverty Intensity* reached: *MIPI* = 3 916.2.

Table 1 contains information on calculated indicators for selected 25 streets of Zgierz, which number of beneficiaries *per* citizen (*B*/*C*) exceeded in 2016 the ratio of 6%. All the streets were classified according to the decreasing value of the *MIPI* indicators which differs from the *B*/*C* order. If the intensity of poverty is higher (column with *MIPI* values), the lower street number was issued (*MIPI* order column). Only for 11 out of 25 streets, *B*/*C* order equaled the order of the *MIPI* indicator.

The *MIPI* values were further plotted on the map of Zgierz (Fig. 1). This allowed for analyzing the concentration of the spatial distribution of locations for the street layout. As a consequence, simultaneously it was possible to determine the poverty intensity map with the assessment of phenomenon's intensity.

Table 1. The Multiplicative Indicators of Poverty Intensity (MIPI) for the streets of Zgierz.

Streets	***B/C***	***B/C*** order	***S/C***	***A/C***	***MIPI***	***MIPI*** order
Szeroka	54.8%	1	8.0	889.1	3 916.2	1
Wspólna	32.3%	2	4.4	561.5	800.4	2
Słowackiego	24.9%	3	3.7	498.7	457.7	3
Narutowicza	22.1%	4	2.4	287.4	153.0	4
Plac Jana Pawła II	16.9%	8	2.4	290.5	117.4	5
Dąbrowskiego	18.8%	6	2.3	268.7	117.3	6
Plac Kilińskiego	19.9%	5	2.0	268.5	105.8	7
Popiełuszki	17.3%	7	2.0	230.9	79.8	8
Łęczycka	12.4%	11	1.7	203.2	41.5	9
Koszarowa	15.6%	10	1.6	156.2	38.2	10
Sieradzka	8.0%	22	1.9	231.8	34.9	11
Skargi	16.5%	9	1.8	106.4	31.2	12
Mielczarskiego	11.7%	12	1.3	161.1	25.0	13
Cezaka	11.4%	13	1.3	150.9	22.6	14
Pułaskiego	9.8%	15	1.3	149.6	19.5	15
Piłsudskiego	8.8%	18	1.3	170.3	18.9	16
Klonowa	9.3%	16	1.1	136.5	13.9	17
Piątkowska	8.8%	19	1.0	142.7	12.0	18
Śniechowskiego	8.0%	23	1.1	130.9	11.8	19
3 Maja	8.4%	20	1.0	130.8	11.4	20
Pawińskiego	8.4%	21	0.9	153.4	11.4	21
Aleksandrowska	9.8%	14	1.0	114.1	11.0	22
Konstantynowska	9.2%	17	0.9	105.1	8.9	23
Długa	7.8%	24	0.9	112.5	7.9	24
Rembowskiego	6.8%	25	0.7	94.8	4.8	25

The obtained higher poverty levels (exceeded values of *MIPI*) were located in the city center (the Old Town – with *MIPI* streets no: 1, 2, 5, 7, 11, 12). It should be also noted that the lower street number indicated higher intensity of poverty.

The poverty intensity should be of particular interest to social workers dealing with social assistance for beneficiaries or families that require such assistance (financial and non-financial support).

Fig. 1. Spatial distribution of *MIPI*. Size of symbol indicate the level of *MIPI*.

The major advantage of using the complexed *MIPI* indicator to analyze the intensity of poverty in a given city is a fact that it includes not only the number of beneficiaries (*B*), but also the number of received benefits (*S*) and the financial value of total assistance (*A*). The number of benefits is the main factor determining the frequency of granted assistance, while the value of material support can inform (at least partially) about the degree of satisfying the social needs. The combination of these three factors in one indicator (*MIPI*) showed adjusted (while compared with typical (*B*/*C*) analysis) intensity of the poverty phenomenon in selected location.

3 Assessment of the effectiveness of social services

In addition to spatial distribution analysis indicating poverty enclaves, one of the most important principles for the social benefits system functioning and its quality is the effectiveness issue (Suchecka and Jewczak, 2014). Many indicators can be proposed to assess

effectiveness, while the concept itself needs to be clarified (Golinowska, 2012; Golinowska and Topińska, 2002; Hryniewicka, 2011).

Effectiveness analysis is used not only for beneficiaries, but also for the units providing social services such as: socials welfare centers (Szatur-Jaworska, 2010). The term effectiveness should be understood as the degree to which the activities carried out contribute to the objectives' achievement. However, this definition might be perceived as too general statement. In practice of social welfare, this concept can be interpreted two ways:

1. either as the number or share of people covered by assistance in relation to the actual number of people in need for the assistance – this recognition of effectiveness is commonly adopted into practice;
2. or, it relates to people (or households) who have already received the aid (e.g.: in a certain year) and the share of those who receive aid in subsequent periods (years). The effectiveness defined within this framework was analyzed in the paper basing on the example of provided social assistance (in years 2012-2016) and granted housing allowances (for 2010-2013 period) by the Social Welfare Centre in Zgierz.

3.1 Assessment of the effectiveness of social assistance

Three types of social assistance allowances were taken into consideration: permanent, temporary and designated. The analyzed data related to the period from 2012 to 2016. Permanent benefits, placement in nursing houses and care services were omitted, while they represent assistance provided most often in long-term periods, and at the same time it was not possible to investigate their effectiveness in case considered. It was assumed that if the effectiveness of social benefits is to be high, beneficiaries using social assistance do not continued applying for the benefits in the next times period. The assumption allowed for constructing the temporary condition of effectiveness for social benefits, as follows:

$$Effectiveness\ Indicator = \frac{B_{t+s}}{B_t},$$

where: B_t – beneficiaries in base period (total number of people with granted social allowance), B_{t+s} – beneficiaries in comparable period (s – indicates the duration of service given, i.e.: for 1 year). The social benefit should be classified as effective when none of the beneficiaries from period t applied for the same services in period $t+s$, in this case the *Effectiveness Indicator* should equal zero ($Eff.Ind > 0$ indicates the ineffectiveness of social aid).

Table 2 contains numbers of people and the effectiveness indicators for individuals, who benefit from social assistance in 2012 and continued to receive assistance benefits in following years. In order to calculate the effectiveness ratios, complete data for the city of Zgierz was used.

Table 2. Numbers of beneficiaries and effectiveness indicators for social assistance in 2012 and following years.

Specification	2012	2013	2014	2015	2016
No. of beneficiaries	3 099	2 345	1 828	1 594	1 307
Effectiveness indicator (base period: 2012)	1	0.76	0.59	0.51	0.42

Fig. 2 indicates that the percentage of people who have benefited from social assistance since 2012 and shows a declining trend with significant time coefficient parameter (*p-value*<0.0000).

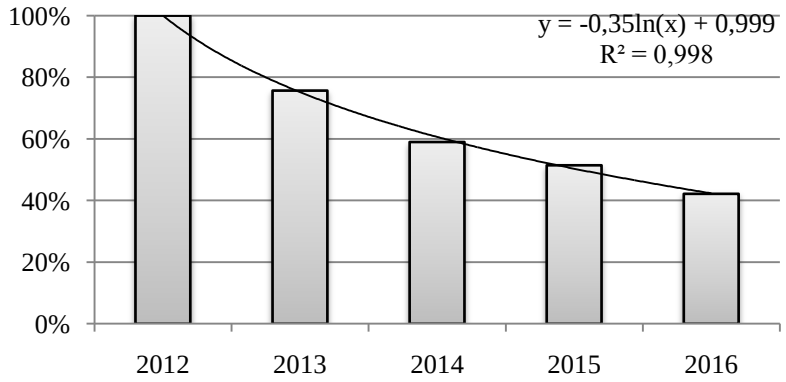

Fig. 2. The effectiveness indicator for social assistance between 2012 and 2016.

As it was already mentioned, the effectiveness level of social assistance was gradually decreasing, however the highest reduction took place in 2013 when compared with 2012 (the number of people dropped by 24%), while in the following years the rate of decrease was clearly slowing down and amounted to: 22% in 2014 compared to 2013; 13% in 2015 compared to 2014; 18% in 2016 compared to 2015.

Faster reduction in the number of beneficiaries between the first and the second period resulted from the fact that for approx. 10% of beneficiaries the assistance was successful and further support no longer required – the changes should be there conclued as positive. Similar

relationships were clearly visible when comparing the following periods (subsequent columns in Table 2). In order to verify the observed trends in the frequency use of social assistance in the current period (2012-2016), estimates were made for the control period, years 2002-2006 (considering only targeted benefits and for 2002). The obtained results were convergent for both periods and detailed estimates for 2002-2006 were presented in Table 3.

Table 3. The effectiveness indicator for designated benefits of social assistance between 2002 and 2006.

Specification	2002	2003	2004	2005	2006
No. of beneficiaries	1 865	1 315	1 068	953	845
Effectiveness indicator (base period: 2002)	1	0.71	0.57	0.51	0.45

A rapid decrease of 29% in the number of people benefiting from designated benefits occurred in 2003 (compared to 2002) and in subsequent years the rate of decline decreased significantly, which indicated that a significant number of people still needed assistance (the rates of decline amounted for: $d_{04/03}$=-18%, $d_{05/04}$=-11% and $d_{06/05}$=-11%).

3.2 Assessment of the effectiveness of housing allowances

In the paper, we analyzed the effectiveness of assistance provided in the area of housing allowances in Zgierz for the period 2010-2013 (Melaniuk, 2014). The calculation principles were identical to those in the case of social assistance. The calculated effectiveness indicators were presented in Table 4.

Table 4. The effectiveness indicator for beneficiaries receiving housing allowances in Zgierz in the years 2010-2013.

Specification	2010	2011	2012	2013
No. of beneficiaries	2 076	852	604	428
Effectiveness indicator (base period: 2010)	1	0.31	0.29	0.21

In the first column, we assumed the number of citizens receiving housing allowances in 2010 as base period. Of this number, in 2011 31.4% of families benefited from the allowances

and in the following two years – 29.1% and 20.6%, respectively. Naturally, in the following years, the housing allowances of these families, which go on to the next year have been omitted and only the newly started additions were taken into account. The indicators in the second and third columns are calculated analogically. For the interpretation purposes: if the housing allowance would be fully effective in the following years, the individuals would not have to re-apply for the allowance. The number of 21% in 2013 should be considered satisfactory in generally, since almost 80% of families after three year period, no longer required continuing applying for housing allowances. However, it should be also noted and highlighted that in our analysis there were cases that some individuals received a housing allowance for over a decade, without any interruption, which could indicate for ineffectiveness of social allowance policy.

Conclusions

The article presented new, advanced and more complexed approach towards assessing the effectiveness of social services and social policy as well. An important part of analyses was dedicated to identifying the enclaves of poverty in the city Zgierz, where we proposed the *Multiplicative Indicator of Poverty Intensity*. *MIPI* allowed for integrating not only the percentage of people benefiting from social services, but also the value of the aid received and the number of benefits granted directly to people living in certain locations (city streets). We treated the effectiveness of the social services as a dynamic phenomenon, taking into account the percentage of people profit from social assistance benefits and housing allowances in subsequent years in relation to the base year. The results of the research indicated that the effectiveness of social services is not satisfactory, while in five year period after being granted with the assistance, half of the individuals still received benefits (which by definition should be of permanent state). More positively one should consider the effectiveness of social services in form of housing allowances – in this very case for city of Zgierz, after 4 year period the number of people still receiving the allowance amounted to one fifth (20%) only.

In the paper, *Multiplicative Indicators of Poverty Intensity* were estimated for individual streets in one period. On the other hand, effectiveness indicators concerned the city area and were presented in dynamic approach. Further research should concentrate on establishing a comprehensive approach to the problem of poverty combining a dynamic analysis of social services effectiveness with a multi-criteria *MIPI* indicator.

References

Cyrek, M. (2017). Social efficiency of employment in three sectors — a comparison of Polish regions. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *12*(3), 417-432.

Golinowska, S. (2012). O biedzie i polityce jej zwalczania współcześnie. Podejście porównawcze w świetle Europejskiego Roku Zwalczania Ubóstwa i Wykluczenia Społecznego. In: Kubiak, H. E. (ed.), *Polska bieda w świetle Europejskiego Roku Walki z Ubóstwem i Wykluczeniem Społecznym.* Kraków: Oficyna Wydawnicza AFM.

Golinowska, S. & Topińska, I. (2012). *Pomoc społeczna – zmiany i warunki skutecznego działania*. Warszawa: Centrum Analiz Społeczno-Ekonomicznych.

Grotowska-Leder, J. (2010). Analiza zasobów wsparcia społecznego łodzian, *Praca Socjalna,* (8-9)*:* 181-196.

Hryniewicka, A. (2011). *Różne wymiary skuteczności w pomocy społecznej*. Warszawa: Instytut Rozwoju Służb Społecznych.

Melaniuk, M. (2014). Logistyka dystrybucji świadczeń społecznych. *Logistyka* (5)*:* 1968-1976.

Krzysztofik, R., Dymitrow, M., Grzelak-Kostulska, E. & Biegańska, E. (2017). Poverty and social exclusion: An alternative spatial explanation. *Bulletin of Geography. Socio-economic Series*, *35*(35): 45-64.

Rapeli, M., Cuadra, C., Dahlberg, R., Eydal, G. B., Hvinden, B., Ómarsdóttir, I. L. & Salonen, T. (2018). Local social services in disaster management: Is there a Nordic model? *International Journal of Disaster Risk Reduction*, (27), 618-624.

Sapiro, P. (2016). Beyond the strictly orthodox/mainstream divide: Applying geodemographic analysis to a small nationwide sub-population. *Computers, Environment and Urban Systems*, (56), 36-47.

Suchecka, J. & Jewczak, M. (2014). Cost-Benefit Analysis in the study of the effectiveness of health programs. In: Papież M. & Śmiech S. (eds), *Proceedings of the 8th Professor Aleksander Zelias International Conference on Modelling and Forecasting of Socio-Economic Phenomena*, 194-203.

Szatur-Jaworska, B. (ed.). (2010). *Ewaluacja w służbach społecznych*. Warszawa: Mazowieckie Centrum Polityki Społecznej.

Warzywoda-Kruszyńska, W. & Grotowska-Leder, J. (1996). *Wielkomiejska bieda w okresie transformacji (zasiłkobiorcy pomocy społecznej)*. Łódź: Instytut Socjologii Uniwersytetu Łódzkiego.