STATISTICS IN TRANSITION new series, September 2024
Vol. 25, No. 3, pp. 13–30, https://doi.org/10.59170/stattrans-2024-025
Received – 12.09.2022; accepted – 23.02.2024

Reconstruction of the social cash transfers system in Poland and household wellbeing: 2015–2018 evidence

Adam Szulc[1]

Abstract

This study examines the impact of changes in the social benefits system on the wellbeing, poverty, and economic activity in Poland. The core element of those changes was a programme of large cash transfers, referred to as Family 500+, introduced in 2016. It was intended to support families with children, especially the least affluent ones, and to foster fertility. The impact of the transfers has been examined through the observation of changes in the monetary and multidimensional wellbeing of households. The study also analysed the changes in recipients' economic activity using estimates of regression models and treatment effects. The Family 500+ programme proved to be successful as an anti-poverty tool and also resulted in the increase in the average wellbeing for the whole population. However, its side-effects included the fall in the economic activity of some recipients, especially in 2016 and 2017. The above trends partly reversed in 2018. As some income data in the lower parts of the distribution seemed to be flawed, income imputations, based on regression on income correlates, were applied in the study.

Key words: family benefits, monetary and multidimensional poverty, income imputation.

1. Introduction

In this study, the effects of the changes in the system of social cash transfers in Poland between 2015 and 2018 are examined. In April 2016, the state family support programme, which seriously changed the volume and structure of social benefits, was launched. It is known as "Family 500+" and ensures the monthly unconditional support of tax-free 500 PLN (złoty) per each child in families with two or more children and means-tested support of the same amount for families with one child. In 2016, 500 PLN was equal to 26% of the mean monthly equivalent income. Total spending in 2017 was equal to 6% of the state budget. Family 500+ also changed the composition of the social transfers – the contribution of all family benefits to their total amount (excluding retirement and invalid pensions) increased from 63% in 2015 to 86% in 2018. For more

[1] Institute of Statistics and Demography, Warsaw School of Economics, Poland. E-mail: aszulc@sgh.waw.pl. ORCID: https://orcid.org/0000-0003-2646-2468.

details on Family 500+, see Brzeziński and Najsztub (2017), and Ministerstwo Rodziny i Polityki Społecznej (2021). The effects of the abovementioned social policy reconstruction are examined by observing resulting changes in the standards of living, especially monetary and multidimensional poverty. The following changes in the labour activity of the recipients are also explored.

The declared goals of Family 500+ were: (i) to reduce child poverty, and (ii) to increase fertility (which was among the European lowest in 2015 in Poland). The opponents argued that there would be a negative impact on the labour supply and a low efficiency resulting from also covering non-poor families with at least two children through the programme. Among several analyses using formal quantitative methods, some of them claimed or anticipated negative effects from Family 500+. For instance, Brzeziński and Najsztub (2017), using microsimulation models, predicted a low efficiency of the program due to its structure. Magda et al. (2021) estimated, using the difference-in-difference method, its negative impact on the female labour supply, however those findings stand in opposition with the conclusions reached by Premik (2022). Wilk (2021) reported a low response to the programme in terms of the fertility rate. On the other hand, it is not surprising that Family 500+ has been effective in reducing the economic hardship of the families with children (Milovanska-Farrington, 2021). This is also claimed by simulation results presented by Brzeziński and Najsztub (2017).

In the present study, the abovementioned issues, excluding demographic ones, are analyzed further, using data for 2015–2018. The findings confirm many of the observations described above for the 2016–2017 period. However, in 2018 some trends reversed. The analysis reported here covers the effects of all social benefits not related to the social insurance system, i.e. retirement and invalid pensions. The effects do not differ much from those obtained solely for Family 500+. This suggests that this type of child allowance did not lead to unpredictable results and has generally been in line with the effects of the cash transfers observed for some post-communist countries (Szulc, 2012; Harumová, 2016).

The remaining part of the paper is organized as follows. In Section 2, the theoretical concepts employed in the study are discussed. In Section 3, basic statistics on the Polish social transfers system are provided. Section 4 is devoted to the impact of the transfers on monetary and multidimensional poverty. In Section 5, changes in economic activity of the recipients are examined. Section 6 concludes the paper.

2. Conceptual framework

2.1. Data

The individual data on households and persons employed in this research come from the household budget surveys collected annually by the central statistical office –

Statistics Poland. The yearly samples cover from 37,148 (2015) to 36,166 (2018) households. The reference period of observation is one month. Basic methodological details may be found in Główny Urząd Statystyczny – Statistics Poland (2018). The household data include a wide set of economic, demographic and sociological variables, allowing the evaluation of various aspects of households' and individuals' economic positions. Those utilised in the present study encompass, inter alia, information on household disposable income and its components, expenditures, assets, durables, dwelling conditions, demographic and socio-economic attributes, and answers to subjective income questions. There are two-year panel components covering from 15,635 (2015–2016) to 15,155 (2017–2018) households included in the samples. The survey data were weighted using the 2011 National Census results to minimise differences between the structure of the surveyed sample and the population.

There are reasons to assume that for some households their incomes are misreported, especially at the bottom of the distribution. This problem is tackled by income imputations. Some observable variables that may be assumed to be more reliable and stable in time are used to provide the estimates. They capture information on housing, consumer durables, education and some expenses related to standards of living. The income imputation is based on algorithm for missing data imputation proposed by Rubin (1987). More details may be found in Szulc (2022, pp. 4–5).

2.2. Well-being measurement

Household equivalent disposable income (employing OECD 70/50 equivalence scales) is used as a monetary well-being indicator. As it is generally accepted that monetary poverty measurement does not suffice as a tool for capturing the nature of poverty, a multidimensional approach has also been adopted in the present study. It comprises the following components: (i) income, (ii) housing and equipment, and (iii) subjective evaluations of one's own standard of living. The first one is represented by a function of equivalent income defined by eqn. (1), while the two remaining are composed of sets of single variables aggregated in one indicator. The final measure is defined as a weighted mean of indicators calculated for all three dimensions separately.

At the first stage poverty measures are calculated. If a variable describing poverty at the lowest level of aggregation is binary, it is equal to 0 when a symptom of poverty (e.g. a lack of some consumer goods) is not observed and 1 otherwise. For continuous (e.g. the equivalent income or dwelling size) and discrete ordinal (e.g. subjective evaluation of own economic conditions) variables, the concept of well-being indicator is based on the "Totally Fuzzy and Relative" (TFR) approach to multidimensional poverty measurement proposed by Cheli and Lemmi (1995). In the "fuzzy" approach, as opposed to the dichotomous approach, no single poverty line is set. Instead, for a variable y used as a single dimension well-being measure, the degree of poverty based

on preselected interval, say [y^*, y^{**}], is calculated for each unit (individual or household). A poverty measure for the i-th unit is equal to 1 when $y \leq y^*$ and equal to 0 when $y \geq y^{**}$. To measure poverty for y$\in(y^*,y^{**})$ the following TFR function is applied as the "fuzzy" poverty indicator for i-th unit:

$$p_i = p(y_i) = \begin{cases} 0 & if\ y\ \geq\ y** \\ p(y_{i-1}) + \frac{F(y_i)-F(y_{i-1})}{1-F(y*)} & if\ \ y \in (y*, y**) \\ 1 & if \leq\ y\ y* \end{cases} \quad (1)$$

where F stands for an empirical cumulative distribution function. By definition, p_i fits the interval [0; 1]. When y is a discrete ordinal variable (like subjective income questions ranging from "very bad" to "very good"), it is natural to set $y^* = y_{min}$ and $y^{**} = y_{max}$. Formally, the same choice may be applied to continuous variables, like income, but it seems to be more rational to set $y^* > y_{min}$ and $y^{**} < y_{max}$ to relax impact of outliers. Moreover, when $y^* = y_{min}$ and $y^{**} = y_{max}$, the indicator p_i is "totally relative" and its value depends on the shape of the distribution only. In this study, comparisons between years are performed, hence fixing y^* and y^{**} over time is a better choice. For income, the bottom limit is equal to the 2015 existence minimum, while the upper limit is three times the social minimum (both thresholds are calculated by the Institute of Labour and Social Affairs, 2020). For other (nearly) continuous variables, like dwelling size, y^* and y^{**} are set at the 0.05 and 0.95 percentiles obtained for 2015, respectively.

Once individual measures are defined, they should be aggregated to mid-level dimensions, i.e. equivalent income, housing and equipment, and subjective evaluations of the own economic conditions. As the first one is represented by a single variable, the problem of aggregation is relevant for the two remaining dimensions only. The weighting system within those dimensions was proposed by Cheli and Lemmi (1995). For the *j-th* item it is calculated as:

$$w_j = ln\left(\frac{1}{\overline{H_j}}\right)$$

where $\overline{H_j}$ denotes the proportion of units that are poor with respect to the *j-th* item. It is presumed that a more frequent poverty syndrome (e.g. the lack of a passenger car) is a less important symptom of poverty than a less frequent one (e.g. the lack of a refrigerator). However, that form of weighting is problematic when three mid-level components are to be aggregated in one well-being indicator, as it assumes the equal importance of all dimensions. Hence, at the highest level of aggregation arbitrary weights are applied: 0.5 for income and 0.25 for both remaining dimensions.

In the present study, the impact of social transfers on the standards of living is one of the main goals. Therefore, it is more convenient to define a multidimensional well-being measure instead of a poverty measure to make it compatible with equivalent income. This may be easily done by defining the multidimensional well-being indicator $F = 1 - P$ where P is an aggregate poverty indicator.

2.3. Measurement of the transfers' effects on the well-being

The final impact of the social transfers on the well-being depends on their volume and allocation. Comparing actual poverty indices and pre-transfer (simulated) ones allows for the evaluation of the simultaneous effect of both abovementioned attributes. Indices gauging poverty incidence and depth are used for that purpose and the poverty lines are set at the first decile and first quartile. Moreover, the elasticity of the effect with respect to the poverty threshold is evaluated using graphical methods. Poverty indices are calculated for each year separately, for all types of households together and for households with children. Simulated indices of income poverty are calculated by means of actual incomes reduced by transfer values. For multidimensional poverty, regression models are estimated to predict changes in well-being levels due to changes in incomes.

A static evaluation of the transfers is supplemented by a dynamic one aimed at answering two questions: how well the non-poor are protected from falling into poverty and to what extent transfers allow the poor to leave the poverty zone. For that purpose, joint (two year) well-being distribution is constructed using panel data. Both income and multidimensional poverty are included in the analyses. The concept applied in the present study follows the idea of protection and promotion effects proposed by Ravallion et al. (1995). If the analysis is restricted to transitions to and out of poverty, the effects may be estimated as follows. A protection effect takes the form of a relative difference between the simulated number (subscripted by *S*) of new poor and the actual one (subscripted by *A*):

$$PROT = \frac{N[y_S(0) \geq z_0 \ \& \ y_S(1) < z_1] - N[y_A(0) \geq z_0 \ \& \ y_A(1) < z_1]}{N[y_S(0) \geq z_0 \ \& \ y_S(1) < z_1]} \tag{2}$$

where $N\left[y_{A/S}(0) \geq z_t \ \& \ y_{A/S}(1) < z_t\right]$ is the number of individuals who were not poor in period 0 and became poor in period 1. Similarly, the promotion effect takes a form of a relative difference between the actual number of new non-poor and the corresponding simulated number:

$$PROM = \frac{N[y_A(0) < z_0 \ \& \ y_A(1) \geq z_1] - N[y_S(0) < z_0 \ \& \ y_S(1) \geq z_1]}{N[y_A(0) < z_0 \ \& \ y_A(1) \geq z_1]} \tag{3}$$

where $N\left[y_{A/S}(0) < z_t \,\&\, y_{A/S}(1) \geq z_t\right]$ is the number of individuals who were poor in period 0 and non-poor in period 1. The simulations are intended to answer the question: what would happen if the transfers were terminated.

Finally, the impact of the transfers on the labour activity measured by means of the changes in economically active people is gauged. A static version is based on two treatment effect estimates: a propensity score matching (see Abadie and Imbens, 2012, or Wooldridge, 2010, pp. 903–936) and inverse probability weighted regression adjustment (hereafter: IPWRA, see Wooldridge, 2007, or Cattaneo et al., 2013). In a dynamic approach, changes in outcome variables of interest are regressed on changes in transfers using two-year panels. Both matching estimation and IPWRA are intended to produce unbiased estimates of a treatment effect, which in the present case is defined as receiving a certain type of benefits.

Using panel data in both static and dynamic analysis gives an opportunity to reduce the bias caused by endogeneity (regression models) or violating the unconfoundedness assumption (the estimation of treatment effect). Both types of bias result from the occurrence of omitted variables in the model, especially unobservable ones like the capability to earn income related to psychological attributes or hidden skills. Omitting them in the model usually results in a downward bias in the estimation of the effect of benefits if they are means-tested. When panel data are available it is possible to use benefits received in the basic period as proxies for abovementioned unobservable control variables.

3. General review of the social benefits in Poland: descriptive statistics

Between 2015 and 2018, the considerable growth of mean standards of living could be observed: the mean equivalent income rose by 19.8% and the multidimensional well-being indicator by 2.8%. In 2016 and 2017, but not in 2018, the recipients of social benefits experienced higher than average well-being increases. At the same time, due to the growing number of children, for recipients of 500+ the growth rate was lower than for all the beneficiaries of social transfers. The main feature of the changes in the system of social cash transfers (see Table 1) was the huge growth of family benefits under the relative stability of the remaining ones. For the whole sample, the mean real value of the first rose by 291%, while the mean value of the latter by 10%. The mean value of all transfers increased by 188% for the whole sample and among recipients of the benefits by 99% and by 222% among households with children. Those growths were accompanied by moderate increases in the proportion of recipients of all types of transfers: from 29% to 33%. As might be expected, the proportion of family benefits recipients greatly increased, at the cost of the remaining benefits. A huge growth was also observed for households with children.

Table 1: Social benefits: basic statistics (monthly means in 2015 prices)

Type of the benefit	2015	2016	2017	2018
mean benefits				
All types	191	430	563	550
Family	121	353	488	473
incl. 500+	-	219	352	334
Other	70	78	75	77
All types – recipients only	560	996	1092	1116
All types – hh with children only	291	716	952	936
proportion of the recipients				
All types	0.287	0.328	0.369	0.331
Family	0.101	0.167	0.224	0.213
incl. 500+	-	0.112	0.199	0.190
Other	0.186	0.161	0.146	0.118
All types – hh with children only	0.367	0.529	0.682	0.680
proportion of the households with children				
-	0.338	0.333	0.326	0.316

Source: author's own calculations based on the household budget surveys.

Although expanding the value of social benefits usually results in easing the economic hardship of recipients, it may also lead to dependency on the social system (see, e.g. Kotlikoff et al., 2006 and Shepherd et al., 2011). As displayed in Table 2, the average proportion of social benefits in the household income between 2015 and 2018 rose from 6.6% to 11.8% for the whole sample and from 19.4% to 24% for the recipients. Moreover, the proportion of households for which social benefits contribute more than 50% to the whole income increased from 8.4% to 10.4%. Other side effects of the social transfers, especially the reduction of economic activity, are analyzed in Section 5.

Table 2: Contribution of the social transfers to household income

Specification	2015	2016	2017	2018
Share of the transfers: all households	0.066	0.102	0.126	0.118
Share of the transfers: all recipients	0.194	0.237	0.244	0.240
Share of the transfers: households with children	0.094	0.161	0.204	0.193
Share of the transfers < 0.2	0.730	0.656	0.641	0.646
0.2 < share of the transfers < 0.5	0.186	0.240	0.253	0.251
Share of the transfers > 0.5	0.084	0.103	0.106	0.104
% of poverty gap, poverty line at the first quartile	79	140	170	148
100% of poverty gap if poverty line at centile	21	31	35	33

Source: author's own calculations based on the household budget surveys.

4. Impact of the transfers on incidence and depth of the poverty

4.1. Static analysis

A conventional measure of an effect of social transfers takes the form of the difference between poverty indices calculated with the use of actual and pre-transfer incomes. For income poverty such a difference may be obtained just by subtracting cash transfers from actual incomes and then calculating simulated indices of poverty. For multidimensional poverty changes in indices may be predicted conditionally on changes in income. In the present study, this measure is implemented using regression models with a multidimensional well-being indicator as a dependent variable regressed on a quadratic polynomial of equivalent income. To estimate this model, the sample was restricted to the incomes between the first decile and the median. Censoring the lowest incomes is intended to reduce the impact of data errors mentioned in Section 2.1 which result, inter alia, in nonsensical relations between equivalent income and multidimensional poverty (see Szulc, pp. 19–20). Hence, indices measuring poverty are calculated for both types of incomes. The results are reported in Table 3 (income poverty) and in Table 4 (multidimensional poverty).

Table 3: Income poverty rates and depth: before and after transfers differences

Poverty measure	2015	2016	2017	2018	2015	2016	2017	2018
	declared incomes				corrected incomes			
poverty line at the first quartile, all households								
Rate, before	0.289	0.336	0.355	0.349	0.292	0.338	0.357	0.350
Difference	**0.039**	**0.086**	**0.105**	**0.099**	**0.042**	**0.088**	**0.107**	**0.100**
Depth, before	0.340	0.345	0.349	0.345	0.264	0.284	0.300	0.290
Difference	**0.071**	**0.100**	**0.123**	**0.110**	**0.078**	**0.119**	**0.140**	**0.131**
poverty line at the first quartile, households with children								
Rate before	0.372	0.429	0.447	0.442	0.376	0.433	0.454	0.445
Difference	**0.055**	**0.137**	**0.175**	**0.167**	**0.058**	**0.140**	**0.177**	**0.167**
Depth, before	0.356	0.369	0.378	0.372	0.283	0.314	0.340	0.330
Difference	**0.081**	**0.126**	**0.164**	**0.148**	**0.089**	**0.150**	**0.182**	**0.171**
poverty line at the first decile, all households								
Rate before	0.147	0.189	0.219	0.210	0.155	0.203	0.228	0.220
Difference	**0.047**	**0.089**	**0.119**	**0.110**	**0.055**	**0.103**	**0.128**	**0.120**
Depth, before	0.343	0.347	0.345	0.343	0.252	0.279	0.292	0.275
Difference	**0.096**	**0.110**	**0.120**	**0.103**	**0.122**	**0.164**	**0.183**	**0.174**
poverty line at the first decile, households with children								
Rate before	0.200	0.262	0.299	0.287	0.214	0.283	0.320	0.311
Difference	**0.068**	**0.145**	**0.198**	**0.185**	**0.079**	**0.166**	**0.211**	**0.201**
Depth, before	0.351	0.358	0.361	0.357	0.264	0.303	0.323	0.304
Difference	**0.109**	**0.129**	**0.152**	**0.128**	**0.129**	**0.190**	**0.214**	**0.205**

Source: author's own calculations based on the household budget surveys.

Table 4: Multidimensional poverty incidence and depth: before and after transfers differences

Poverty measure	2015	2016	2017	2018	2015	2016	2017	2018
	declared incomes				corrected incomes			
poverty line at the first quartile, all households								
Rate before	0.291	0.338	0.354	0.347	0.302	0.357	0.371	0.363
Difference	**0.041**	**0.088**	**0.104**	**0.097**	**0.052**	**0.107**	**0.121**	**0.113**
Depth, before	0.279	0.291	0.304	0.282	0.275	0.346	0.365	0.350
Difference	**0.077**	**0.100**	**0.121**	**0.103**	**0.079**	**0.158**	**0.180**	**0.171**
poverty line at the first quartile, households with children								
Rate before	0.364	0.420	0.437	0.436	0.374	0.440	0.455	0.451
Difference	**0.061**	**0.142**	**0.175**	**0.167**	**0.071**	**0.162**	**0.192**	**0.179**
Depth, before	0.288	0.308	0.326	0.302	0.286	0.370	0.394	0.379
Difference	**0.088**	**0.128**	**0.164**	**0.137**	**0.090**	**0.192**	**0.225**	**0.211**
poverty line at the first decile, all households								
Rate before	0.158	0.203	0.229	0.216	0.153	0.230	0.255	0.248
Difference	**0.058**	**0.103**	**0.129**	**0.116**	**0.053**	**0.130**	**0.155**	**0.148**
Depth, before	0.268	0.276	0.284	0.253	0.293	0.352	0.366	0.344
Difference	**0.094**	**0.105**	**0.119**	**0.105**	**0.122**	**0.189**	**0.201**	**0.198**
poverty line at the first decile, households with children								
Rate before	0.206	0.271	0.304	0.291	0.201	0.303	0.334	0.329
Difference	**0.084**	**0.168**	**0.213**	**0.193**	**0.079**	**0.200**	**0.240**	**0.227**
Depth, before	0.270	0.283	0.296	0.265	0.294	0.365	0.385	0.362
Difference	**0.102**	**0.125**	**0.153**	**0.135**	**0.125**	**0.216**	**0.236**	**0.229**

Source: author's own calculations based on the household budget surveys.

Poverty lines are set at the first deciles and the first quartiles of the well-being for the whole samples. Comparisons based on the raw survey data lead to two general conclusions: (i) the impact of the transfers increased sharply in 2016 and then in 2017, and (ii) the lower the poverty line, the stronger the impact. This finding is valid for both poverty incidence and depth. All estimates of the effects are significant below the 0.01 level. It is not surprising that the effects on poverty are stronger for the households with children, especially after 2015. However, even in 2015 the family allowances were sufficient to provide stronger that average reduction of the pre-transfer poverty. Comparing the abovementioned results with those obtained by means of corrected incomes yields similar general conclusions, although estimates of the effects are greater in the latter case. It may be assumed that due to removing some "fake poor" from the sample (more precisely: moving them to higher ranges of the distribution), those estimates of the effects are more reliable. To display changes in the effects of the transfers not attached to a fixed poverty line, the effects are plotted over a variable

poverty line for 2015 and 2018. When declared survey incomes are utilised, the impact on the poverty depth for poverty lines set below the first decile do not necessarily decrease with respect to the poverty threshold, which is rather a counterintuitive result. There are reasons to believe that this may be an effect of income data errors: the "fake poor" less frequently receive benefits and therefore after-transfer poverty is reduced to low extent. The plots (see Fig. 1 and Fig. 2) produced with the use of corrected incomes support this hypothesis: observed changes in the effects due to the poverty line are much more reliable.

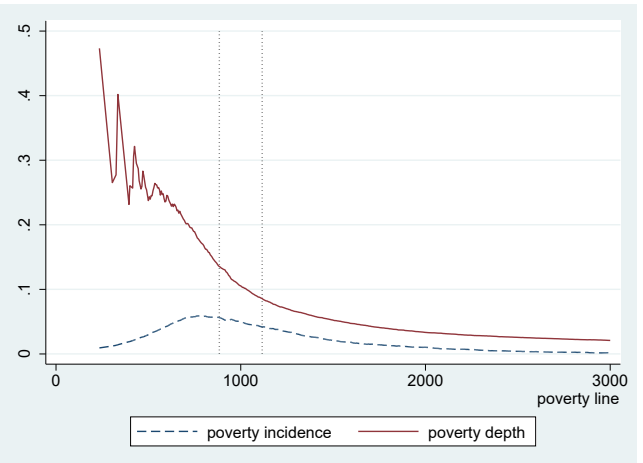

Figure 1: Difference between after and before transfer income poverty incidence and depth, corrected incomes, 2015; vertical dotted lines at the first decile and the first quartile

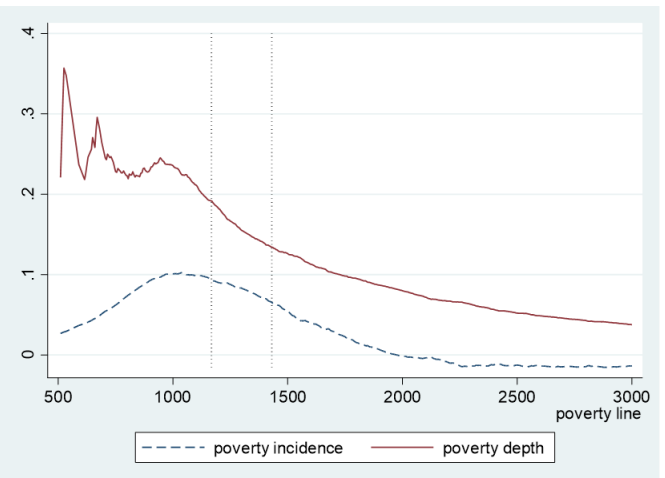

Figure 2: Difference between after and before transfer income poverty incidence and depth, corrected incomes, 2018; vertical dotted lines at the first decile and the first quartile

Conclusions on multidimensional poverty do not differ much from those derived from the estimates obtained for corrected incomes: considerable increases of the effects in 2016 and in 2017 and decreases of the effect due to the increase in the poverty line may be observed. This is true for the results attained by means of both declared and corrected incomes. The impact of the transfers on poverty depth is noticeably stronger when corrected incomes are applied.

4.2. Dynamic analysis

Due to using two-year panel data, it is possible to estimate the protection and promotion effects of the transfers described in Subsection 2.3. Both these measures display simulated transitions between the poverty and non-poverty zones due to changes in social transfers. In Table 5a and Table 5b, the simulated effects of removing all social benefits are reported. For instance, the protection effect 0.171 observed for 2015 - 2016 period suggests that the number of "new poor" in 2016 would increase by 17.1% without the transfers. The protection effect 0.278 observed for the same period should be interpreted as 27.8% increase in the number those who escaped poverty in 2016 after receiving the transfers. Unlike in the case of static effects, negative protection/promotion effects are likely and they occurred in the 2017–18 period. Naturally, this does not mean a counterproductive effect of the benefits, as simulated poverty rates are still much higher than actual ones (see Tables 3 and 4). Rather, the negative value suggests that there are sources for successfully coping with poverty other than social benefits. The increases in labour activity observed between 2017 and 2018 (see Table 6) support this hypothesis. Nevertheless, most of the protection/promotion effects appeared to be positive and significant, usually below the 0.01 level. As might also be observed in the case of static effects, the lower the poverty line, the stronger the effect. The effects for multidimensional poverty are stronger than those for income poverty.

Table 5a: Protection and promotion effect for income poverty

Specification	2015/16	2016/17	2017/18
poverty line at the first quartile			
Protection	0.171***	0.019	-0.166**
Promotion	0.278***	0.134***	-0.023
poverty line at the first decile			
Protection	0.562***	0.629***	0.642***
Promotion	0.430***	0.444**	0.304***

Source: author's own calculations based on the household budget surveys.

*Legend: ***: significant at 0.01, **: significant at 0.05, *: significant at 0.1 (bootstrap standard errors)*

Table 5b: Protection and promotion effect for multidimensional poverty

Specification	2015/16	2016/17	2017/18
poverty line at the first quartile			
Protection	0.430***	0.490***	0.469***
Promotion	0.322***	0.344***	0.236***
poverty line at the first decile			
Protection	0.669***	0.706***	0.685***
Promotion	0.396***	0.371**	0.221***

Source: author's own calculations based on the household budget surveys.

*Legend: ***: significant at 0.01, **: significant at 0.05, *: significant at 0.1 (bootstrap standard errors)*

5. Changes in economic activity following the cash transfers

Examining the household response to receiving increased benefits, especially Family 500+ is another goal of the present study. Impact on the labour activity of the recipients, measured by the changes in the numbers of economically active people, is investigated by means of univariate and multivariate analyses. The latter ones employ regression methods, with a Heckman (1976) correction when necessary, and the estimation of treatment effects (matching estimation and IPWRA). Regression models for *i-th* unit take a general form:

$$\Delta Y_i = \alpha_0 + \alpha_1 \Delta X_i + \alpha_2 \boldsymbol{Z_i} + \varepsilon_i \quad (4)$$

where ΔY_i stands for a change in indicator of well-being or economic activity, ΔX_i is a change in the benefit value, and $\boldsymbol{Z}_i$ represents a set of control variables assumed to be correlated with a response variable.

Table 6: Changes in economic activity: whole sample vs new Family 500+ recipients

Specification	2015/16	2016/17	2017/18
Change in:			
income from economic activity	0.069	0.094	0.074
income from economic activity, new 500+	0.045	0.028	-0.135
non-social income	0.071	0.092	0.097
non-social income, new 500+	0.018	0.040	-0.117
no. of active women	-0.026	-0.023	-0.023
no. of active women, new 500+	-0.024	-0.016	0.095
no. of active men	-0.034	-0.031	-0.025
no. of active men, new 500+	-0.034	-0.036	0.119

Source: author's own calculations based on the household budget surveys.

In Table 6 some univariate statistics for the whole sample and for households receiving 500+ for the first time are reported. It is not surprising that the recipients' incomes originating from economic activity (employment and self-employment, including unpaid work in a family firm/farm) were growing at a slower pace, as compared to the whole sample, and even dropped in 2018. Similar trends can be observed for all non-social incomes (including old age and invalid pensions). Due to the low number of new 500+ recipients in 2018 (1.7% of the whole sample), the results for the 2017–2018 period may be not very reliable due to sampling errors. This problem is resolved further by estimating regression models on the whole panel sample (the results are reported in Table 7) that allow controlling for changes in other variables having impact on the variable(s) of interest.

In the regression models the yearly change in economic activity (income from economic activity and the number of active people) is a dependent variable and the yearly change in 500+ is an independent one. The sets of control variables (varying between estimations) comprise changes in remaining benefits, various household attributes, and the number of economic active men and women, as well as the benefits and incomes in the basic year. All estimates are performed on a sub-sample of the households with children. There are at least two potential problems with the estimation of such a model. First, omitted unobservable variables, like people's attitudes, may result in endogeneity which, in a scarcity of potential instrumental variables, is a serious problem. As Family 500+ for households with one child is means-tested, the recipients' earning income ability is likely to be lower than that of the non-recipients. Using panel data may be an alternative to the instrumental variables estimation. It is possible to relax the impact of omitted variables by including the values of income and benefits during a basic year as proxy variables for the earning ability. Another problem with the estimation stems from the selection of the subsample of recipients. As households with children are more likely to pay more attention to family values at the cost of economic activity, they are also more likely to reach a lower income which is not necessarily a side effect of receiving benefits. In other words, people bearing children may be more likely to stay at home rather than enter the labour market if their potential earnings are lower than their reservation wage. To receive unbiased estimators of eqn. 4 regression models with a Heckman correction are applied. The results are reported in Table 7. The impact of the social benefits is also evaluated by means of estimates of the treatment effects and IPWRA using panel data sets to provide more complete information on household earning ability. Omitting it would probably result in violating the unconfoundedness assumption in the matching estimation. As in the case of regression models presented above, information on transfers of the basic year is included in the estimation. The results of the estimations are displayed in Table 8. In general, conclusions on the

negative impact of the transfers on labour/self-employment income are consistent irrespectively to the method of estimation. On the other hand, those effect in 2018 appeared to be less significant than in the previous years.

Table 7: Impact of social benefits using regression: on Family 500+ and on all transfers (1 unit = 100 PLN)

Specification	2015/16	2016/17	2017/18
Income from economic activity on:			
500+ *(Heckman regression)*	-25.785***	-41.7375***	-43.2491***
all transfers *(LSQ)*	-24.4548***	-35.1543***	-28.4337***
No. of active women on:			
500+ *(Heckman regression)*	-0.0051***	-0.0033**	0.0017
all transfers *(LSQ)*	-0.0037***	-0.0009	0.0009
No. of active men on:			
500+ *(Heckman regression)*	-0.0045***	-0.0037**	-0.0008
all transfers *(LSQ)*	-0.0035**	-0.0004	0.0010

Source: author's own calculations based on the household budget surveys.

*Legend: ***: significant at 0.01, **: significant at 0.05, *: significant at 0.1 (bootstrap standard errors).*

Table 8: Impact of social benefits using treatment effect estimation: on Family 500+ and on all transfers

Specification	2015/16		2016/17		2017/18	
	matching	IPWRA	matching	IPWRA	matching	IPWRA
Income from economic activity on:						
500+	-185.2416***	x	-184.5467	x	-156.2497	x
all transfers	-327.35***	x	-89.2194	-227.03***	-212.18***	-256.84***
No. of active women on:						
500+	-0.0391**	-0.0307**	-0.1843**	-0.0366	0.0659	-0.0481
all transfers	-0.0794**	-0.0510***	-0.0200	-0.0899***	0.0097	-0.1396**
No. of active men on:						
500+	-0.0146	-0.0547***	0.1078	0.0393	0.2122**	0.1386
all transfers	-0.0217	-0.0416***	0.2924***	0.0633**	0.0862	-0.0963**

Source: author's own calculations based on the household budget surveys.

*Legend: ***: significant at 0.01, **: significant at 0.05, *: significant at 0.1 (bootstrap standard errors); x: convergence not achieved*

Table 9: Impact of social benefits using 3 level treatment effect estimation (IPWRA): on Family 500+ and on all transfers

Specification	2015/2016	2016/2017	2017/2018
Income from economic activity on:			
500+	x	-141.4552***	x
all transfers	x	-431.4383*	x
No. of active women on:			
500+	-0.0250***	-0.0126	-0.1049***
all transfers	0.0362	-0.0798	-0.2115*
No. of active men on:			
500+	-0.0253***	-0.0190**	-0.0799***
all transfers	-0.1084*	-0.0391	-0.9569***

Source: author's own calculations based on the household budget surveys.

*Legend: ***: significant at 0.01, **: significant at 0.05, *: significant at 0.1 (bootstrap standard errors); x: convergence not achieved*

The natural question is which results, based on regression or on treatment effects estimates, are more reliable. The previous method is more sensitive to the specification of the model, however it allows continuous variables representing the transfers while in a conventional matching estimation only binary variable may be used. This restriction may be partly overcome by applying multilevel treatment effect IPWRA models. In this study the social transfers are represented by a discrete variable V that equals 0 if no transfers are received by the households, 1 if transfers without 500+ are received and 2 if other transfers including 500+ are received. The respective estimates are displayed in Table 8. When the estimates are statistically significant they are close to those obtained by means of regression (changes in the number of men and women that are economically active are reported in four last rows of Table 6). They were calculated for the whole sample and for the people living in the households of recipients of Family 500+. Due to the ageing society and the increasing number of pensioners (which grew by 9.2% between 2015 and 2018), the number of economically active persons decreased over that period. Nevertheless, the number of economically active women decreased at a lower-than-average pace between 2015 and 2017 and rose substantially in 2018 (by 9.5%). The corresponding indicators for the men were slightly above the average, but the increase in 2018 was even higher than that for the women (by 11.9%). On the other hand, a small sample of the new Family 500+ recipients in 2018 probably resulted in large sampling errors. Relatively minor declines in economic activity may be easily explained by the fact that adults in household bearing children are usually below the retirement age. This suggests that the

abovementioned changes might be related to changes in social transfers. As in the previous section, this issue is analysed further by means of the estimation of regression models and treatment effects. The results are reported in last six rows of Table 7 (regression), Table 8 (matching estimation with a binary treatment) and Table 9 (IPWRA with a three-level treatment).

6. Concluding remarks

Changes in the system of social cash transfers following the introduction of Family 500+ in 2016 increased their total amount enormously. The mean value was equal to 79% of the poverty gap calculated with the use of poverty line at the first income quartile, to 140% in 2016 and to 170% in 2017. Therefore, it is not surprising that the reduction of monetary and multidimensional poverty was meaningful. Moreover, the growth of the transfer resulted in a reduction in the economic activity of the recipients, especially in 2016 and 2017. In 2018 some of the abovementioned trends reversed. This may be attributed to the relative decrease in Family 500+ values, resulting from increases in mean incomes and from the inflation (3.5% between 2016 and 2018). Distinguishing between income and multidimensional poverty generally does not lead to basically opposite results, although the impact of the transfers on multidimensional poverty is usually stronger than that on income poverty. This applies also to estimates of the protection and promotion effects in a dynamic analysis of poverty and also is confirmed by concentration curves and coefficients (see Szulc, 2022, pp. 14–16). This suggests that the administration does not employ only an income criterion when addressing the benefits (see Ravallion, 2009, for a wider general discussion of the issue).

Increases in the transfers' volume resulted in a minor reduction of the economic activity of the new recipients, especially in the first two years of the Family 500+ programme. Univariate analysis revealed drops in the numbers of economically active people, both men and women, in 2016 and 2017 followed by massive increases in 2018 (although the latter may be overestimated due to a very small sample size of new 500+ recipients). Nevertheless, the benefits appeared to be large enough to compensate for the reduction in economic activity and the incomes of the recipients were increasing at a higher pace between 2015 and 2017. In 2018 this trend partly reversed, due to a lack of indexation of the 500+. Multivariate analysis, based on regression models and on estimates of the treatment effect claimed negative impact of the benefits, of any type, on employment and self-employment incomes. Comparing the impact of Family 500+ and the social benefits altogether yields very similar conclusions.

One of the problems in analyses using household surveys is the quality of survey income data, especially at the bottom of the distribution. This problem was tackled by means of income imputations based on regressions on selected income correlates

performed for middle ranges of incomes. Applying this method suggests the underestimation of the transfer impact on poverty when declared, uncorrected incomes are utilised. Due to the non-random selection of observations replaced by the estimated incomes, formal statistical inference on imputed values could not be performed.

Acknowledgement

This study was partly sponsored by the Collegium of Economic Analyses/Warsaw School of Economics research grant. The author is grateful to the anonymous referee for the valuable comments. All remaining errors are solely the responsibility of the author.

References

Abadie, A., Imbens, G. W., (2009). Matching on the estimated propensity score. Working Paper 15301. *Harvard University and National Bureau of Economic Research,* Cambridge, Massachusetts, http://www.nber.org/papers/w15301.

Brzeziński, M., Najsztub, M., (2017). The impact of "Family 500+ programme on household incomes, poverty and inequality. *Polityka Społeczna,* Vol. 44, pp. 16–25.

Cattaneo, M. D., Drukker, D. M., Holland, A. D., (2013). Estimation of multivalued treatment effects under conditional independence. *Stata Journal*, Vol. 13, pp. 407–450.

Cheli, B., Lemmi, A., (1995). A "Totally" Fuzzy and Relative Approach to the Multidimensional Analysis of Poverty. *Economic Notes*, Vol. 24, pp. 115–134.

Główny Urząd Statystyczny - Statistics Poland, (2018). *Budżety gospodarstw domowych - Household Budget Survey*, Warsaw.

Harumová, A., (2016). Inclusive Labor Markets as a Solution of Long Term Unemployment in Slovakia. *Mediterranean Journal of Social Sciences*, Vol. 7, pp. 194–200.

Heckman, J., (1976). The common structure of statistical models of truncation, sample selection and limited dependent variables and a simple estimator for such models; in: *Annals of Economic and Social Measurement*, Vol. 5 (4), pp. 475–492.

Institute of Labour and Social Affairs, (2020). *Minimum socjalne i minimum egzystencji*, Minimum socjalne i minimum egzystencji | IPiSS.

Kotlikoff, L. J., Marx, B., Rizza, P., (2006). Americans' Dependency on Social Security, Working Paper 12696, *National Bureau of Economic Research, Cambridge, Massachusetts*, http://www.nber.org/papers/w12696.

Magda, I.; Kiełczewska, A., Brandt, N., (2018). The "Family 500+" child allowance and female labour supply in Poland, OECD Economics Department Working Papers, *No. 1481*, *OECD Publishing, Paris*, https://ibs.org.pl/en/publications/the-family-500-child-allowance-and-female-labour-supply-in-poland/.

Milovanska-Farrington, S., (2021). The Effect of Child Benefits on Financial Difficulties and Spending Habits: Evidence from Poland's Family 500+ Program, IZA DP No. 14274, *IZA – Institute of Labor Economics*, https://docs.iza.org/dp14274.pdf.

Ministerstwo Rodziny I Polityki Społecznej, (2021). Rodzina 500 plus, https://www.gov.pl/web/rodzina/rodzina-500-plus.

Premik, F., (2022). Evaluating Poland's Family 500+ Child Support Programme, *Gospodarka Narodowa. The Polish Journal of Economics,* Vol. 310, pp. 1–19.

Ravallion, M., (2009). Miss-targeted or miss-measured?, *Economics Letters*, Vol. 100, pp. 9–12.

Ravallion, M., Van De Walle, D., Gautam, M., (1995). Testing a Social Safety Net. *Journal of Public Economics*, Vol. 57, pp. 175–199.

Rubin, D. B., (1987). Multiple Imputation for Nonresponse in Surveys. *New York: Wiley*.

Shepherd, A., Wadugodapitiya, D., Evans, A., (2011). Social Assistance and the 'Dependency Syndrome'. *Chronic Poverty Research Centre Policy Brief,* No. 22, https://ssrn.com/abstract=1765933.

Szulc, A., (2012). Social Policy and Poverty: Checking the Efficiency of the Social Assistance System in Poland. *Eastern European Economics*, Vol. 50, pp. 66–93.

Szulc, A., (2022). Reconstruction of the Social Cash Transfers System in Poland and Household Well-being: 2015 – 2018 Evidence, SGH KAE Working Papers Series, No. 2022/076, Warsaw, https://cor.sgh.waw.pl/bitstream/handle/20.500.12182/1134/WPKAE_2022_076.pdf?sequence =2&isAllowed=y.

Wilk, S., (2020). The Role of Family Policy in Solving Demographic Problems: Study of the Polish Program Family 500+. *European Journal of Sustainable Development*, Vol. 9, pp. 84-92.

Wooldridge, J. M., (2007). Inverse probability weighted estimation for general missing data problems. *Journal of Econometrics*, Vol. 141, pp. 1281–1301.

Wooldridge, J. M., (2010). Econometric Analysis of Cross Section and Panel Data. *The MIT Press,* Cambridge*, Massachusetts,* London*,* England.