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IZA DP No. 11652

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ABSTRACT

The Effects of Large Universal Child Benefits on Female Labour Supply*

In 2016 the Polish government introduced a large new child benefit, called "Family 500+", with the aim to increase fertility from a low level and reduce child poverty. The benefit is universal for the second and every further child and means-tested for the first child. Increasing out-of-work income significantly, the transfer can reduce incentives to participate in the labour market. We study the impact of the new benefit on female labour supply, using Polish Labour Force Survey data. Based on a difference-in-differences methodology we find that the labour market participation rates of women with children decreased after the introduction of the benefit compared to childless women. The estimates suggest that by mid-2017 the labour force participation rate of mothers dropped by 2-3 percentage points, depending on the estimation specification, as a result of the "Family 500+" benefit. The effect was higher among women with lower levels of education and living in small towns.

JEL Classification: E24, H53, I38, J13, J21, J22

Keywords: child allowance, social transfers, family policy, labour market participation

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1. Introduction

In 2016 the Polish government introduced a large new child benefit, called "Family 500+", with the aim to increase fertility from a low level and reduce child poverty. The benefit is universal for the second and every further child and means-tested for the first child. This programme more than doubles fiscal support for families, making Poland one of the top spenders in the EU concerning cash transfers for families.

This paper looks at the impact of the new benefit on female labour supply. The transfer increases out-of-work income significantly, especially for parents with several eligible children, reducing incentives to enter the labour market through an income effect. This holds particularly for lower-earning families. Furthermore, the benefit for the first child is fully withdrawn once family income rises above the eligibility ceiling. This can create an inactivity trap for singles or second-earners from low-earning families, as they would need to earn quite a high wage to make up for this loss.

From a theoretical perspective, in a simple static labour supply framework, child benefits may reduce labour supply through an income effect, as they shift the consumption – leisure budget constraint (Blundell, 1995; Moffitt, 2002; Cahuc et al., 2014). In a search model framework the "Family 500+" child benefit is likely to increase the reservation wage and thus discourage labour market participation among individuals close to the income threshold below which the benefit for the first child is paid. Women, as primary caregivers, are likely to be particularly responsive to such incentives, which is confirmed by empirical evidence for other countries (Jaumotte, 2003; Milligan and Stabile 2009; Haan and Wrohlich, 2011). Schirle (2015) analyses the introduction of the Universal Child Care Benefit (UCCB) in Canada in 2006 and the impact it had on the labour market. Using Canadian Labour Force Survey data for 2003-2009, she finds large and significant negative income effects of the UCCB on labour supply of mothers and fathers. The effects were stronger for low educated parents, though concerned better educated women as well. Among mothers, labour supply was decreased both at the extensive and intensive margin. Gonzalez (2013) uses a regression discontinuity framework to analyse the fertility and labour supply effects of a large universal one-time benefit introduced in 2007 in Spain. She finds a negative labour force participation effect a year after birth, which however disappears by the time the child is two.

The negative effects of child benefits on female labour supply tend to be greater for women with lower potential incomes and lower levels of education (Eissa and Liebman, 1996; Immervoll et al. 2007). Also marital status is likely to play a role for the impact of child benefits on female labour supply, with married women reacting more strongly to changes in income and wages. Koebel and Schirle (2016) followed up on Schirle's (2015) study of the Canadian UCCB, finding that the benefit decreased labour supply among married women, but increased labour force participation of divorced/separated women, with no impact on mothers, who had never been married, or those in common-law relationships. Finally, the labour supply response to child benefits will differ across countries, reflecting not only the institutional differences in the design of tax-benefit systems but also the level of economic development. In particular, Scharle (2007) finds the negative effect of cash benefits on female labour

force participation to be higher in Central and Eastern European countries, which may be a reflection of lower income levels in these countries.

The introduction of child benefits in Poland is an opportunity allowing us to study the labour market effects of such transfers in the context of a catching-up economy with relatively low social and family transfers hitherto. The benefit is large relative to average incomes compared to child benefits in other countries, increasing the likelihood of observing a significant impact. It was introduced quickly after it was first announced by a new government, so women are very unlikely to have anticipated the introduction by changing their labour supply or their decision to have children. This justifies treating the reform like a natural experiment. Poland is also distinguished by a very good labour market situation on the one hand, and low female participation rates on the other. The latter is related to strong family values shaped by deep-rooted Catholicism and a relatively weak although improving institutional childcare infrastructure, in particular in rural areas.

Given this unique institutional framework this study can add important insights into the nature of labour supply effects of child benefits. It is the first ex-post evaluation of the introduction of the child benefit in Poland. Before its implementation, Myck (2016) used a discrete-choice labour-supply model and Polish Household Budget Survey data to simulate the effects of the "Family 500+" benefit on labour supply. He found that the benefit could reduce labour supply in the long term by about 240 000 individuals.

We use Polish Labour Force Survey data for an early evaluation of the reform. Based on a difference-in-differences methodology we find that the labour market participation rates of women with children decreased significantly after the introduction of the benefit compared to childless women, who were not eligible for the benefit. Results imply that the labour force participation rate of mothers would have been 2-3 percentage points higher in the absence of the reform. The effect set in earlier for partnered women and within this group it was highest among those with lower levels of educational attainment and thus generally lower incomes.

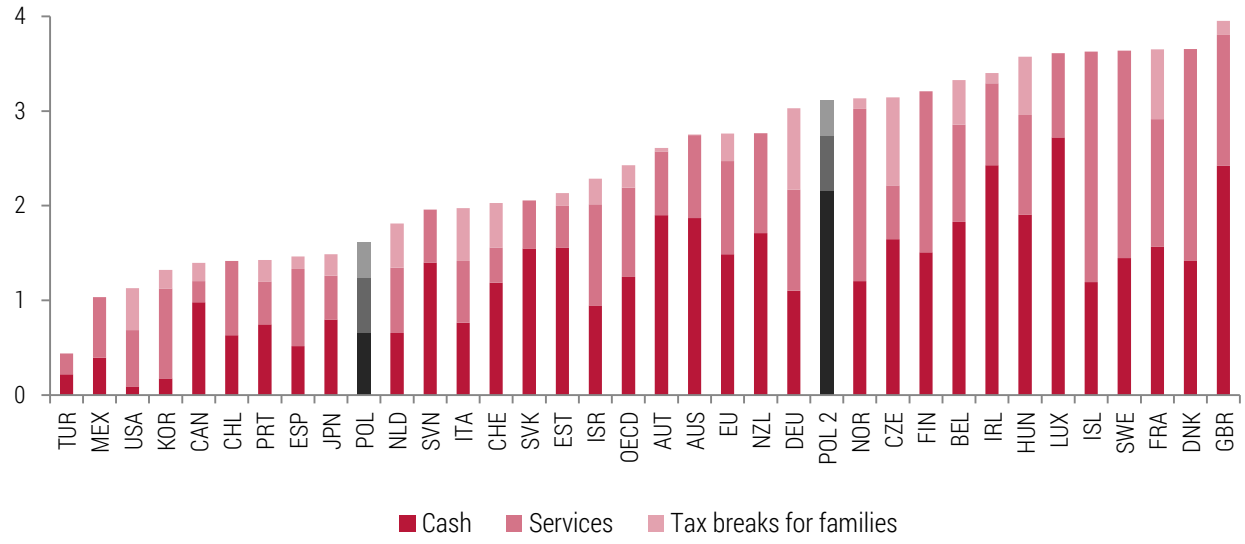
2. Family policy and labour market background

While fiscal support for families had been relatively modest overall in Poland, the "Family 500+" programme nearly doubled it compared to 2013, lifting it well above the OECD average to more than 3% of GDP (Figure 1). The Programme introduced an unconditional cash transfer of 500 PLN per month for every second and subsequent child under the age of 18. The benefit is also granted for the first child subject to an eligibility ceiling of net monthly per capita family income of 800 PLN, or 1200 PLN if the child is disabled (MRPiPS, 2015). It is fully withdrawn once family income rises above this ceiling.

The "Family 500+" programme is a step change in terms of availability of cash benefits for families. Other means-tested family benefits and tax breaks continue to exist, and the "Family 500+" transfer does not affect the eligibility for these or any other benefits, as it is not considered as income for the purposes of establishing benefit eligibility. At end-2015 the average monthly family benefit per beneficiary varied between 89 and 129 PLN, merely a fraction of cash transfers that are now available for families with children eligible through the "Family 500+" benefit. Given that it is universal for second

and further children, the benefit also has a much wider coverage, benefitting 2.74 million families, so far, compared with 1.04 million families for the means-tested benefit (MRPiPS, 2016). The "Family 500+" benefit is worth a third of a net minimum wage in Poland. As a comparison, child benefits in Germany amount to just 12% of a minimum wage.

Figure 1. Public support for families as a percentage of GDP, 2013



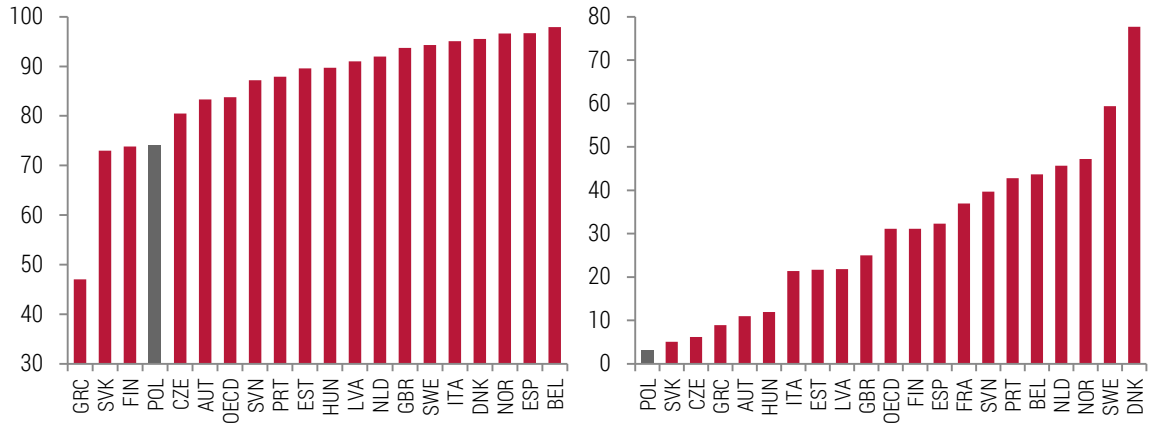
Note: Data for 2013 or latest available year. POL 2 – Poland's public spending on family benefits taking into account the 2016 reform of child benefits.

Source: OECD (2017), OECD Family Database.

In contrast, public spending on childcare services remains relatively low (Figure 2), although Poland has made considerable efforts to improve access to crèches and kindergartens. The coverage of institutional childcare for children aged less than 3 doubled between 2011 and 2015 and increased by almost a quarter for children between 3 and 6 years old (Statistics Poland, 2016) with more than 80% of children participating in 2016 (Figure 2 shows 2014 numbers). Yet, coverage remains weak, in particular for the youngest children from families with lower educational attainment. Access to childcare is a particular problem in rural areas, and families often have to resort to private providers there, which can be prohibitively expensive for lower-earning families.

The length of maternity and paid childcare leave in Poland is around the OECD average, although taking into account the benefit generosity the 41.6 weeks of full-time-equivalent leave are above the median among the EU and OECD countries. The great majority of paid leave can be shared with fathers, in principle, but less than 2% of parents on leave were men in 2014 according to data from the Social Insurance Institution. Independently of that there are two weeks of paternity leave after childbirth, which are non-transferrable, with a take-up rate of roughly 43% (2017). On top of this, there is unpaid leave of 156 weeks, an OECD record.

Figure 2. Enrolment rates in pre-primary or primary education – 3-to-5 year-olds (left) and participation rates in formal childcare and pre-school services – 0-to-2 year-olds with mothers without tertiary education (right), 2014

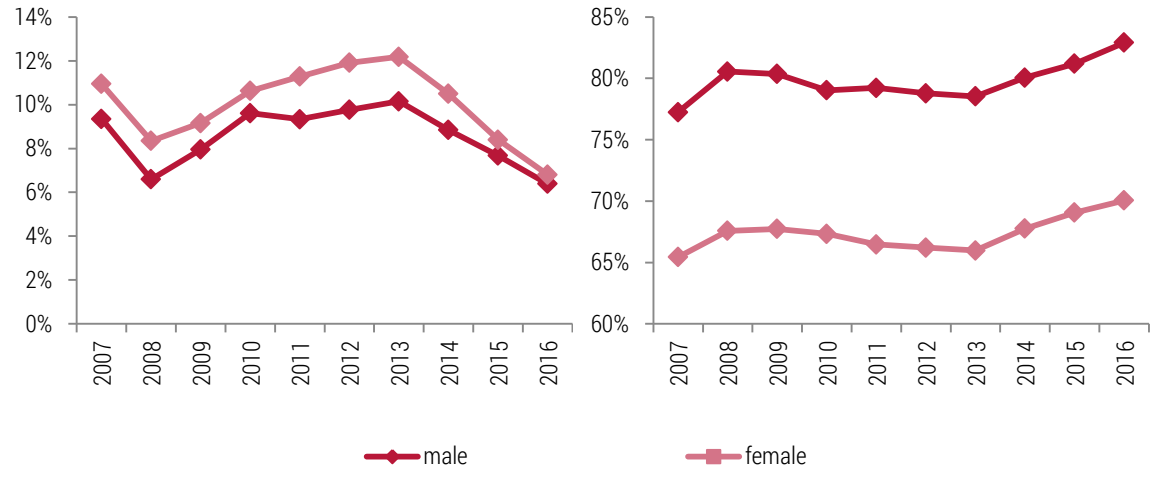


Note: Potential mismatches between the enrolment data and the coverage of the population data (geographic coverage and/or the reference data used) may lead to overestimated or underestimated enrolment rates. Data for 2014 or latest available year. Data refer to children using centre-based services (e.g. nurseries or daycare centres and pre-schools, both public and private), organised family daycare, and care services provided by paid professional childminders, excluding those using unpaid informal services provided by relatives, friends or neighbours.

Source: OECD (2017), OECD Family Database.

The labour market in Poland has recorded a substantial improvement since 2013. Employment has increased markedly, and the overall unemployment rate has fallen sharply, as it did for prime-aged individuals (Figure 3). The unemployment decrease has been steeper among women. As a result, female and male unemployment rates have converged quickly. However, increased labour market withdrawal among prime-aged women has contributed significantly to the 2015-2016 drop in unemployment, while the pick-up in their employment growth was in line with that of men.

Figure 3. Unemployment (left) and employment rates (right), age 20-49



Source: Own calculations based on Polish Labour Force Survey data.

One hypothesis would be that this bigger outflow from unemployment to inactivity for women was driven by the introduction of the family benefit. Indeed, out-of-work income has increased significantly for families thanks to the new child benefit. The fact that the benefit for the first child is withdrawn at once when per capita family income increases beyond the eligibility ceiling limits incentives for single mothers or second earners with children to work. An unemployed single mother of two taking up a job that pays the average wage would retain less than 20% of her earnings as a result of taxes and benefit withdrawal. Once taking childcare costs into account, which can be very high in the private sector – often the only available option, she would actually lose money.

The new child benefits may thus have reinforced a longer-standing trend of labour force participation among lower-skilled women in Poland to fall. Despite a strong labour market, participation among women has not increased in recent years, unlike that of men. This is because of a sharp fall in labour force participation among low-educated women, with less than upper-secondary education, from 2013 onwards. Participation rates of tertiary educated women increased between 2012 and 2015 but then decreased somewhat in 2016, the year the "Family 500+" benefit was introduced (Figure A1 in the Appendix). While the 2013-15 fall in female participation rates occurred mostly among women with three or more children, the 2016 decrease concerned all women with children, regardless of their number (Figure A2 in the Appendix). At the same time activity rates of childless women increased.

3. Methodology and data

We test the hypothesis that the implementation of the "Family 500+" programme led to a fall in labour force participation among mothers. To this end, we use a difference-in-differences approach (Angrist and Pischke, 2014; Lechner, 2011). To identify the effect of the introduction of the "Family 500+" benefit we compare changes in participation rates of women who are eligible for the transfer, as they have children – our treated group, and of women who have no children and as such are not eligible – the control group.

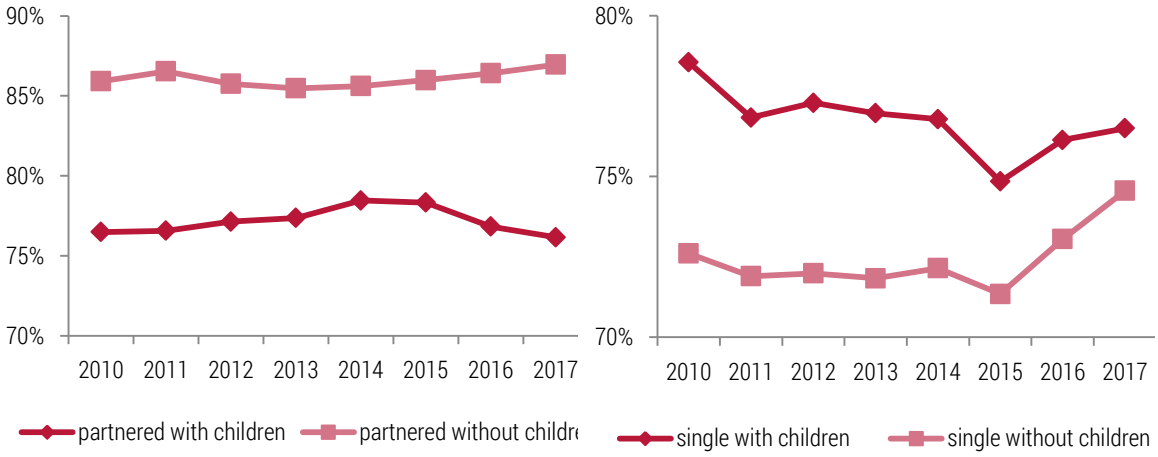
In the case of women with one child, many are not eligible to the benefit, because their income is too high. Yet, single women can in principle become eligible by withdrawing from the labour market or reducing their hours worked so that their income drops below the eligibility ceiling, as could some partnered women provided their partner's income is low enough. It seems sensible to consider these women as treated, since the child benefit is potentially available to them and might thus influence their behaviour. This is less clear for women whose partner's income is so high that they could not become eligible for the benefit even by withdrawing from the labour market. Assigning them to the treated group should bias the estimated impact on participation downwards, as they cannot be reasonably expected to react to the benefit. This is why we also test some alternative specifications, which are discussed later.

We test whether the difference in participation rates of the treated and control group changes after the introduction of the "Family 500+" benefit. A key assumption of the methodology is that the treated and the control group are similar enough so that changes in the outcome variable, labour market participation in the case of this study, are the same unless they are subject to a different "treatment". If

this assumption is correct, comparing changes in the participation rate following the introduction of the child benefit is a way to identify its effect.

As common in the literature we verify the validity of this "common trends assumption" via visual inspection of historical trends of our outcome variable, labour force participation (see e. g. Gebel and Voßemer, 2014; Centeno et al., 2009). Figure 4 shows that changes in participation rates for women with 1 or 2 children and those without children were indeed quite similar prior to the introduction of the child benefit in 2016, but started to diverge thereafter, in particular for women with partners. This makes us confident that comparing these two groups allows us to identify the effect of the child benefits. Since the pre-reform trend of labour force participation rate of women with three and more children was quite different (see Figure A2 in the Appendix) we consider that childless women are not sufficiently similar to them for a valid comparison and drop women with three or more children from our analysis. We also test the common trends in participation rates of women in the treated and control groups using placebo tests.

Figure 4. Labour force participation rates of women aged 20-49 with a partner (left) and without (right) differentiated by the presence of children



Note: 2017 only for the first half of the year.

Source: Own calculations based on Polish Labour Force Survey data.

We use Polish Labour Force Survey data for years 2010-17, restricting the sample to women aged 20-49. The analyses are run separately for single and partnered women to account for differences in their labour force participation decisions, which are likely to be influenced by the presence of a partner. Partnered women are defined as women living with a spouse or cohabiting partner in the same household. We compare their activity rates before and after the second half of 2016, as municipal offices started transferring the "Family 500+" benefits as of the end of June 2016. We study the labour market reaction in the first year after the introduction of the benefit, that is until mid-2017. As the benefit was announced in February 2016, it is safe to assume that it was not anticipated and women did not react before they actually received the money.

Table 1 compares descriptive statistics for the treated and control group in 2016, distinguishing between single and partnered women. Not surprisingly, childless women are much younger, in

particular among singles. Childless single women are also already better educated and more likely to be still in education than single mothers. Among partnered women, there is a higher share of rural inhabitants in the treated group. Such differences in the treated and control group are taken into account in our methodology by introducing the socio-economic variables displayed in Table 1 as controls.

Table 1. Descriptive statistics for women aged 20-49 in 2016 (treated group - women with 1 or 2 children, control group - childless women)

	Partnered women		Single women	
	Control	Treated	Control	Treated
Age: 20-29	24	18	61	23
Age: 30-39	20	51	20	45
Age: 40-49	56	31	19	32
Place of residence: city with more than 100 thousand inhabitants	35	28	34	32
Place of residence: city with 20-100 thousand inhabitants	19	19	16	21
Place of residence: city with less than 20 thousand inhabitants	11	12	11	13
Place of residence: rural area	35	42	39	34
Educational level: tertiary	40	45	44	32
Educational level: secondary	34	34	40	40
Educational level: basic vocational or lower	26	21	16	29
Student status	5	2	26	3
Labour market status of partner: employed	89	93	-	-
Labour market status of partner: unemployed	3	3	-	-
Labour market status of partner: inactive	8	4	-	-
Educational level of partner: tertiary	26	30	-	-
Educational level of partner: secondary	34	35	-	-
Educational level of partner: basic vocational or lower	40	35	-	-

Source: Own calculations based on Polish Labour Force Survey data.

We estimate the following equation:

$$A_{it} = \alpha + \beta X_{it} + \gamma T_i + \delta Y_t + \theta Post_t \cdot T_i + \varepsilon_{it} \qquad (1),$$

where A_{it} is a dummy variable indicating whether individual *i* is active in the labour market in period t; α is a constant; X_{it} is a vector containing a set of individual-specific characteristics detailed in Table 1. Unfortunately, income and wage variable cannot be included as controls, as these data are unavailable (income) or too patchy (wages) in the Polish Labour Force Survey. T_i is a treatment group variable, specifying whether the woman has children (treated group) or not (control group); $Post_t$ is a dummy variable for the period following the second quarter of 2016 when the child benefit was introduced, or the post-treatment period; ε_{it} is an error term; and α, β, γ, δ and θ are parameters to be estimated. We also introduce time-fixed effects to account for changes in labour market policies and the economic situation in general (Y_t is a set of half-year dummies).

We use the linear probability model to estimate equation (1). We run the probit model as a robustness check and the results were very similar (they are available upon request). To overcome error-term heteroscedasticity, we compute robust standard errors. Additional estimates with the so-called placebo effects (that is treatment dummies for other periods prior to the introduction of the child benefit) are run to check the robustness of the results.

4. Results

4.1. The effect of child benefits on labour force participation

Table 2 reports the estimate of our main parameters of interest, γ, the group effect, and θ, the treatment effect. Estimates of other coefficients are presented in Table A1 in the Appendix. The estimates imply that, after adjusting for differences in the composition of the two groups, the labour force participation rate of childless women with a partner was almost 6 percentage points higher than for partnered women with one or two children over the estimation period. Following the introduction of the child benefits this difference increased by 2.4 percentage points. The implication is that labour force participation among partnered mothers might have been 2.4 percentage points higher in the absence of the child benefits. The treatment effect for single women is of the same order. Placebo tests for other periods than the one following the introduction of child benefits were insignificant in the large majority of cases (these are available from authors upon request).

Table 2. The effect of child benefits on labour force participation of mothers, for women aged 20-49 with 1 or 2 children

	Partnered women	Single women
Group effect (γ)	-0.059***	0.002
Treatment effect (θ)	**-0.024*** **	**-0.024*** **
Observations	299 662	159 506
R-squared	0.116	0.277

*Note: The coefficients of all covariates are in Table A1 in the Appendix . Robust standard errors. Significance levels: *** 0.01, **0.05, * 0.1.*

Source: Own calculations based on Polish Labour Force Survey data.

To test whether the effect of the child benefit on female labour force participation changed over time, we also estimated equation 1, allowing for a different treatment effect in 2016 and 2017. Results presented in Table 3 show that the effect of the benefit on labour force participation actually strengthened in 2017 for both partnered and single women. For single women it was insignificant in the first post treatment period and a little higher than for partnered women in the second period.

One may expect that the treatment effect for partnered mothers would be higher because their labour force participation is likely to be more elastic. Thus the same treatment effect for the entire period analysed may be quite surprising. Yet, the dynamics of the effect shows that single women indeed reacted more slowly to the introduction of the 'Family 500+" benefit.

Overall, in absolute terms the estimates suggests that up to 103 thousand women did not participate in the labour market in the 1st half of 2017 due to the "Family 500+" benefit. This is 1.3% of all women who participate on the labour market in Poland and 1.9% of active women aged 20-49.

Table 3. The dynamics of the effect child benefits on labour force participation of mothers (women aged 20-49 with 1 or 2 children)

	Partnered women [1]	Single women [2]
Treatment effect in the 2nd half of 2016 (θ_{2016})	**-0.017****	**-0.014**
Treatment effect in the 1st half of 2017 (θ_{2017})	**-0.027*****	**-0.029****
Observations	299 662	159 506
R-squared	0.116	0.277

*Note: The coefficients of all covariates are available upon request. Robust standard errors. Significance levels: *** 0.01, **0.05, * 0.1.*

Source: Own calculations based on Polish Labour Force Survey data.

4.2. Testing for heterogeneous effects

We also test whether the impact of the "Family 500+" benefit on the labour force participation rate of women with children was heterogeneous across different groups of women. To verify this, we interact the group and post-period dummies and their combination with the socio-economic variables described in Table 1, using the following equation:

$$A_{it} = \alpha + \beta X_{it} + \delta Y_t + \gamma T_i + \sigma T_i \cdot X_{it}^c + \theta Post_t \cdot T_i + \mu Post_t \cdot T_i \cdot X_{it}^c + \rho Post_t \cdot X_{it}^c + \varepsilon_{it} \quad (2)$$

with the notation as in equation 1. For parsimony we test heterogeneity with a simple post-period dummy and run regressions separately for each socio-economic variable. X_{it}^c is a subvector of X_{it} for the variable of interest. σ, μ and ρ are newly added vectors of parameters to be estimated. μ in particular is a vector with a set of parameters capturing different treatment effects by socio-economic group.

The heterogeneous treatment effects for partnered women are displayed in Table 4. For single women treatment effects do not differ significantly by socio-economic group in most of cases. The full set of results is available from the authors upon request.

The estimates confirm that the effect of child benefits is strongest for women with the lowest levels of education. It lends support to the idea that women with weak earnings are most likely to react to an increase in transfers, in particular when they can rely on the income of a partner. Women living in mid-sized towns seem to be most strongly affected, which may reflect their more difficult labour market situations and lower earnings – which in turn make the new benefit more generous in relative terms. The youngest age group seems to react most strongly to the introduction of child benefits (which may also reflect potentially lower earnings for labour market entrants), while the treatment effect for partnered women older than 30 is insignificant.

Table 4. Heterogeneous treatment effects for partnered women (treated group - women with 1 or 2 children, control group - childless women)

Model with interactions for educational level (Educational level – base: tertiary)	
Treatment effect for tertiary education	-0.011*
Difference in treatment effect for secondary education	-0.018
Difference in treatment effect for basic vocational or lower education	-0.045***
Model with interactions for place of residence (Place of residence – base: city with more than 100 thousand inhabitants)	
Treatment effect for cities with more than 100 thousand inhabitants	-0.005
Difference in treatment effect for cities with 20-100 thousand inhabitants	-0.052***
Difference in treatment effect for cities with less than 20 thousand inhabitants	-0.014
Difference in treatment effect for rural areas	-0.018
Model with interactions for age (Age – base: 30-39)	
Treatment effect for age 30-39	-0.007
Difference in treatment effect for age 20-29	-0.044***
Difference in treatment effect for age 40-49	-0.020
Model with interactions for number of children (Number of children – base: two)	
Treatment effect for mothers of two children	-0.027***
Difference in treatment effect for mothers of one child	0.006
Model with interactions for age of the youngest child (Age of the youngest child – base: 7-12)	
Treatment effect for mothers of children aged 7-12	-0.043***
Difference in treatment effect for mothers of children aged 0-1	0.070***
Difference in treatment effect for mothers of children aged 2-3	0.002
Difference in treatment effect for mothers of children aged 4-6	0.025**
Difference in treatment effect for mothers of children aged 13-17	0.009

Notes: The coefficients of all covariates and for single women are available upon request.

Source: Own calculations based on Polish Labour Force Survey data.

Whether women have one or two children does not seem to matter among partnered mothers, although it differentiates the effect significantly among single mothers. The treatment effect among single mothers of two children was 4.8 percentage points – 3.4 percentage points lower than among single mothers of one child. Such a relatively large reaction of single mothers of two children is likely related to the eligibility ceiling for the first child.

In terms of age of the youngest child, mothers whose youngest child was younger than 1 or between 4 and 6 reacted less strongly than others. The treatment effect for mothers of children younger than 1 was even positive. This has to be interpreted with caution as women on maternity leave are counted as employed. Smaller coefficients for mothers of children aged between 4 and 6 may be puzzling. One possible explanation is that the income effect was counterbalanced for those mothers. It may be

related to weak childcare infrastructure and high costs of private kindergartens. Maybe the 500+ benefit may have made it possible for some mothers of children in preschool age to work and afford the childcare costs.

4.3. Robustness tests

As a first robustness check we compare changes in participation rates among women with two children (treated group) to changes in participation rates among childless women, leaving out women with one child whose assignment to the proper group is more challenging. Table 5 summarizes the results, which are statistically significant and even stronger in size for single women than in the baseline.

Table 5. The effect of child benefits on labour force participation of mothers with 2 children, separately for partnered and single women

	Partnered women [1]	Single [2]
Treatment effect in the 2nd half of 2016 (θ_{2016})	-0.019***	-0.052***
Treatment effect in the 1st half of 2017 (θ_{2017})	-0.031***	-0.044***
Observations	184 220	130 600
R-squared	0.122	0.302

*Note: Robust standard errors. Significance levels: *** 0.01, **0.05, * 0.1.*

Source: Own calculations based on Polish Labour Force Survey data.

As a second robustness check testing the impact of the assignment of women with one child to the treatment and control group, we redefine these groups in a following way. We define the treatment group as women with two children and those with one child who are eligible to the 'Family 500+" transfer. Because there is no variable that would allow us to directly identify those receiving the "Family 500+" benefit in the data for 2016, we derived it from other information – whether woman declares receiving a social benefit in the form of family benefits or social assistance, as this implies eligibility for the 500+ benefit as well. The control group includes mothers with one child who do not report receipt of any social assistance benefits. Most of them will not be eligible for the 500+ transfer. This approach allows us to gauge differences in labour market behaviour across eligible and non-eligible mothers, rather than comparing mothers with childless women – an additional way to test the robustness of our results. However, because the eligibility ceiling for social assistance is lower than that for the "Family 500 +" benefit, mothers with household income that falls between those two eligibility ceilings will be wrongly assigned to the control group. That said the two income ceilings are close and therefore the corresponding bias should be limited. According to our estimates based on Household Budget Survey data, wrong assignment should concern around 12% of households with one child.

We also make use of the time panel dimension of our data (available only as one-year transitions, though) and investigate the impact of the "Family 500+" benefit on labour market withdrawal, or the flow from activity to inactivity, rather than the level of activity, thus varying the outcome variable. In

particular, we compare the flows from activity to inactivity between the 2nd and 3rd quarters of 2016 and between the 3rd and 4th quarters of 2016 to the same flows one year earlier.

We again use the difference-in-differences framework, but this time to increase the comparability of individuals across the treated and control groups and lower the potential selection bias we employ a kernel propensity score matching technique (Blundell and Dias, 2009). We estimate for each individual the probability that she would be in the treated group based on the socio-economic characteristics described in Table 6. This probability is referred to as the propensity score. For each treated subject, we derive a weighted average of all individuals in the control group with weights based on the distance of their propensity score to that of the treated individual. The highest weight is given to those with propensity scores closest to that of the treated unit. Once we weight the covariates based on the propensity score matching technique, the differences in means between the treated and the control group become statistically insignificant for all variables, substantially reducing the selection bias.

Table 6. Balancing t-test of differences in means of covariates between the control and treated groups, 2015

	Raw			With weighted covariates		
	Control	Treated	Difference	Control	Treated	Difference
Unemployed (share among active)	0.057	0.084	0.027***	0.102	0.090	-0.012
Age: 20-24	0.023	0.010	-0.013***	0.011	0.011	0.000
Age: 25-29	0.118	0.068	-0.050***	0.072	0.073	0.001
Age: 30-34	0.212	0.230	0.018**	0.241	0.239	-0.002
Age: 35-39	0.218	0.366	0.149***	0.350	0.371	0.021
Age: 40-44	0.250	0.244	-0.006	0.240	0.226	-0.014
Age: 45-49	0.179	0.081	-0.098***	0.086	0.081	-0.005
Level of education: High	0.448	0.454	0.006	0.444	0.447	0.003
Level of education: Medium	0.345	0.338	-0.008	0.345	0.342	-0.003
Level of education: Low	0.206	0.208	0.002	0.211	0.211	0.000
Age of the youngest child: 0-3	0.190	0.236	0.046***	0.231	0.246	0.015
Age of the youngest child: 4-6	0.178	0.246	0.068***	0.244	0.241	-0.003
Age of the youngest child: 7-17	0.633	0.518	-0.114***	0.525	0.513	-0.012
Main source of household income: contract work	0.750	0.704	-0.046***	0.698	0.701	0.003
Main source of household income: own agricultural farm	0.070	0.085	0.015***	0.097	0.092	-0.005
Main source of household income: self-employment	0.117	0.135	0.018***	0.121	0.127	0.006
Main source of household income: other	0.063	0.076	0.013***	0.084	0.081	-0.004
Presence of the partner in the household	0.816	0.853	0.037***	0.844	0.853	0.010
Place of residence: large city	0.278	0.254	-0.024***	0.229	0.234	0.005
Place of residence: medium city	0.200	0.176	-0.024***	0.180	0.175	-0.005
Place of residence: small city	0.136	0.127	-0.009	0.135	0.137	0.001
Place of residence: rural area	0.386	0.444	0.057***	0.456	0.455	-0.001
Number of observations	3007	2309	-	3007	2309	-

Source: *Own calculations based on Polish Labour Force Survey data.*

The estimated group and treatment effects are displayed in Table 7. The treatment effect is positive and statistically significant. The results suggest that after the "Family 500+" programme was introduced the gap in the quarterly withdrawal rate between the treated and control was 2.2 percentage points higher than it was a year earlier. This is a large effect, considering that the average withdrawal rates vary between 1 and 4% . In the second half of 2016 the average quarterly withdrawal rate for the treated group was on average 3.9%. Our results imply that it would have been less than half of that had the "Family 500+" benefit not been introduced. In absolute terms this suggests that on average 50-54 thousand women withdrew from the labour market in the second half of 2016 due to the "Family 500+" benefit. This is compatible with the estimates obtained in the first part of our analysis.

Table 7. The impact of child benefits on labour market withdrawal rates – results from a difference-in-differences estimation with kernel propensity score matching

	Outcome: flow from activity to inactivity 2016 vs 2015
Group effect (γ)	-0.006 (0.005)
Treatment effect (θ)	**0.022***** (0.007)
Observations	10 310

Source: Own calculations based on Polish Labour Force Survey data.

As a last robustness check we use our baseline mode, but look at employment versus non-employment (unemployment or inactivity) as an outcome variable rather than at activity versus inactivity. We might expect that most of the negative impact of the "Family 500+" benefit concerned unemployed women, who stopped searching for a job; while the effect on those employed would be weaker. This turns out not to be the case: the effect among employed women (compared to non employed) is even a bit stronger than the results for inactivity (Table 8 summarizes the results).

Table 8. The effect of child benefits on employment of mothers, separately for partnered and single women, aged 20-49, with one or two children

	Partnered women [1]	Single [2]
Treatment effect in the 2nd half of 2016 (θ_{2016})	-0.020***	-0.002
Treatment effect in the 1st half of 2017 (θ_{2017})	-0.029***	-0.036***
Observations	299 662	129 506
R-squared	0.116	0.277

*Note: Robust standard errors. Significance levels: *** 0.01, **0.05, * 0.1.*

Source: Own calculations based on Polish Labour Force Survey data.

5. Conclusions

The results presented in this paper suggest that the recent introduction of child benefit in Poland had a significantly negative impact on labour force participation and employment of eligible mothers. This finding is robust to changing the precise outcome variable we look at (labour force participation, employment or labour market withdrawal), to different definitions of the treated and the control groups in our difference-in-differences methodology and to different estimation approaches. The effects are sizeable implying that labour force participation and employment would have been between 2 ½ and 3 percentage points higher by mid-2017 in the absence of the reform. Testing for heterogeneity across different groups reveals that the effects are strongest for the lowest-educated mothers in line with previous results in the literature.

In terms of questions for further research, it will be interesting to study at a later point in time the extent to which the new child benefits may lengthen career interruptions of mothers and the ensuing impact on their earnings prospects when they return to the labour market. Also, whether fertility is influenced positively by the new benefit introduced in Poland, as intended, would be an interesting research question for the future, as many countries struggle to alleviate demographic changes and increase the low birth rates.

The size of the effect on labour supply of the "Family 500+" benefit may be influenced by the existing tax disincentives for second earners, insufficient child care coverage, gender pay gaps and gendered norms. Studying how these feature influence the impact of child benefits on labour supply would shed light on policies that can help alleviate any unwanted side effects of such transfers. Finally, the child benefits might also influence labour supply of men and informality, which would be interesting fields for study for the future.

References

Angrist, J. D., & Pischke, J. S. (2014). Mastering' metrics: The path from cause to effect. Princeton University Press.

Blundell, R. (1995). The Impact of Taxation on Labour Force Participation and Labour Supply (OECD Jobs Study Working Papers). doi:10.1787/576638686128

Blundell, R., & Dias, M. C. (2009). Alternative approaches to evaluation in empirical microeconomics. Journal of Human Resources, 44(3), 565-640.

Cahuc, P., Carcillo, S., & Zylberberg, A. (2014). Labor economics. MIT Press.

Centeno, L., Centeno, M., & Novo, Á. A. (2009). Evaluating job-search programs for old and young individuals: Heterogeneous impact on unemployment duration. Labour Economics, 16(1), 12-25.

Eissa, N., & Liebman, J. B. (1996). Labor supply response to the earned income tax credit. *The quarterly journal of economics, 111*(2), 605-637.

Gebel, M., & Voßemer, J. (2014). "The impact of employment transitions on health in Germany. A difference-in-differences propensity score matching approach", Social Science & Medicine, Vol. 108, pp. 128-36.

González, L. (2013). The effect of a universal child benefit on conceptions, abortions, and early maternal labor supply. *American Economic Journal: Economic Policy*, *5*(3), 160-88.

Haan, P., & Wrohlich, K. (2011). Can child care policy encourage employment and fertility?: Evidence from a structural model. Labour Economics, 18(4), 498-512.

Immervoll, H., Kleven, H. J., Kreiner, C. T., & Saez, E. (2007). Welfare reform in European countries: a microsimulation analysis. *The Economic Journal*, *117*(516), 1-44.

Jaumotte, F. (2003). Female labour force participation: past trends and main determinants in OECD countries (OECD Economics Department Working Papers, No. 376). Paris: OECD Publishing.

Koebel, K., & Schirle, T. (2016). The differential impact of universal child benefits on the labour supply of married and single mothers. *Canadian Public Policy*, *42*(1), 49–64.

Lechner, M. (2011). The estimation of causal effects by difference-in-difference methods. Foundations and Trends® in Econometrics, 4(3), 165-224.

Milligan, K., & Stabile, M. (2009). Child benefits, maternal employment, and children's health: Evidence from Canadian child benefit expansions. *American Economic Review*, *99*(2), 128-32.

Ministry of Family, Labour and Social Policy. (2015). Program „Rodzina 500 plus" w pigułce. Warsaw. Retrieved from https://www.mpips.gov.pl/wsparcie-dla-rodzin-z-dziecmi/rodzina-500-plus/informatory-rodzina-500-plus/

Ministry of Family, Labour and Social Policy. (2016). Raport Rodzina 500+. Warsaw. Retrieved from https://www.mpips.gov.pl/wsparcie-dla-rodzin-z-dziecmi/rodzina-500-plus/dokumenty-i-opracowania/

Moffitt, R. A. (2002). Welfare programs and labor supply. In A. J. Auerbach, & M. Feldstein (Eds.) *Handbook of Public Economics*, (pp. 2393–430). Newnes.

Myck, M. (2016). Estimating Labour Supply Response to the Introduction of the Family 500+ Programme (CenEA Working Paper Series WP01/16). Retrieved from http://www.cenea.org.pl/images/stories/pdf/working_papers/cenea_wp_0116.pdf

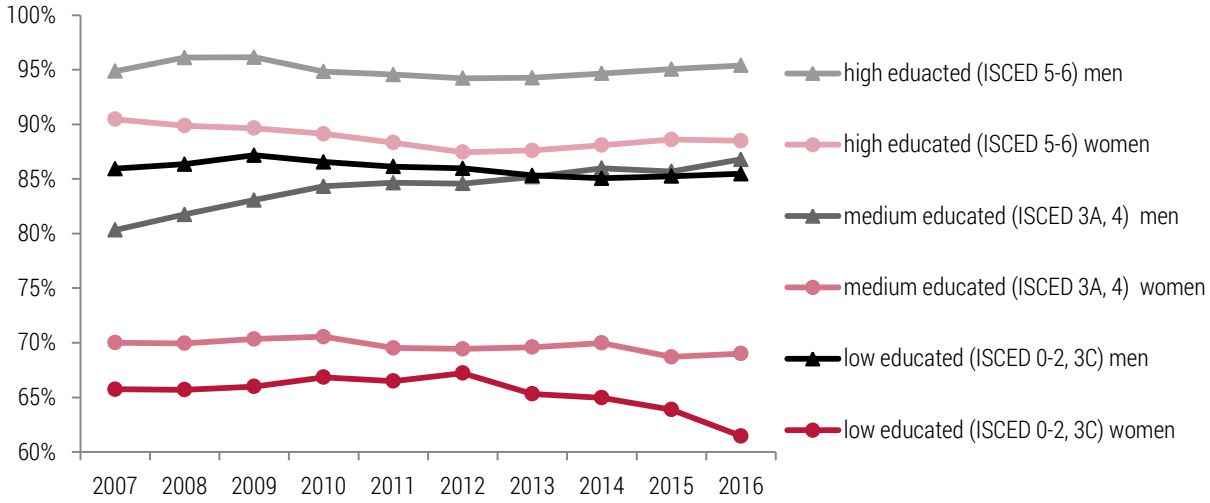
Scharle, Á. (2007). The effect of welfare provisions on female labour supply in Central and Eastern Europe. Journal of Comparative Policy Analysis, 9(2), 157-174.

Schirle, T. (2015). The effect of universal child benefits on labour supply. Canadian Journal of Economics/Revue canadienne d'economique, 48(2), 437-463.

Statistics Poland. (2016). Działania prorodzinne w latach 2010-2015. Cracow: Statistics Poland, Statistical Office in Cracow. Retrieved from https://stat.gov.pl/obszary-tematyczne/dzieci-i-rodzina/rodzina/dzialania-prorodzinne-w-latach-2010-2015,1,1.html

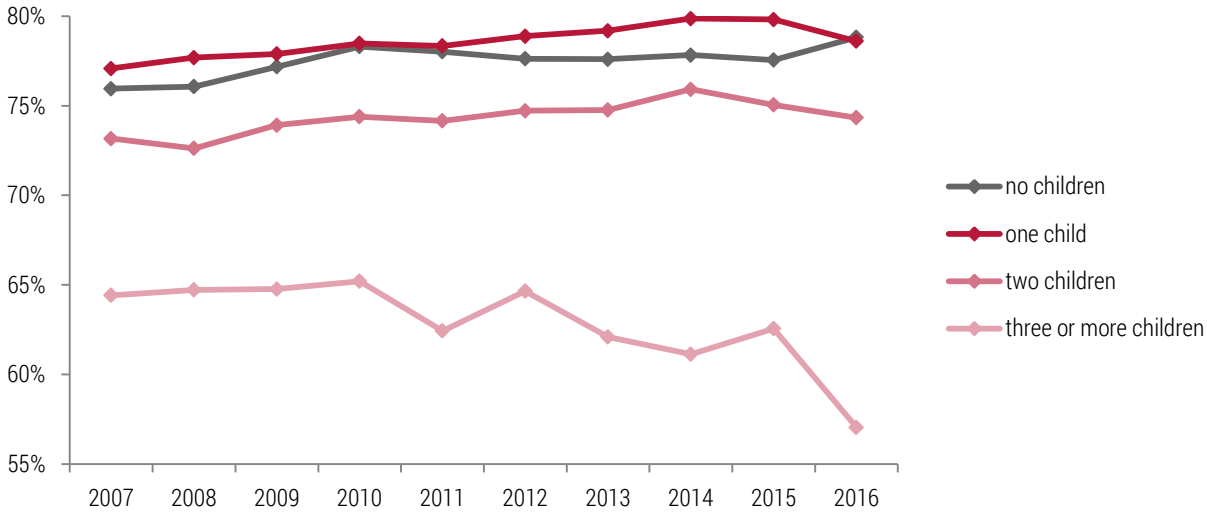
Appendix

Figure A1. Labour force participation rates for men and women aged 20-49, by level of education



Source: Own calculations based on Polish Labour Force Survey data.

Figure A2. Labour force participation rates of women aged 20-49, by number of children



Note: Number of children aged less than 18 and living in the same household.

Source: Own calculations based on Polish Labour Force Survey data.

Table A1. The effect of child benefits on labour force participation of mothers, for women aged 20-49 with 1 or 2 children, full set of estimated coefficients.

		Partnered women	Single women
	Group effect (γ)	-0.059***	0.002
	Treatment effect (θ)	**-0.024*** **	**-0.024*** **
Half year - base: 2nd half of 2015	1st half of 2010	0.017***	0.063***
	2nd half of 2010	0.011***	0.057***
	1st half of 2011	0.013***	0.045***
	2nd half of 2011	0.010**	0.047***
	1st half of 2012	0.010**	0.050***
	2nd half of 2012	0.007*	0.041***
	1st half of 2013	0.000	0.040***
	2nd half of 2013	0.004	0.028***
	1st half of 2014	0.007	0.032***
	2nd half of 2014	0.004	0.018***
	1st half of 2015	0.002	0.011*
	1st half of 2016	-0.003	0.018***
	2nd half of 2016	-0.000	0.018***
	1st half of 2017	0.002	0.027***
Quarter – base: 1st or 3rd	2nd quarter	-0.002	0.003
	4th quarter	0.002	-0.002
Age - base: 30-39	20-29	-0.073***	-0.028***
	40-49	0.014***	-0.004
Place of residence - base: city with more than 100 thousand inhabitants	City with less than 100 thousand inhabitants	-0.014***	0.004
	Rural areas	-0.016***	0.000
Educational level - base: tertiary	Secondary	-0.145***	-0.131***
	Basic vocational or lower	-0.235***	-0.321***
Number of children - base: two	One child	0.025***	0.048***
Age of the youngest child - base: 7-12 years	0-1	-0.208***	-0.320***
	2-3	-0.160***	-0.207***
	4-6	-0.049***	-0.053***
	13-17	0.046***	0.022***
	Student status	-0.088***	-0.471***
`Voivodeship - base: Dolnośląskie	Kujawsko-Pomorskie	0.043***	0.047***
	Lubelskie	0.040***	0.031***
	Lubuskie	0.076***	-0.013*
	Łódzkie	0.047***	0.007

	Małopolskie	0.077***	0.049***
	Mazowieckie	0.036***	0.019***
	Opolskie	0.055***	0.058***
	Podkarpackie	0.025***	0.025***
	Podlaskie	0.053***	0.002
	Pomorskie	0.076***	0.011*
	Śląskie	0.010**	0.038***
	Świętokrzyskie	0.014***	0.053***
	Warmińsko-Mazurskie	0.053***	0.012*
	Wielkopolskie	0.021***	-0.028***
	Zachodniopomorskie	0.028***	0.056***
Labour market status of partner - base: employed	Unemployed	-0.001	
	Inactive	-0.072***	
Educational level of partner - base: tertiary	Secondary	-0.002	
	Basic vocational or lower	-0.019***	
Constant		0.978***	0.920***
Observations		299 662	159 506
R-squared		0.116	0.277