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Evaluating the Effectiveness of Social Transfer Policies on Poverty for Children with Previous Experience in Poverty

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Abstract

This paper assesses the effectiveness of social benefit programs on children who had prior experience with poverty across 27 European countries in the years following the Great Recession (2012–2015). Even though social benefit functions might contribute to alleviating child poverty, our findings highlight that child poverty differs not only across social benefit functions, but also between children with and without previous experience in poverty. While living in a country with comparatively high family/children's benefits is associated with lower child poverty risk, these benefits do not significantly prevent children from being poor when they have been in poverty in the past year. By contrast, old-age/survivor benefits appear to be strongly associated with a lower risk of poverty for children with previous experience in poverty. This is particularly noticeable in multigenerational households, especially in countries that provide limited support for families with children and allocate significant expenditure to pension benefits. This finding remains consistent even when using lower poverty thresholds.

Keywords Social benefits · Child poverty · Prior experience in poverty · Family/children's benefits · Old age/survivor benefits

JEL Classification D31 · I32 · I38

Introduction

More than one out of every five children in Europe lived in a situation of monetary poverty prior to the COVID-19 crisis. Even though only a portion of children in monetary poverty in a single year is persistently poor, these children should be a priority for anti-poverty policies given the negative implications that persistent child poverty may entail in the short and long term at both an individual and societal level (Biewen, 2014; Chzhen, 2017; Griggs & Walker, 2008).

In the last decades, numerous studies have complemented the traditional cross-sectional approach to monetary poverty analysis that considers poverty at a moment in time by instead addressing poverty from a longitudinal approach following the same individual over time. This has made it possible to study key aspects in monetary poverty (poverty from now on) analysis such as the drivers and characteristics of individuals that stay in poverty persistently or how long children remain in poverty (see, e.g., Ayllón, 2013, 2015; Biewen, 2014; Chzhen, 2016; Fabrizi & Mussida, 2020; Watson et al., 2018). This approach allows overcoming the limitations of cross-sectional analysis by providing policymakers convenient insight for designing and evaluating alleviation policies, not only those aimed at reducing transitory episodes of poverty, but also those aimed at individuals staying in poverty for consecutive years.

One of the ways public policies may combat child poverty is through social protection policies, which function as devices for redistribution or as insurance. It is widely accepted that cash social transfers play a particularly important role in preventing poverty in the short term

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(Bárcena-Martín et al., 2018; Chzhen, 2016; Diris et al., 2017).[1]

Findings regarding the role of cash social transfers usually rely on cross-sectional data and address child poverty at a given moment. Nevertheless, to evaluate the effectiveness of social transfer policies on child poverty over several consecutive years, longitudinal analyses can provide policymakers valuable information. This research enters at this point. Specifically, it addresses the short-term feedback effect of child poverty, that is, the extent to which having experienced poverty is significantly associated with the likelihood that a child will be in poverty in the next year and examines the effectiveness of social transfer policies in reducing this short-term feedback effect in 27 European countries. To this end, the European Union Statistics on Income and Living Conditions (EU-SILC) longitudinal microdata for the years following the Great Recession have been used, namely, the period 2012–2015. The aim is to obtain lessons for future periods of economic downturns when the feedback effect of child poverty tends to be a greater social problem.

Given that the redistributive outcomes of social benefits systems depend on numerous individual and contextual factors, we take advantage of a multilevel model and simultaneously consider sociodemographic characteristics of households and a set of country-level variables, which include the main social protection functions. We rely on the methodological approach of Wooldridge (2005), who proposed a correlated random effects probit model to deal with the problem of endogeneity of the initial conditions while controlling for unobserved heterogeneity (differences between individuals that are associated with the variable of interest).

The remainder of the article proceeds as follows. Next section reviews the literature and establishes the research hypotheses. Then, the following section describes the data and explanatory variables. Then, methodology is explained and then the results are presented and discussed the results. Finally, conclusion remarks and policy implications are provided.

Background and Hypotheses

In recent decades, empirical studies on poverty that track the same individual over time (poverty dynamics) have grown in number due to the increasing availability of longitudinal data (Addison et al., 2009; Ayllón, 2013, 2015; Bárcena-Martín & Cowell, 2006; Biewen, 2014; Cappellari & Jenkins, 2004;

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[1] Obviously, cash social transfers are not the only way to combat short-term child monetary poverty. In-kind benefits (public spending on services for families with children, including childcare, public childcare support, assistance, family services, and home help) or income and VAT taxation are other alternatives through the transfer tax system. However, this is beyond the scope of this article.

Jenkins, 2011; Chzhen, 2016; Fabrizi & Mussida, 2020). These studies typically examine a single country or a limited number of countries. However, works that simultaneously address a considerable group of countries in the analysis of child poverty dynamics are less common. Pioneering comparative analyses have been performed by Bradbury et al. (2001), Duncan et al. (1993) and Jenkins and Schluter (2003). More recently, Chzhen et al. (2016) examined child poverty dynamics in the EU during the Great Recession, while Watson et al. (2018) focused on the poverty dynamics of social risk groups.

Child Poverty and the Risk of Remaining in Poverty

From a micro perspective, numerous characteristics related to both the household as a whole and the household head have been found to influence the risk of poverty. As regards households, children whose parents are married and cohabitate are less likely to be poor than children whose parents are divorced or widowed. It has also been shown that children living with younger parents or in households headed by a woman, a lower educated person, or an unemployed person are at greater risk of poverty (Brady et al., 2009; Chen & Corak, 2008; Chzhen & Bradshaw, 2012).

Furthermore, it is well documented that experiencing one year in poverty increases the risk of being poor the following year (Ayllón, 2013, for Spain; Biewen, 2014, for Germany; Cappellari & Jenkins, 2004, for the UK; Devicienti & Poggi, 2011, for Italy; Fusco & Islam, 2012, for Luxembourg), thus highlighting the relevance of longitudinal research from a policy perspective.

The study of child poverty dynamics can inform us about why certain children are poor for one year, while others stay persistently poor over time. There are two main explanations for this. A child can remain in poverty due to observed or unobserved characteristics that persist over time, such as living in a household with little educational training, lack of employment, health problems, or single parents, among others.

A second mechanism for the persistence of child poverty is the so-called genuine state dependence: current poverty per se directly increases the probability of being poor in a future year. That is, there is a direct effect from being poor today to being poor tomorrow. This effect could be due to an incentive mechanism or because falling into poverty triggers processes that make future poverty more likely. Thus, aspects such as the stigmatization associated with receiving social assistance, the reduction of one's social network, and the adverse effect of the loss of hope in returning to a better economic situation—all of which are associated with periods in which the household is below the poverty line—might affect child poverty status (Arranz & Cantó, 2012; Biewen, 2009). In this vein, Ayllón and Gabos (2017),

Biewen (2009) and Devicienti and Poggi (2011), among others, have pointed to a remarkable feedback effect in the overall population that should be considered to obtain unbiased estimates of poverty state dependence.

Our purpose is to analyze to what extent a child living in a poor household in a given year is more likely to live in poverty in the next year. Therefore, the first hypothesis (H1) we test is that poverty today tends to increase the likelihood of a child living in poverty tomorrow. The clue to testing this hypothesis is to untangle which part of this dependence is attributable to previous experience in poverty and which part is attributable to characteristics that lead to being in poverty. The distinction between both has important implications for the design of social policies aimed at combatting economic hardship. Thus, for example, if being in poverty is mostly due to past poverty experiences, income transfers may help individuals to move above the poverty line and break the spiral of poverty.

The Role of Social Transfer Policies in Combating Child Poverty

Previous studies have most often highlighted the crucial role of social transfers in alleviating child poverty (see, e.g., Brady et al., 2009; Marx et al., 2015; Wagle, 2013). Specifically, Kenworthy (1999, 2011) found that each additional percentage point of public transfer expenditures (relative to GDP) helps decrease poverty by three-quarters of a percentage point in high-income countries.

Evidence supports the thesis that social protection is an instrument to address poverty by transferring resources to the most vulnerable. The literature on child poverty usually focuses on the role of benefits that specifically target working-age families or families with children. Thus, especially in periods of economic downturn, the expenditures accruing to working-age individuals and their families are known to function as automatic stabilizers by (partially) compensating for their lost market income. In principle, increased spending on other types of benefits not intended for families with children will only contribute to reducing child poverty if these benefits end up in households with children. Therefore, despite the quantitative importance of old-age benefits, their role is usually neglected as irrelevant to combating child poverty since such benefits are targeted particularly at the elderly. Nonetheless, two potential direct offsetting impacts of old-age benefits on child poverty have been identified in the literature (Diris et al., 2017). On the one hand, increased spending on old-age benefits can increase child poverty since these benefits are predominantly distributed to households without children. Consequently, this raises the poverty line more than children's income and results in increased poverty. On the other hand, given that there are extended families in which grandparents live with grandchildren (multigenerational households with at least three generations), an increase in old-age benefits may end up benefiting households with children and reduce the risk of poverty of these households. Studies from different points of view (Diris et al., 2017) have indicated that at least a significant share of the extra pension income brought into multigenerational households is used for the benefit of children. Given that some countries distribute relatively little non-pension transfers to children and have comparatively large pension spending, one way to protect against income poverty is the formation of multigenerational households. Hence, household structure becomes an important driver not only of the structure of social spending, but its impact on child poverty as well.

Thus, there is evidence that social benefits targeted at families with children reduce child poverty and that others not targeted at children, such as old-age benefits, might also play a certain role. In this article, we go a step further to gain a better understanding of the effect of social transfers in a longitudinal setting by tracking the same child over time. We inquire as to whether benefits are only associated with contemporary poverty or also with children that were in poverty in the previous year. For households with children that were poor in the last year to move above the poverty line, it is necessary that sufficient benefits end up reaching them. Therefore, although benefits targeted at children that strengthen family stability and facilitate the work-family balance should also reduce staying in poverty for several consecutive years, in practice both the generosity and the targeting of benefits are crucial factors (see, Bárcena-Martín et al., 2018). In the case of pensions, the key way these benefits can reduce the feedback effect of child poverty is through multigenerational households. Indeed, such households might function as a mechanism to prevent children from being poor when they have been in poverty previously, especially in countries where pro-children transfers are low compared to pension expenditure.

This study constitutes a first attempt to explicitly analyze the role of social benefits in reducing the effect of experiencing poverty today on the likelihood of being poor tomorrow among children or the short-term feedback effect. In line with Bárcena-Martín et al. (2017), our analysis focuses on the specific role of each benefit function (family/children, housing and social exclusion, sickness/healthcare and disability, unemployment, and old age/survivors). To this end, Hypothesis 2 (H2) tests the effectiveness of each social benefit function separately in reducing the risk of child poverty for those that have been in poverty in the previous year.

Testing this hypothesis is particularly important as the findings can help policymakers identify which specific benefit functions contribute to preventing children from staying in poverty year after year.

Data and Explanatory Variables

Data

Poverty is not a fixed condition, but a complex phenomenon that develops over time. To study child poverty from a longitudinal standpoint across European countries, we use the longitudinal component of the EU-SILC 2012–2015 microdata for 27 European countries (EU-27, except Croatia, Germany, Malta, and Sweden, plus Iceland, Norway, the United Kingdom, and Switzerland) and country-level data from statistics collected by Eurostat for the countries included in the analysis.

The EU-SILC aims at collecting timely and comparable cross-sectional and longitudinal multidimensional microdata on income, poverty, social exclusion, and living conditions and is the main source of information on living standards in the EU. The EU-SILC is a rotating panel study in which individuals are interviewed for a maximum of four years in most countries.[2] This brief observation period does not allow the use of modelling frameworks, such as hazard rate models, which are appropriate for studying the duration and recurrence of poverty spells. Despite the drawbacks of the EU-SILC database due to the short observation period, it has been used by several authors to examine poverty from a longitudinal approach (Chzhen, 2016; Fabrizi & Mussida, 2020; Jenkins & Van Kerm, 2011, 2014; Polin & Raitano, 2014; Van Kerm & Pi Alperin, 2013;).

We have pooled all the possible transitions together from all the EU-SILC waves from 2012 to 2015, thereby increasing the sample size to obtain more reliable results (a similar data pooling method was used in Van Kerm & Pi Alperin, 2013). Year-on-year transitions refer to transitions from 2012 to 2013, from 2013 to 2014, and from 2014 to 2015. In other words, a person present in the data for all four waves can have a total of three 2-year transitions.

In our study, children are defined as those under the age of 18 living in the household unit (Chzhen & Bradshaw, 2012, among others). We keep observations of individuals below the age of 18 with available information in all waves, thus maintaining a balanced panel. Following Eurostat, our poverty measure is based on annual disposable household income, including only cash and not in-kind resources.[3]

Income data correspond to the year prior to the survey for all countries except the United Kingdom (income reference periods refer to the period around the interview with total income converted to annual equivalents) and Ireland (income data refer to 12 months prior to the interview). The analysis pools the data from 27 countries into one merged file that contains 50,397 observations (see Table A1 in the Online Appendix 1 for details on the number of observations by countries). We measure poverty at the household level,[4] so a child is classified as poor if he/she lives in a household with a disposable household equivalent income below 60% of the median equivalent income of the country where the household is located. To adjust household income according to the size of the household, we use the modified OECD equivalence scale, which assigns a weight of 1 to the first member in the household, 0.5 to the rest of the adults, and 0.3 to children below 14 years of age.[5] To measure the change in living standards since the onset of the crisis, the baseline poverty line is held constant by using the poverty line anchored in 2008 following Eurostat's procedure for the EU 2020 strategy.[6] Thus, the poverty line is adjusted for price inflation but not for changes in median incomes, so that "individuals may compare their material circumstances not only with those of the average person in the society in which they live, but also with their own in a previous period" (Matsaganis, 2013, p. 10). Finally, EU-SILC longitudinal weights are used.

Explanatory Variables

We employ different determinants of child poverty, which are divided into micro and contextual variables. The main descriptive statistics are reported in Table 1.

To capture genuine state dependence, we include the lagged poverty status, y_{ict-1}, which takes the value of one if the child was poor in the previous interview and zero

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[2] For a review of the advantages and disadvantages of the EU-SILC for comparing poverty dynamics across countries, see, for example, Iacovou and Lynn (2013), and Jenkins and Van Kerm (2017).

[3] Disposable household income is defined as the sum, for all household members, of gross personal income components plus gross income components at the household level minus regular taxes on wealth and income, social insurance contributions, and regular inter-household transfers paid. As argued by Böheim and Jenkins (2006), the differences in income reference periods are unlikely to be a major

Footnote 3 (continued)

source of non-comparability across countries. Furthermore, Lohmann (2011) noted that the general structure of poverty risk across EU countries is not affected by differences in the data collection approaches of register and survey countries.

[4] Although the poverty measure is constructed at the household level, in the analysis we weight data by the number of children living in each household. Thus, we refer to children and not households with children.

[5] Note that a household in which a child turns 14 would reduce the equivalent income. Nonetheless, this effect is not significant enough since the percentage of households in which children turn 14 and enter or exit poverty is statistically equivalent to the same percentages in the overall sample.

[6] Note that we attempt to evaluate poverty with the living standards at the onset of the economic crisis period. In anchoring the poverty line in 2008, we do not update living standards to the recovery state of each country in 2012, but to the onset of the crisis.

Table 1 Descriptive statistics

		Mean	SD
Micro variables			
Household characteristics			
Lagged poverty (y_{it-1})	1 if the child was poor in the previous interview	0.231	0.422
No. children	Number of children in the household	2.087	1.012
Workers	Proportion of active members of the household that work full time (including employees and self-employed)	0.772	0.318
Self-employed	Proportion of active members of the household that are self-employed	0.14	0.302
Multigenerational	1 if children cohabit with at least one person aged 18 to 64 and at least one person aged 65 or older	0.051	0.221
Lone parent	1 if lone parenthood	0.089	0.285
Disability	1 if person in the household has a chronic disease	0.203	0.402
High density	1 if children cohabit in high density area#	0.310	0.463
Household head* characteristics			
WomanHH	1 if household is headed by a woman	0.162	0.369
YoungHH	1 if head is younger than 30	0.341	0.474
TertiaryHH	1 if head has tertiary education	0.237	0.425
SecondaryHH	1 if head has secondary education	0.384	0.487
Contextual variables			
Country's living standard and labor market			
lnGDP	Logarithm of real GDP per capita** expressed in 10^4 euros per inhabitant with reference year 2005	2.603	1.185
Employment	Proportion of the working age population that is employed	71.615	5.02
Expenditure of social benefit functions***			
Family/children	Family/children benefits	1.962	0.719
Housing/social exclusion	Housing and social exclusion benefits	1.006	0.784
Sickness/disability	Sickness/healthcare and disability benefits	8.97	2.162
Unemployment	Unemployment benefits	1.405	1.005
Old age/survivor	Old-age/survivor benefits	12.375	2.595

#Contiguous grid cells of 1 km^2 with a density of at least 1500 inhabitants per km^2 and a minimum population of 50,000

Source: Authors' calculations based on EU-SILC waves 2012–2015

*The head of the household is the person owning or renting the accommodation. If the accommodation is provided free, the person to whom the accommodation is provided is the responsible person. If two persons share responsibility for the accommodation, the oldest is counted as the head of the household

**GDP per capita is transformed on log scale because increases in income at lower income levels are expected to have greater effects on poverty than at higher income levels

***Expenditure variables refer to the level of spending of each social protection function in cash or in kind measured relative to GDP to ensure comparability across countries and over time. See Table A2 in the Online Appendix 1 for descriptive statistics of the expenditure variables by country

otherwise. In our sample, 16.01% of children, on average, have been in poverty at least two consecutive years during the four-year observation period, but this proportion differs by country (Fig. 1). For instance, Greece and Romania show the highest proportions, while Switzerland, Norway, and Denmark have the lowest.

We consider explanatory variables related to the household as a whole and other factors linked to the household head that affect child poverty dynamics, as well as country-level variables with a potential influence on child poverty from Eurostat (see Table 1 for a description). Given that the analysis of cross-country differences in policy patterns would require considering an itemized analysis of social benefit functions (the five aggregated functions mentioned in Table 1), we introduce the level of expenditure in each social protection function as key variables in the significance of each function across countries and over time. Note that there is considerable variation in countries' spending in relative size in specific functions.[7] Therefore, we focus on expenditure in each social benefit function as an approximation to

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[7] Sickness/healthcare and old-age/survivor benefits account for a greater percentage in all countries, while there is considerable variation in average spending on housing and social exclusion and unem-

Fig. 1 Proportion of children in poverty for at least two consecutive years by country. Eurostat country code used in EU-SILC. Source: Authors' calculations based on EU-SILC waves 2012–2015
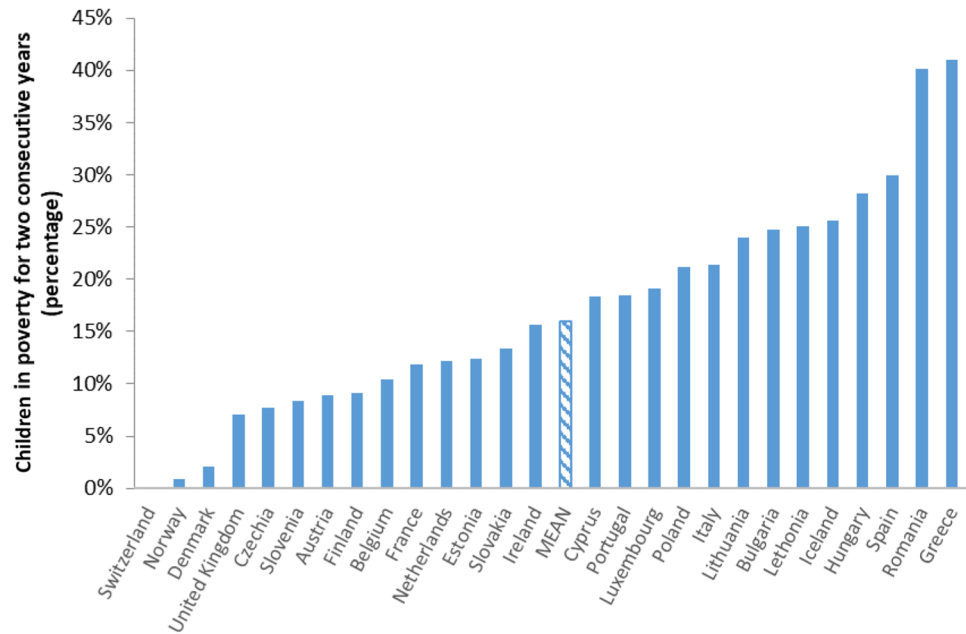
Note: Eurostat country code used in EU-SILC.
Source: Authors' calculations based on EU-SILC waves 2012–2015.

the longitudinal analysis of the effect of the generosity of social benefit functions on child poverty.[8]

Methodology

To study poverty as a dynamic process and track the same child over time, we use the random-effects probit models proposed by Wooldridge (2005), which handles the issues of initial conditions (see Online Appendix 2 for further explanation) in a dynamic, nonlinear, unobserved effect panel data model. This model offers the advantages of flexibility and computational simplicity compared to other alternatives. It allows for the inclusion of strictly exogenous explanatory variables along with a lagged dependent variable, thus leading to more accurate parameter estimates for better estimation and control for endogeneity biases in the presence of unobserved variables. Standard random effects software, such as Stata in our case, can be used to estimate the parameters and average effects.

Table 2 Dynamic multilevel probit model of child poverty (Micro determinants)

	Model (1)
Constant	− 0.944**
Household characteristics	
No. children	0.330**
Workers	− 0.569**
Self-employed	0.178
Multigenerational	0.434*
Lone parent	− 0.084
Disability	− 0.089
High density	− 0.014
Household head's characteristics	
WomanHH	0.372**
YoungHH	0.122
TertiaryHH	− 0.357**
SecondaryHH	− 0.011
Unobserved heterogeneity (child mean values)	Yes
Genuine state dependence: y_{it-1}	0.500**
Initial conditions: y_{ic0}	1.694**
$x_{ic0}^{\#}$	Yes
Year dummies	Yes
Observations	50,397
Number of countries	27

#The initial response for covariates is included to correct for finite sample bias in short panels (Akay, 2012). Results are available upon request from the authors

*p < 0.05; **p < 0.01

Source: Authors' calculations based on EU-SILC waves 2012–2015

However, there are certain aspects to consider regarding Wooldridge's (2005) model. One issue is missing data for both the explanatory and dependent variables for a subject. Two solutions are available: (a) treating each occasion that follows an occasion with missing data as an 'initial' occasion; and (b) only analyzing subjects with data at occasion 0 and discarding all data following an occasion with missing data. Since we are working with a balanced panel, we anticipate no problems under the assumption that data are missing at random. Furthermore, according to Akay (2012), the Wooldridge method tends to produce biased estimates of state dependence for short panels. To mitigate this substantial finite sample bias, Rabe-Hesketh and Skrondal (2013) proposed including initial values of explanatory variables as additional covariates. Akay (2012) found that this solution renders the bias in state dependence negligible. Therefore, this study adopts this solution.

As our main aim is to explain the role of social benefit functions in reducing the effect of current child poverty on child poverty one year on (feedback effect of child poverty) in Europe by combining a macro-to-micro approach, we consider the hierarchical structure of data at three levels: observations for each year (level 1) of the children (level 2) nested into countries (level 3). Thus, our model attempts to capture the effect of explanatory variables that vary both within children and across children over time, as well as across countries and within countries over time. According to the idea that children may be influenced by their social and political context, we might expect that two randomly selected children from the same country will tend to be more highly correlated than two children selected from different countries. Therefore, it is important to account for such unobserved country-level effects. The same reasoning applies to two years for the same children.

One of the main advantages to using mixed or multilevel models is that we gain precision compared to using aggregate (country-level) data only. In addition, such models permit controlling for individual- and country-level influences simultaneously.

Hence, we estimate the dynamic random intercept and slope probit models (see the Online Appendix 2 for a detailed explanation). The latent poverty propensity y_{ict}^* of children i in any country c and year t is specified as:

$$
\begin{aligned}
y_{ict}^* = {}& \gamma_1 y_{ict-1} + \gamma_2 y_{ic0} + \beta_1 x_{ictM} + \beta_2 x_{ic0} \\
& + \alpha_1 \overline{GDP}_c + \alpha_2 \overline{employment}_c \\
& + \alpha_3 GDP_{ctM} + \alpha_{42} employment_{ctM} + \delta_1 Z_{ctM} \\
& + \delta_2 \overline{Z}_c + \delta_3 Z_{ctM} y_{ict-1} + T_m \\
& + \theta_{0c} + \theta_{1c} y_{ict-1} + \varepsilon_{ic} + u_{ict}.
\end{aligned}
\tag{1}
$$

The observed binary poverty status of the individual is defined as:

$$
y_{ict} = \left\{ \begin{array}{ll} 1 & \text{if } y_{ict}^* > 0 \\ 0 & \text{else} \end{array} \right\},
\tag{2}
$$

where y_{ict-1} denotes the individual's poverty status in the previous year (t-1) since latent poverty propensity depends on what the poverty outcome was in the previous period (genuine state dependence); y_{ic0} is the initial response that is incorporated as the solution to the initial conditions problem; x_{ictM} are the micro variables (shown in Table 1) centered in the mean; x_{ic0} are the initial values of the explanatory variables; $lnGDP_{ctM}$, $employment_{ctM}$, and Z_{ctM} denote the logarithm of real GDP per capita, the employment rate, and social benefit expenditure (for each function separately), respectively, which are group-mean centered and capture the longitudinal relationship between poverty and each of these variables (i.e., the effect of variations in social benefit expenditure on the risk of poverty over time within each country); $\overline{GDP}_c$, $\overline{employment}_c$, and $\overline{Z}_c$ capture the effect on y_{ict}^* of average cross-national differences in GDP, employment rate, and social benefit expenditure, respectively (Fairbrother, 2014); $Z_{ctM} y_{ict-1}$ captures the interaction between social benefit expenditure and individual's poverty status in the previous year to assess the role of social benefits in reducing the short-term feedback effect of child poverty; T_m are the time dummy variables that capture the increasing effect of state dependence year by year; θ_{0c} is the random intercept, which represents the differences between countries in child poverty risk; θ_{1c} designates the random slope, which represents the difference in the feedback effect of child poverty across countries since children in different countries are expected to have different feedback effect levels; and $\varepsilon_{ic} \sim N(0, \sigma_\varepsilon^2)$ are individual country-specific effects independent of x_{ictM} and u_{ict} for all i, c, t; and $u_{ict} \sim N(0, 1)$. All residuals are assumed to be independent and to follow normal distributions with zero mean.

To avoid violating the orthogonality condition in random effects models, the correlation of these individual-specific terms with the observed characteristics is treated by assuming a relationship of the form (see, Chamberlain, 1984 and Mundlak, 1978):

$$
\varepsilon_{ic} = a\overline{x_{ic}} + \alpha_{ic},
\tag{3}
$$

where $\overline{x_{ic}}$ is a vector with the time means of explanatory variables for each individual with the exception of intrinsically time-varying variables such as age and $\alpha_{ic} \sim N(0, \sigma_\alpha^2)$ are the individual-specific effects which are independent of x_{ictM} and u_{ict} for all i, c, t.

As is usual in the literature, we use the variance partition coefficient (VPC, see Online Appendix 2) to evaluate the proportion of variance accounted for by higher-level units. To explain differences in the risk of child poverty between European countries, we focus on level-3 VPC, which is the interclass correlation at country level.

We estimate the models in a sequential way. First, we fit Model 1 with only micro-level variables. We then add country-level variables in models 2–7 to check how much of the unexplained variation is due to differences in country-level factors. To start with, Model 2 introduces two basic aggregates referring to the average material well-being of people (measured by GDP per capita) and employment rate. Then, simultaneously controlling for the two previous country-level variables, we introduce each of the five aggregated benefit functions and their interaction with the lagged poverty status in models 3–7. This is done to disentangle the role of each of these functions in reducing the short-term feedback effect of child poverty.

Results

Focusing first on the associations between the micro-level variables and child poverty (see Table 2),[9] it is important to note that there are observable characteristics related to the risk of child poverty. Likewise, some time-averaged variables have been introduced in the model to control for potential correlations with the unobserved individual specific error term. The variables introduced in the estimation with their value for any given year indicate the immediate effect of having a particular characteristic. The estimates are similar across the different models and consistent with previous results in the literature: there is a relationship between households with a greater number of children and the likelihood of a child being poor (positive coefficient), while households with a higher proportion of household members who work full time are inversely associated with a child's likelihood of being poor (negative coefficient). Living in multigenerational households (households in which at least three generations live) tends to be associated with a greater risk of poverty. With respect to the characteristics of the household head, a child living in a household with a female[10] household head is more likely to be poor than one living with a male household head, while living with a tertiary educated household head is related to a lower risk of a child being poor.[11]

Concerning our first hypothesis, we find no evidence to reject H1: poverty today tends to be associated with a higher likelihood of being poor tomorrow among children, even when we control for individual heterogeneity and treat the initial condition problem. Our results confirm the close association between previous experience in poverty and the likelihood of being poor the following year (marginal predicted mean increases of 7.85% in Model 1).

This suggests that the distinction between those who have experienced a poverty event in the previous year and those who have not is highly relevant in policy terms to address situations of both occasional and recurrent poverty. If experiencing poverty consecutively in the years to come is (at least partly) due to genuine state dependence, then it makes sense to force households out of poverty at time t to reduce their likelihood of experiencing poverty in the future. By contrast, if staying in poverty over time is due only to non-genuine state dependence, any policy aimed at breaking the 'vicious circle' via monetary transfers to the poor is pointless: forcing households out of poverty today does not affect their adverse characteristics and hence does not reduce their likelihood of experiencing poverty in subsequent years.

We find that being poor at the base year (y_{ic0}, initial condition) is significant in explaining child poverty. This result is in line with other authors (Andriopoulou & Tsakloglou, 2011; Gradín & Cantó, 2012) and reveals the importance of considering the initial condition problem.

We analyze the VPC in Model 1 (see Table 3) and conclude that 14.9% of the total variance in Model 1 for non-persistently poor children is due to the country-level variance, while this figure is 25.5% for persistently poor children. Therefore, country differences in child poverty risk are greater if we focus on children that have been in poverty in the previous year rather than those without previous experience in poverty. Again, this seems to suggest that for children the relationship between previous experience in poverty and contemporary poverty differs across European

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[9] We first test if there are significant country differences in child poverty in Model 1—likelihood ratio test to compare the multilevel model with a single-level model ($\chi^2 = 1028$; $p = 0.000$)—and conclude that it is convenient to estimate a multilevel model with country effects given the significant country differences in the risk of child poverty. We then test if the effect of previous experience in poverty differs across countries—we test for the convenience of introducing a random coefficient ($\chi^2 = 142$; $p = 0.000$)—and conclude that it varies across countries. Therefore, we estimate a random intercept and random coefficient model. The covariance between the country intercepts and the coefficient on previous experience of poverty is not statistically different from zero, thus indicating that we do not expect countries with higher levels of child poverty to have a stronger feedback effect or the opposite.

[10] Note that the relationship between lone parent households and child poverty is non-significant as it is likely that female household heads and single-parent households are capturing the same effect to some extent.

[11] We perform a Wald test of joint significance of parameters for all time-individual mean variables ($\chi^2 = 329.13$; $p = 0.000$) and verify that without them the estimators would be inconsistent due to the significant correlation between the individual-specific random effects and the explanatory variables. Thus, not controlling for unobserved child heterogeneity would bias the estimation. The Wald test of joint significance of parameters for all the initial values of the variables ($\chi^2 = 29.60$; $p = 0.0010$) verifies that it is convenient to control for these values to reduce the substantial finite sample bias.

Table 3 Dynamic multilevel probit model of child poverty (Country-level determinants)

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
Micro determinants[a]	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country's living standard and labor market							
lnGDP		− 3.177†	− 2.613*	− 2.582	− 4.470**	− 2.802*	− 3.649**
Employment		− 0.201*	− 0.196*	− 0.194*	− 0.122*	− 0.204*	− 0.196**
Expenditure of social benefit functions							
Family/children			− 0.291				
Family/children*lagpoor			0.671				
Housing/social exclusion				0.001			
Housing/social exclusion*lagpoor				1.403*			
Sickness/disability					− 0.170**		
Sickness/disability*lagpoor					− 0.191		
Unemployment						0.032	
Unemployment*lagpoor						0.192	
Old age/survivor							0.119
Old age/survivor*lagpoor							− 0.416**
Unobserved heterogeneity (country mean values)							
Family/children			− 0.375**				
Housing/social exclusion				− 0.113			
Sickness/disability					− 0.127		
Unemployment						− 0.015	
Old age/survivor							− 0.006
Country's living standard		− 0.466**	0.083	− 2.582	0.338	− 0.450*	− 0.476*
Employment		− 0.025	0.002	− 0.194*	− 0.008	− 0.025	− 0.025
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$\sigma^2_{\theta_0}$	0.334**	0.187**	0.247*	0.189**	0.321	0.189**	0.190**
$\sigma^2_{\theta_1}$	0.148	0.129	0.251	0.145	0.225	0.125	0.145
$\sigma^2_{\theta_\alpha}$	0.913**	0.952**	0.431**	0.959**	0.421**	0.953**	0.989**
VPC-level3[b]	0.149	0.087	0.147	0.088	0.184	0.088	0.087
VPC-level3[c]	0.255	0.148	0.349	0.174	0.360	0.150	0.153
Observations	50,397	50,397	50,397	50,397	50,397	50,397	50,397
Number of countries	27	27	27	27	27	27	27

[a]Results for micro determinants are shown in Table A3 in the Online Appendix 1

[b]VPC-level 3 is conditional on zero values of random effects covariates (non-persistent)

[c]VPC-level 3 is conditional on one value of random effects covariates (persistent)

†p < 0.1; *p < 0.05; **p < 0.01

countries, so we proceed to scrutinize different contextual variables that may account for such differences.

Focusing on country-level factors in Table 3, Model 2 introduces GDP per capita and employment rate. Our results indicate that an increase in GDP per capita and the employment rate is strongly associated with lower poverty risk. In fact, when controlling for GDP per capita and employment rate, the VPCs show lower cross-country differences for children with and without previous experience in poverty.

Additionally, Models 3–7 investigate[12] whether social transfers are effective in reducing child poverty and their differential effect over children with and without previous experience in poverty. The results differ remarkably across

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[12] As with child heterogeneity, we find that the Wald test of joint significance of parameters for all time-country mean variables ($\chi^2 = 11.56$; $p = 0.0031$ in Model 2) indicates that not controlling for unobserved country heterogeneity would seriously harm the fit of the model. Therefore, it is necessary to control for unobserved child and country heterogeneity.

social benefit functions.[13] From a cross-sectional perspective (time average variable), the only function that is significantly associated with the risk of child poverty is family/children in the sense that living in a country with a high weighting of family/children's benefits plays a significant role in reducing child poverty risk. As expected, we confirm that social protection expenditure specifically targeted at covering the risks or needs of children, which includes support (except healthcare) to cover costs associated with pregnancy, childbirth, childbearing, and caring for other family members, constitutes a key social benefit function in reducing child poverty across European countries. Nonetheless, we can add to the literature that the longitudinal effect of this function is not significantly different for children with and without previous experience in poverty. That is, family/children's benefits do not play a specific role in reducing the short-term feedback effect of poverty. We speculate that the non-significant effect of these benefits in Europe is driven by the fact that they are not strongly targeted at poor individuals or, more specifically, that such benefits are not strongly oriented to individuals that stay poor recurrently; or if they are, they are not generous enough to move children over the poverty line.

In relation to other types of social transfers not targeted particularly at children, no cross-sectional (time average) relationship is significant. Longitudinally, however, there are differences. Children living in countries where spending on sickness/healthcare and disability benefits is high are at a lower risk of being poor, and there is no differential effect for children with previous experience in poverty. Unemployment benefits exert no significant longitudinal influence on the risk of poverty; hence, there is no difference for those persistently in poverty. The longitudinal effect of housing and social exclusion benefits is non-significant for children without previous experience in poverty. Indeed, these benefits do not help combat poverty and can even exert the contrary effect over the feedback from past poverty experiences to current poverty situations among children. Finally, our main finding is that old-age/survivor benefits are strongly associated with a lower risk of poverty, but only for children with previous experience in poverty.

Regarding pensions and their role in mitigating child poverty, Diris et al. (2017) referred to two opposing forces of pensions, as explained in the Background and hypotheses section. First, increases in overall pension spending weaken the relative income position of children. Second, an increase in pensions may end up benefiting households with children and reduce their risk of poverty. The relative importance of each effect largely depends on the prevalence of multigenerational households. We find slight evidence of the first

force, as old-age/survivor benefits display a non-significant direct (positive coefficient) relationship with contemporary poverty among children without previous experience in poverty. Conversely, we observe stronger evidence of the second force, as this type of social benefit function is closely associated with lower levels of poverty among children with previous experience of poverty. This is consistent with Verbist et al. (2020), who emphasized that financial solidarity between generations in multigenerational households strongly favors children and is less beneficial for the elderly, so it may reduce child poverty.[14]

In any event, a deeper analysis of the role of old-age/survivor benefits seems necessary. Table A4 in the Online Appendix 1 shows the results when splitting the sample into countries with a high and low prevalence of multigenerational households. This allows us to conclude (with caution given the small number of countries in each group) that in countries with a low prevalence of multigenerational households, increased spending on old-age/survivor benefits seems to be associated with a higher risk of poverty among children (crowding-out effect on other social benefits). However, no significant relationship was found for children with previous experience in poverty. This could be explained by the fact that old-age/survivor benefits in these countries are predominantly distributed among households without children. On the other hand, in countries with a high prevalence of multigenerational households, increased spending on old-age/survivor benefits does not seem to be related to children's risk of poverty, while it is significantly related to the risk of poverty for children with previous experience in poverty. This suggests that the presence of multigenerational households is the key mechanism through which old-age/survivor benefits are associated with lower levels of feedback effect of child poverty.

In short, we find no evidence to support our second hypothesis, H2, that benefits prevent the short-term feedback effect of poverty, except for old-age/survivor benefits, particularly in countries with a high prevalence of multigenerational households. This highlights the relevance of children's relative income position when analyzing the relationship between benefits and child poverty (see Bárcena-Martín et al., 2018 and Diris et al., 2017).

Lastly, we should highlight that the differences between countries in child poverty risk (VPC) remain with respect to Model 2 (see Table 3) when we introduce social transfers in

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[13] Note that our main findings are not related to the level of benefit expenditure. Benefit functions with a higher level of expenditure do not necessarily exert the largest effect on child poverty (Table 1).

[14] Results remain consistent for the 40%, 50%, and 60% poverty lines. Notwithstanding, the support provided by old-age/survivor benefits vanishes as the poverty line increases. We posit that this outcome is attributable to old-age/survivor benefits not being sufficiently high to lift children in multigenerational households out of poverty when the poverty lines are more stringent, such as those set at 65% or 70% of the median equivalized household income. Results available from the authors upon request.

most of the models. This seems to indicate that variables of this type do not help to sufficiently explain this variability. In other words, even though some social benefit functions are associated with reductions in current child poverty risk, social transfers are not fully determining factors to explain the variance between countries in terms of this risk.[15]

Conclusions

This study employs a longitudinal multilevel approach to examine how social benefits contribute to reducing the short-term feedback effect of poverty among children in European countries in the context of the years following the Great Recession. Our results confirm that social benefit functions—both those targeted at children and those not explicitly targeted at children—might contribute to alleviating child poverty. However, it differs not only across social benefit functions, but also between children with and without previous experience in poverty. This latter insight is a novelty in the literature, as it indicates that the effectiveness of social transfers in combatting child poverty at a given moment does not always coincide with their effectiveness in preventing children with previous experience in poverty from remaining below the poverty threshold year after year.

Living in a country in which family/children's benefits are comparatively high is associated with lower child poverty risk. Nevertheless, these social benefits do not seem to specifically favor children with previous experience in poverty. This result may be driven by the fact that family/children's benefits are not strongly targeted towards poor individuals, disregard the occasional or persistent character of poverty, or are not generous enough to move children experiencing poverty over the poverty line. This suggests that the ambition to reduce the short-term feedback effect of child poverty would require revising the targeting towards poor children and the generosity level of family/children's benefits taking into account, contrary to current practices, previous experiences in poverty among children.

As regards other social benefit functions, living in countries where expenditure on old-age/survivor benefits is higher seems to be associated with a lower feedback effect of child poverty. This finding is consistent with previous studies concluding that multigenerational living arrangements may be regarded in certain contexts as a means to provide a safety net for some, especially children. Our approach, however, allows us to go a step further, as it shows that old-age/survivor benefits are particularly beneficial for children with previous experience in poverty rather than those suffering specific drops in disposable household income at certain times. This ratifies the role of this benefit function as a family safety net for children persistently in poverty, even though the benefits are not intended for children. This conclusion seems to be determined by the presence of multigenerational households, which are mainly found in countries with comparatively low family/children's benefits and high pension expenditure.

These insights allow us to draw lessons for future periods of economic downturns in European countries when increases in the feedback effect of child poverty are expected. The challenge is to ensure that children spend the least possible time in poverty given the multiple, adverse short- and long-term consequences of poverty at both the individual and societal levels. Social benefits systems may also have a significant contribution to make beyond, for instance, programs focused on job retention and skills training or targeted at increasing parental labor market income to help protect families during weak economic times. Nevertheless, social transfer policies targeted at children have failed to prevent children living in poor households from remaining in poverty. In this context, it appears crucial to distinguish between poverty in a specific year (occasional poverty) and recurrent poverty based on longitudinal analyses when developing anti-poverty strategies. A key lesson to combat the effects of future crises on child poverty persistence is that although family/children's benefits schemes may be effective in reducing occasional child poverty, we should not trust these benefits to prevent a large number of children from remaining in poverty in the following years. Thus, it may be pertinent to revisit the debate on the effectiveness of social transfer policies to combat child poverty from a dynamic perspective. Apart from the widely discussed issues in the literature such as the controversy between targeted versus universal benefits, it seems relevant to rely on longitudinal approaches to evaluate the design of social benefits such as family/children's benefits not only in terms of occasional poverty reduction, but also to tackle the problem of the feedback effect of child poverty.

Some limitations of our analysis should be noted. Firstly, it may be suitable to include additional control country-level time-varying variables in our models to capture other potential significant changes in economic variables, as well as other social and political aspects susceptible to changes in the short term. However, due to the methodological restrictions on including a higher number of country-level variables in our models, we have been forced to limit them. For

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[15] To delve further into the factors that may be associated with which countries are characterized by higher vs. lower child poverty rates and higher vs. lower inter-year correlations in child poverty, we performed a robustness check in Model 2. We conclude that population characteristics (in aggregated terms), such as the age dependency ratio and the proportion of tertiary educated population, seem to have no association with the level of child poverty rate nor with the experience of poverty in the previous year. In terms of economic policies, however, high levels of economic freedom seem to be associated with lower levels of child poverty risk and lower levels of inter-year correlation in child poverty.

this reason, we have focused on the evolution of two key macro variables such as GDP per capita and employment. Secondly, further data and analysis would be required to explore the direct and indirect mechanisms through which social protection policies may reduce both occasional and persistent poverty. Expenditures on social benefits do not fully capture qualitative differences in policy design (targeted versus universal eligibility, the specific mix of social protection measures, or the nature of social transfers). This limitation hinders our understanding of the variation in specific policy structures and experiences. Additionally, the brief observation period during which individuals are followed in the EU-SILC limits the possibilities for more comprehensive analysis, which could provide valuable insights into the duration and recurrence of poverty episodes. However, our analysis contributes to a more nuanced understanding by presenting a comprehensive overview of a government's intentions and efforts to combat both child poverty and its feedback effect.

Declarations

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