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Children in jobless households across Europe: Evidence on the association with medium- and long-term outcomes

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Abstract

The proportion of children living in a jobless household is a key indicator of social exclusion across Europe. Yet there is little existing evidence on the extent to which this measure of childhood deprivation is associated with later life outcomes. We use two harmonised cross-national data sources, the European Survey of Income and Living Conditions (EU-SILC) from 2011 and the Programme for International Student Attainment (PISA) from 2012, to address this question. We consider the association between children experiencing jobless households and three medium- and long-term outcomes: education, adult worklessness and adult poverty. We find evidence of large penalties to experiencing a jobless household in childhood across all three outcomes in some countries while in other countries there is no longer-term consequences of this indicator of social exclusion. Countries with high levels of children in jobless households such as the UK, Belgium and Ireland typically have more severe penalties for the medium- and longer-term outcomes of those children, although this varies by gender. This research suggests that this is a powerful measure of social exclusion, predicting severely limited life chances for the next generation.

JEL codes: J62, J64, I32, I24

Keywords: PISA; Worklessness; Joblessness; Poverty; Intergenerational mobility; Education inequality

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1. Introduction

Previously, in the era of the male breadwinner, the male employment rate gave a good indication of the proportion of households without an employed member. However, since the 1980s there have been growing differences between individual- and household-level joblessness both within countries (Gregg and Wadsworth, 1996, 1998, 2008; Corluy and Vandenbroucke, 2015; O’Rorke, 2016) and across countries (Gregg et al., 2010; Corluy and Vandenbroucke, 2013; OECD, 1998). This diversion can be summarised by an increasing proportion of households without an earner over the 1980s and 1990s, despite individual level employment rates remaining stable during this period. This reflected both changes in family structure and employment polarisation at the household level, with increasing numbers of dual earner and no earner households.

From 2000, the proportion of people living in a jobless household became a key indicator of poverty and social exclusion used by the European Union. Since 2005, this measure has been extended to consider the proportion of children (0-17 year olds) living in such households. Eurostat, the statistical agency that collects these data, state that experiencing a jobless household during childhood ‘increases the risk of intergenerational transmission of poverty’. This is due to the likely impact on their access to health, housing, education, justice and other private services such as culture, sport and leisure, as well as a lack of role models (Eurostat, 2005). Therefore, experiencing a jobless household in childhood is viewed as a marker of disadvantage with potential long-term effects on those children.

The evidence for such adverse outcomes has been limited to date. Primarily, work on children in jobless households has considered contemporaneous outcomes such as poverty (Corluy and Vandenbroucke, 2015; Gradin et al., 2014; Nickell, 2004) and, to a lesser extent, early child outcomes such as wellbeing (Pedersen et al., 2005) and measures of cognition and behavioural issues (Schoon et al., 2012). There has also been a limited number of studies considering outcomes later in childhood and into adulthood (Schoon, 2014; McLanahan and Sandefur, 1994). The first objective of this paper is to provide new evidence across European countries on the extent of the association between experiencing a jobless household in childhood and three medium- and long-term outcomes: education, adult employment and adult poverty.

In doing so, it explores the intergenerational transmission of disadvantage across countries for the first time, where family joblessness in childhood acts as a marker of childhood disadvantage. Research on intergenerational transmissions has a long history, including work by sociologists on intergenerational class mobility since the 1960s (Blau and Duncan, 1967; Erikson and Goldthorpe, 1992, 2010) and more recently, by economists on the intergenerational persistence of income (Solon, 1992, 1999; Chetty et al., 2014a, 2014b; Jäntti et al., 2006; Gregg et al., 2016). Almost all of these studies consider intergenerational associations at the population mean. However, there have been a few studies that assess the extent to which deprivation or disadvantage is associated across generations. See for example, Macmillan (2014), Ekhaugen (2009), and O'Neill and Sweetman (1998), which consider intergenerational worklessness. Blanden and Gibbons (2006), Corak (2004) and Jenkins and Seidler (2007) present evidence on the intergenerational transmission of poverty. Our study also speaks to this literature.

Models of intergenerational transmissions put human capital at the forefront of mechanisms that drive associations across generations (Becker and Tomes, 1986; Solon, 2004; Duncan and Hodge, 1963). The relationship between parental socio-economic status and children's educational attainment is therefore central to intergenerational associations (Blanden et al., 2007). The association between experiencing a jobless household and children's educational attainment is therefore informative, both directly in terms of the educational penalties associated with growing up in a jobless household, and indirectly in terms of the future consequences of this for later outcomes.

This paper contributes to these literatures by describing the extent of the intergenerational transmission of disadvantage into the labour market, adult poverty and educational attainment across Europe for the first time. We use two harmonised data sources, the European Survey of Income and Living Conditions (EU-SILC) and the Programme for International Student Attainment (PISA). Whilst the measurement of disadvantage in childhood is not complete, being limited to parental employment, or more specifically experiencing a jobless household in adolescence, the data has other advantages. In particular, by using harmonised data, our key variables are defined and measured in the same way across countries. This is key to our goal of providing the first piece of international comparative evidence on this issue.

We make considerable efforts to validate the data on childhood exposure to household joblessness across both data sources through comparisons with contemporaneous data. We also use both data sources to cross-validate the strength of our evidence across outcomes. Specifically, we ask whether countries with higher levels of intergenerational joblessness, and greater associations between childhood household joblessness and adult poverty, also have stronger associations between childhood household joblessness and education. If there is an association between countries across two separate data sources and three different outcomes, this offers compelling evidence that some countries have more severe longer-term penalties associated with experiencing a jobless household in childhood than others. Critically, such a result would also indicate that a key Eurostat measure of social exclusion has different implications within different European settings.

We find significant differences between countries in the extent to which they produce associations between household joblessness in childhood and adult joblessness, poverty, and education. Belgium, Ireland and the UK stand out as countries with consistently strong associations across all three domains. France and Italy follow these countries in having widespread evidence of adult disadvantage being associated with being a teenager in a jobless household. The Netherlands, Denmark and Finland are at the other extreme, with less adverse outcomes. Germany unusually shows among the worst outcomes for men but not women.

Across countries we find a marked correlation for males ($\rho = 0.47$) between intergenerational joblessness in the EU-SILC and lower educational outcomes of those living in jobless households in their teens in PISA. Similarly, when focusing on poverty as the adult outcome, a more moderate correlation is again found for males ($\rho = 0.35$). For women, the evidence of experiencing a jobless household as a teenager across multiple domains of adult disadvantage in the same countries is less marked. We discuss potential explanations for this finding, including the greater variety of options open to women on leaving full time education.

The paper proceeds as follows. Section 2 reviews the literature on jobless households and intergenerational transmission of disadvantages. Section 3 describes the data and our empirical methodology. We present our main results in

section 4, with conclusions and suggested directions for future research following in section 5.

2. Related literature

Since the mid-1990s, there has been an increasing focus on the dispersion of joblessness between individuals and households. This literature began in the UK (Gregg and Wadsworth, 1996, 1998; Gregg et al., 1999), where the growth of jobless households, and in particular children living in jobless households, was evident even with stable individual employment rates. The issue has since spread across Europe (OECD, 1998; Gregg et al., 2010; Corluy and Vandenbroucke, 2013; Gradin et al., 2014). The initial focus was on household employment for all working age households, with the issue having greater attention in Belgium (Corluy and Vandenbroucke, 2015) Ireland (O'Rourke, 2016) and the UK (Gregg and Wadsworth 1996, 1998), where jobless households were most common.⁵ Children growing up in jobless households received more attention somewhat later, with Eurostat starting to publish data in 2005. Recent figures show that Belgium, Ireland and the UK all had high rates of children in jobless households in 2015, while Finland, Netherlands and Portugal had the lowest rates. Spain and Greece have experienced large increases in the proportion of children living in jobless households since the Great Recession (Eurostat, 2015).⁶

Most of the literature in this area has focused upon the drivers of jobless households, discussing the relative roles of changing household structures and the distribution of joblessness across households, known as polarisation, in this process. Over the period 1995-2008, Corluy and Vandenbroucke (2013) found that improving employment rates had a bigger overall influence on jobless household rates than changing household structures, which were pushing the other way. However, the main source of divergence between household and individual employment rates was increasing employment polarisation in almost every country.⁷

The other, more limited focus of this literature, has assessed the implications of household joblessness on families and children, though this focus has rarely gone

⁵ <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> accessed 28/10/16, 13:20.

⁶ <http://ec.europa.eu/eurostat/web/products-datasets/-/tps00181> accessed 29/10/16, 13.05.

⁷ With the exception of the UK where policies explicitly targeted this issue over the New Labour period.

beyond childhood poverty (Corluy and Vandenbroucke, 2015; Gradin et al., 2014; Nickell, 2004). Household joblessness have been shown to be a significant predictor of poverty (Gradin et al., 2014) while aggregate individual-based unemployment measures have little or no association with poverty (OECD, 2001).

A few studies have widened the focus with Pedersen et al. (2005) looking across Nordic countries to show that parental joblessness in childhood is associated with lower well-being in childhood. Schoon et al. (2012) and Parsons et al. (2014) use longitudinal data from the UK to show that parental joblessness is also associated with lower cognitive and behavioural scores at age five and seven. Schoon (2014) considers the association between jobless households and NEET status age 16-20. There is also a wider literature on the impact of parental job loss on child outcomes, although this literature typically considers the impact of father's job loss on educational outcomes in a given setting (Rege et al., 2007; Stevens and Schaller, 2011; Gregg et al., 2012).

There is, to our knowledge, no literature to date that considers the association between children's experiences of jobless households and longer-term adult outcomes across countries. There is, however, a large related literature on the intergenerational persistence of education, social class and incomes (see for example Blau and Duncan, 1967; Erikson and Goldthorpe, 1992, 2010; Solon, 1992, 1999; Chetty et al., 2014a, 2014b; Jäntti et al., 2006; and Gregg et al., 2016). This literature is predominantly assessing persistence for all members of society rather than having a specific focus on the intergenerational persistence of disadvantage. Black and Devereaux (2011), in their survey of the economic literature, note that this research has also spread into other domains such as specific occupations, IQ, health, education and welfare receipt. There is a more limited literature on intergenerational worklessness, focusing on the association between fathers' worklessness and sons' adult workless experiences within a given country (Macmillan, 2014 for UK; Ekhaugen, 2009 for Norway).

There is also a limited literature on intergenerational poverty, to which this research contributes. In the UK, Blanden and Gibbons (2006) highlight the issue using the national birth cohort studies, while Corak (2004) looks across a range of developed countries and Jenkins and Seidler (2007) provide a review of country-specific

studies. These studies typically focus on measures of poverty, rather than household joblessness, in the first generation. Nevertheless, if we think of growing up in a jobless household as a marker for sustained childhood deprivation, then the approaches are clearly related.

3. Empirical Methodology and Data

The two main data sources used in this analysis are the European Survey of Income and Living Conditions (EU-SILC) and the Programme for International Student Attainment (PISA). We use the EU-SILC to measure: (i) intergenerational worklessness (the association between living in a jobless household at 14 and adult worklessness) and (ii) the association between living in a jobless household at 14 and adult poverty. We then measure the association between experiencing a jobless household at 15 and educational attainment using PISA. Finally, we consider the association between the EU-SILC and PISA results. Our empirical approach therefore proceeds in the three stages described below. These two data sources cover a wide range of countries, though we focus upon the 24 European nations common to both.

Stage 1: EU-SILC analysis

We begin by estimating a series of intergenerational models using EU-SILC, capturing the association of joblessness between parents and their offspring. Specifically, we estimate the following probit model of how worklessness in the second generation ($w_{i,t}$) is associated with experiencing a jobless household in the first generation ($w_{i,t-1}$) across all countries (K.)

$$F(w_{itk}) = \Phi(\alpha_k + \beta_k w_{i,t-1,k} + C_{itk}) \nabla K, \quad (1)$$

Where:

w_{itk} = Whether the second-generation (offspring) is defined as working (0) or workless (1)

$w_{i,t-1,k}$ = Whether the second-generation lived in a working (0) or jobless household at 14 (1)

C_{itk} = A vector of controls, including immigration status and age

Φ = Cumulative standard normal distribution for the probit model.

i = Individual i

t = Refers to the *second* generation (and $t-1$ to the first generation)

∇K = Denotes that all models are estimated separately for each country.

The parameter of interest from model (1) is: $\frac{\partial F}{\partial w_{i,t-1,k}} = \hat{\beta} \phi(\alpha_k + \beta_k w_{i,t-1,k} + C_{itk})$ -

the marginal effect or the difference in the probability of the second-generation being workless, depending upon whether they lived in a jobless household at age 14, holding all other values constant at their mean.

In our second set of models, we consider the association between jobless households in the first generation ($w_{i,t-1}$) and adult poverty in the second generation, where:

p_{itk} = Whether the equivalised household income of the second-generation (offspring) is defined as above the at-risk-of-poverty threshold (0) or at or below the at-risk-of-poverty-threshold (1).

$$F(p_{itk}) = \Phi(\alpha_k + \tau_k w_{i,t-1,k} + C_{itk}) \nabla K, \quad (2)$$

The parameter of interest from model (2) is again the marginal effect, $\frac{\partial F}{\partial w_{i,t-1,k}} = \hat{\tau} \phi(\alpha_k + \tau_k w_{i,t-1,k} + C_{itk})$, or the difference in the probability of the second-generation being in poverty, depending upon whether they lived in a jobless household at age 14, holding all other values constant at their mean.

Our EU-SILC analysis draws upon the cross-sectional sample from 2011, which included an additional intergenerational module. In this survey, respondents were asked to recall from their childhood questions about their parents. Measures of joblessness in the parents' generation (who were typically born around 1937-1957) are based on the main activity status of parents in the household when the survey respondent was 14 years old. Each parent present in the household is defined as jobless if their main activity status when the respondent was 14 was unemployed,

fulfilling domestic tasks and care responsibilities or other inactive. Those in employment or self-employment are defined as employed. Studies of jobless households commonly combine ILO defined measures of unemployment with other forms of worklessness to capture a broader population of households without an earner.

The recall-based nature of the childhood experience is likely to increase measurement error in the EU-SILC data. However, it is also likely to be focused on sustained rather than transitory joblessness. Hence the data are likely to capture sustained childhood disadvantage. Given potential issues with recall bias for the measure of parental joblessness for the first generation, reported workless rates for fathers and mothers are compared to workless rates for each country from OECD Labour Force Statistics over similar time periods. Information on the birth date of the respondent was used to calculate the year in which the survey respondent turned 14. The reported workless rates for each country in these given years was then compared to the workless rate calculated as $(1 - \text{employment to population ratio})$ from national statistics for individuals age 40-44 (average age of fathers when the respondent was 14 is 43 and the average age of mothers is 41). Given the small sample sizes in the EU-SILC, averages are calculated over a ten-year period from 1971-1980, 1981-1990 and 1991-2000. Historical labour force data is only available for a small sub-sample of countries ($n=5$) in the 1970s, a larger sub-sample in the 1980s ($n=16$) and the full set in the 1990s ($n=24$).

While comparisons of workless rates in the 1970s were poor (correlation 0.189 for fathers), Figure 1 shows that comparisons of workless rates across sources were greatly improved for those reporting about their parents' main activity status in the 1980s. The upper graph illustrates a strong positive relationship between father's worklessness in the EU-SILC and male workless rates in the OECD LFS with a correlation of 0.717 for the 16 countries available. For mothers and women in the second panel this is even stronger, with a correlation of 0.971.

For the 1990s, there was a correlation of 0.627 for EU-SILC fathers and OECD men for the original 16 countries where data was also available in the 1980s. In addition to these 16 countries, information on workless rates are also available for 8 additional countries (typically 'newer' Eastern European nations) during the 1990s.

When these are included, the correlation is weaker at 0.416 (see Appendix Figure A1). This is concerning given that it would be expected that the reporting of parents' activity status in more recent years might be more strongly correlated with national statistics. This could be reflecting the nature of the economies in former Soviet Union countries, which experienced near-full employment under communist rule. The concept of a jobless household in the first generation in these countries is therefore not as clear. Given this concern, the main results presented in section 4 will focus upon the subset of 16 countries with more historical data available. The key motivation for restricting attention to this subset of 16 countries is that we believe the reporting of parents' workless status to be far more reliable. Nevertheless, for completeness, the results for the other eight nations are included in all results tables and will be briefly discussed when presenting the results.

We define the first generation as a jobless household if:

(a) The respondent reported living with both parents and both were jobless at age 14

or

(b) If the respondent reported living with just the mother or just the father and that parent was jobless at age 14.

This will therefore measure a persistent workless experience for the first generation. The first column of Table 1 summarises the average level of workless households across countries; consistent with previous literature in this area, the UK, Belgium and Ireland have the highest proportion of jobless households while Norway, Greece and Denmark have a lower proportion of jobless households at age 14. As noted by OECD (1998) there is much less variation across countries in household measures of joblessness compared to individual measures of joblessness (as seen in Figure 1, although women rather than men predominantly drive the variation in individual-level measures).

There is a fair amount of variation across countries in terms of lone parent households (see Panel A of Appendix Figure A2), and these households have a higher risk of being categorised as jobless based on this measures as it only takes one jobless parent to create a jobless household compared to both in a two-parent

family. The literature on jobless households explicitly considers the role of different family structures in explaining the differential rates of jobless households across countries and finds that this is a second-order issue, with differences in polarisation of employment driving the majority of the differences across countries (Gregg et al., 2010; Corluy and Vanderbroucke, 2013). Here, for space reasons, we do not explicitly draw out the picture for lone parent families separately, but they are included in the samples as a whole.

The second generation, typically born around 1965 to 1985, is defined as workless if they spend the entire 12-month reference period of the survey⁸ out of work. The respondent is asked about their main activity in each month of the reference period, with priority given to economic activity if a similar time is spent in two activities in the same month. Worklessness is defined as either unemployment, disabled and / or unfit to work, fulfilling domestic tasks and care responsibilities or other inactivity reported as the main activity status for each month. Those reporting any employment or self-employment within the 12-month period as their main activity status are assigned as employed. We are therefore also measuring a persistent spell of worklessness in EU-SILC in the second generation and sustained disadvantage in both generations. We again compare male and female respondents, sons and daughters for the purpose of this analysis, from the EU-SILC to men and women from the OECD LFS from 2011, finding strong correlations between the workless rates across surveys ($p=0.897$ for men and $p=0.970$ for women).⁹

Adult poverty in the second generation is defined based on the survey respondents' equivalised disposable household income (after transfers) over the 12-month reference period of the survey. Disposable household income (after transfers) is equivalised based on the number of adults and number of children present in the household with the OECD-modified scale used where adults are weighted by 0.5 and children by 0.3 (see Mack and Lange, 2015, for full details). The country-level median equivalised disposable income (weighted using adjusted personal weights) is used to create an at-risk-of-poverty threshold (ARPT), which is defined here, as

⁸ Typically a fixed 12 month period such as the previous calendar or tax year or the 12 months preceding the survey

⁹ Results available on request. These correlations also find no evidence of lower employment rates for survey respondents in EU-SILC compared to LFS in Ireland as found in Watson et al. (2015). Their focus is on calculating jobless household rates for survey respondents while we calculate jobless households of parents.

standard, at 60 per cent of the median country-level value. Adult poverty is then defined as 1 for those with equivalised disposable household incomes at or below the ARPT in their country and 0 for those above this threshold. When comparing the share of the population defined as at-risk-of-poverty for each of the 16 countries from our main analysis to national statistics from 2011 from the Office of National Statistics and Eurostat, based on the same data we find a very high correlation between the population and national statistics ($\rho = 0.93$). For our final sample, restricting to those with a response to the intergenerational unit and age 25-54, there is a strong, albeit slightly weaker correlation ($\rho=0.82$).¹⁰ Weights from this intergenerational module are used throughout our estimation. Sample sizes for each country for both of our outcomes are presented in columns 3 and 5 of Table 1.

Stage 2: PISA analysis

In the second stage of our analysis, we estimate a similar set of intergenerational models using data from PISA, an international survey of 15-year-olds educational achievement. The key difference is that the dependent variable is now the survey respondent's educational achievement at age 15, as measured by their PISA scores. These estimates are based upon the following OLS regression model:

$$ed_{i,t,k} = \alpha_k + \gamma_k w_{i,t-1,k} + C_{itk} + e_{itk} \nabla K, \quad (3)$$

Where

$ed_{i,t,k}$ = The educational achievement of the PISA respondent.

$w_{i,t,k}$ = Whether the child experienced a jobless household at age 15.

C_{itk} = Controls for immigration status¹¹

e_{itk} is an error term.

i = Individual

t = Refers to the *second* generation (and t-1 to the first generation)

∇K = Denotes that all models are estimated separately for each country.

¹⁰ Results for this and the extended sample of 24 countries, which shows a similar pattern, available on request.

¹¹ Note the PISA data does not collect any information about parents' age. We are therefore unable to control for this factor in this stage of our analysis.

The key parameter of interest from model (3) is γ_k : the association between household joblessness and educational achievement. Unlike in the EU-SILC data, we do not know the age of the parents of PISA participants; however, they all have a 15-year-old child, which makes life cycle issues less of a concern. Note that the parents of the PISA students are observed within a year of the second-generation EU-SILC survey respondents and are similar in age.

We focus on the 2012 round of PISA, using mathematics test scores as our educational attainment outcome for the survey participants.¹² PISA has a two-stage survey design. First, schools are sampled with probability proportional to size and then within each school, a random sample of 30 children is taken.¹³ Scores are scaled to have a mean across core participating countries of 500 and a standard deviation of 100.

Estimates of the link between jobless households in childhood and offspring achievement are presented for the 24 countries also included in EU-SILC. However, our discussion focuses upon 16 countries that were not former members of the Soviet Union (as per the reasoning given above).

Each of the pupils taking the PISA test also fills out a background questionnaire. Here they answer questions about their family and home situation. Pupils are asked if their parents are working part time, working full time, not working, but looking for a job or not working (e.g. retired or home duties). We combine the categories of ‘not working, but looking for a job’ with ‘not working’ and ‘working part time’ with ‘working full time’. Pupils also answer questions about whether or not their parents are present in the household. In a similar manner to EU-SILC, the household is defined as jobless if (a) the child lives with both parents and both are out of work, or (b) the child lives with one parent and that specific parent is out of work. As with the EU-SILC, there is variation in the proportion of lone parents across countries (see bottom panel of Appendix Figure A2) but we combine this information here for reasons of brevity. As noted in sections 1 and 2, family structure has been the focus

¹² PISA tests children in reading, mathematics and science. We have chosen mathematics scores as our outcome as this was the focus of the PISA study in 2012.

¹³ PISA respondents take a 2-hour test. The OECD transforms pupil’s answers to the test questions into a single score using an item-response model with five ‘plausible values’ of mathematics proficiency generated for each child. We account for these five plausible values in all of our estimation, use final student weights, and deal with the standard errors appropriately by using the ‘repest’ command in Stata (Avvisati and Keslair 2014).

of much previous research on this topic and has been found to play a less important role in the formation of jobless households than employment polarization.

Note that the question regarding work in PISA is based on a single point in time and is likely to measure slightly less persistent spells than that of the EU-SILC. This may attenuate our estimates of the association between workless households and educational attainment, although may not affect country rankings if the bias is similar across countries. Comparing jobless household rates in the second generation of EU-SILC (columns 2 and 4 of Table 1) to jobless household rates of parents in PISA (column 1 of Table 2), there are clear similarities across the two surveys.

We investigate the reliability of respondent-reported father and mother workless rates in PISA in a similar manner to EU-SILC, comparing these to OECD LFS statistics from 2012. Figure 2 illustrates that there is a strong correlation for fathers in PISA and males in the OECD LFS ($p=0.803$) and a near-perfect correlation for mothers in PISA and females in the OECD LFS ($p=0.977$). Appendix Figure A3 indicates that this also holds for the extended sample of 24 European countries, including the newer Eastern European countries. Final sample sizes for each country are presented in Table 2.

Stage 3: Combining the EU-SILC and PISA analysis

After estimating the marginal effect of experiencing a jobless household in adolescence across our three outcomes, adult worklessness, adult poverty and education, we examine whether they provide robust evidence of differential penalties to workless households in childhood across countries. Specifically, we hypothesise that countries with a higher estimated intergenerational worklessness association and higher associations between jobless households in childhood and adult poverty will display a more pronounced negative relationship between jobless households and children's education. Given issues of recall and attenuation within our measures of worklessness, discussed above, we argue that even a moderate correlation between these two estimates would be indicative of robust differences in the implications for experiencing a jobless household in childhood across countries.

4. Results

Intergenerational worklessness: Children in jobless households and adult worklessness (EU-SILC)

Table 3 and Figure 3 presents the association between experiencing a jobless household at 14 and adult worklessness across European countries. Figure 3 ranks our subset of 16 countries in terms of the strength of the intergenerational association in worklessness,¹⁴ while Table 3 includes estimates from all 24 countries along with standard errors. There are two main points to note from these results.

For men, Ireland, Belgium, Germany and the UK have the strongest and significant positive association between experiencing a jobless household at 14 and adult worklessness while in other countries such as the Netherlands, Denmark, Greece and Portugal there is no relationship at all.¹⁵ In Belgium and Ireland, males who experience a jobless household at age 14 are 19-24 percentage points more likely to be workless for the whole year leading up to the survey in adulthood than males from households with an employed parent. In Denmark and Portugal, males from jobless households have the same chance of being workless in adulthood as males with an employed parent at 14.

A key finding here is that it is in countries with a higher proportion of children living in jobless households where the intergenerational correlation is strongest (Belgium, Ireland, the UK and Germany). The relationship between intergenerational associations across countries and a measure of the proportion of children living in jobless households (in 2011) is reasonably strong ($\rho = 0.54$ for males and $\rho = 0.60$ for females).

The second point of note is that our findings differ notably by gender. While there is little evidence of intergenerational worklessness for men in Greece, there is a strong

¹⁴ Note that Norway is excluded from the second panel from Figure 5 as the association is driven by a very small number of jobless households ($n=2$) in this country in the first generation. Results are reported in Table 3 and the standard errors are very large.

¹⁵ The difference between UK and Netherlands (the smallest difference between the two groups of countries discussed in the text) is statistically significant at 95% confidence level: UK – Netherlands = 0.149 (0.064), z score = 2.33 where $z = \frac{\hat{\beta}_1 - \hat{\beta}_2}{\sqrt{SE(\hat{\beta}_1)^2 + SE(\hat{\beta}_2)^2}}$ as recommended by Paternoster et al. (1998). Z scores significant at 1% level $>|2.58|$, 5% level $>|1.96|$, 10% level $>|1.65|$

positive association for women.¹⁶ Conversely, in Germany there is evidence of worklessness persisting across generations for men, but little association for women.¹⁷ For countries such as Spain and Sweden, there is a moderate association for both men and women, whereas Belgium, the UK, Italy and most notably Ireland have strong associations for both men and women. Ireland was hit very hard by the Great Recession and worklessness rose dramatically as a result, but the results here suggest that this was strongly focused on those who grew up in a jobless household, a marker of childhood deprivation. Netherlands, Portugal and Denmark have no estimated intergenerational worklessness associations for either gender.¹⁸

Children in jobless households and adult poverty (EU-SILC)

Table 4 and Figure 4 present the associations across countries between experiencing a jobless household at age 14 and being at-risk-of-poverty in adulthood. As with the intergenerational worklessness analysis, Figure 4 ranks the associations from strongest to weakest for our main focus of 16 countries while Table 4 also present the results for the other eight countries.¹⁹

Similar to the patterns found for intergenerational worklessness, there are large differences in the associations between childhood household joblessness and adult poverty across countries. Once again, in Ireland, Belgium and the UK, those who experience a jobless household at 14 have a much higher probability (0.16 – 0.25) of being at-risk-of-poverty as an adult compared to those with an employed parent at 14. Conversely, in other countries, such as Finland, Greece and Denmark, there is no difference in the risk of adult poverty for those from jobless compared to working households in childhood.

As might be expected, there is slightly less variation across genders in terms of poverty outcomes in adulthood compared to worklessness. While there are some

¹⁶ The difference between estimates for men and women in Greece are significant at 90% confidence levels ($z=1.77$), assuming dependent samples.

¹⁷ The difference between estimates for men and women in Germany are significant at 95% confidence levels ($z=2.08$), assuming dependent samples.

¹⁸ For the wider sample of countries, the Czech Republic and Iceland have notable high levels of intergenerational associations for men and women, and Slovak Republic for just men. Austria have average levels for both genders while Slovenia has average levels for men and relatively low levels for women. Poland has average levels for women and relatively low levels for men.

¹⁹ Again, Norway is excluded from the second panel from Figure 6 as the association is driven by a very small number of jobless households ($n=2$) in this country in the first generation. Results are reported in Table 4 and the standard errors are very large.

minor differences in rankings, France and Italy along with Ireland, Belgium and the UK have high associations for both men and women in terms of adult poverty. Denmark, Finland, Netherlands and Portugal all have typically low associations between childhood household joblessness and adult poverty for males and females. Where differences do exist across genders within countries, the patterns are typically quite consistent with the findings for intergenerational worklessness: Germany has slightly higher associations for males compared to females whereas Greece has higher associations for women compared to men.

As with the intergenerational worklessness analysis, there are strong correlations between country-level measures of the proportion of children experiencing a jobless household in childhood (in 2011) and intergenerational associations between childhood household workless experience and adult poverty ($\rho=0.68$ for males and $\rho=0.36$ for females). Once again, countries with a high proportion of children experiencing a jobless household in childhood also have more severe longer-term penalties for those children.

Comparing across the two long-term outcomes in the EU-SILC, perhaps unsurprisingly given that both outcomes are indicators of deprivation and social exclusion, there is a strong correlation across countries between intergenerational worklessness and the association between childhood jobless households and adult poverty ($\rho=0.83$ for males and $\rho=0.56$ for females). Hence, the intergenerational transmission of disadvantage, as captured in the second generation by either a lack of employment or poverty, appears to be similar for broadly the same set of countries.

Ireland, Belgium, the UK, Italy and France stand out as having strong intergenerational transmission of disadvantage. In contrast, for many countries childhood disadvantage is not associated with adult deprivation (the Netherlands, Denmark, Finland and Portugal). Broadly speaking these differences map onto estimated intergenerational income persistence for the small subset of countries (Scandinavia, Germany, France, Italy and the UK) where these are available (see Corak, 2013).²⁰ However, the array of countries that can be considered in this

²⁰ Note these are typically estimated for males only within the intergenerational income mobility literature

analysis is larger and places Belgium and Ireland amongst the low mobility countries and the Netherlands as a high mobility country.

Children in jobless households and educational attainment (PISA)

Figure 5 and Table 5 present results from estimating the relationship between household worklessness and children's PISA maths scores. In all countries those children in deprived households, as captured by no parent working, do less well in the maths test. However, there is considerable variation in this test score penalty. Belgium and Ireland, and to a lesser degree the UK and Germany, have large and significant negative associations between experiencing a jobless household at 15 and maths performance. This penalty equates to 0.6 of a standard deviation in Belgium while, at the other end of the spectrum, the penalty is closer to 0.2-0.4 of a standard deviation in the Netherlands, Greece and Finland.²¹ More generally, differences in maths achievement between children from jobless versus working households tend to be greater in countries where a large proportion of young people are living with parents who are not in work. However, the strength of the association is weaker than for longer-term outcomes ($\rho = -0.35$ for males and -0.35 for females).

Importantly, there is less variation by gender in the association between children in jobless households and educational attainment across countries. This is both expected – there is little reason to assume that girls and boys would perform substantively differently in tests given household jobless experiences within the same education system – and telling us something important about the mechanisms of intergenerational worklessness being quite distinct across genders, a point we return to shortly.

Comparing medium- and long-term associations across countries

To assess whether countries with higher intergenerational workless associations also experience larger educational penalties associated with experiencing a jobless household in childhood, we combine results from the two previous sub-sections. Our

²¹ For girls, the differences between Belgium and the Netherlands, Belgium and Greece and Belgium and Finland are all statistically significant at the five per cent significance level. For boys, these differences are also statistically significant at the five per cent significance level. Here the critical t-value for a two-tailed significance test at the five per cent level is computed as $>|1.99|$. This is because PISA has a sample design with 80 replicate weights, which means the degrees of freedom is approximately 79 (see Appendix C of Jerrim and Shure (2016) for further discussion).

findings are presented in Figures 6 and 7 (see Appendix Figure A4 and A5 for the extended sample).

The top panel of Figure 6 shows that, for males, countries with more intergenerational worklessness in our EU-SILC analysis also have larger penalties in terms of the link between children in jobless households and educational attainment in our PISA analysis. The correlation is -0.44 across the 16 countries and -0.68 if all 24 countries are included (Appendix Figure A4). The top panel of Figure 7 shows that there is also a moderate relationship across countries when considering the association between children in jobless households and adult poverty outcomes in EU-SILC and the association between children in jobless households and educational outcomes in PISA ($\rho = -0.37$ for our main sample and $\rho = -0.57$ for the extended sample of 24 countries).

While at face value these present a moderate correlation, it is important that this is interpreted in context. Figures 6 and 7 bring together intergenerational estimates across two completely different data sources. As illustrated in our results tables, intergenerational estimates for all countries are subject to quite a large degree of sampling error. In other words, any measurement error in our results at the country level will attenuate the relationships depicted in Figure 6 and 7. We therefore interpret these moderate correlations as providing reasonable evidence that there may indeed be longer-term, multi-generational scars to jobless experiences for males.

In contrast, the second panel of Figure 6 shows that there is no evidence of a relationship across countries between intergenerational worklessness in EU-SILC and children in jobless households and educational outcomes in PISA for girls. This difference by gender may not be altogether surprising if there are different mechanisms driving intergenerational worklessness by gender, as could be expected. While for males there is a fairly homogenous process across countries of leaving education and entering the labour market, for women there are large differences across countries in terms of cultural expectations after completing education. Models of employment have traditionally focused on the 'male breadwinner', limiting the centrality of work for women (Simpson and Simpson, 1969; Kaufman and Feters, 1980). While the rise of women in education and the labour

market has changed this model to focus on a 'modern' pattern, where women and men have more similar career trajectories, or an 'innovator' pattern, where women begin to outperform men, there is still evidence that men and women respond differently to workless spells (Kulik, 2000). Women have been found to confront worklessness differently and are less likely to seek a new job or retraining than men (Leana and Feldman, 1988). Unemployed women are also more likely to reject new job offers on the basis of family responsibility, across the education distribution (Kulik, 2000). As a result, the link between educational attainment and later worklessness is far less clear for women than it is for men.

There is a stronger relationship between the educational penalties and adult poverty for women ($p = -0.30$ for 16 countries and $p = -0.36$ for 24 countries), although Denmark is a major outlier. In Denmark, the educational penalty from coming from a disadvantaged family is in the middle of the range across countries but the adult poverty outcome associated with coming from a deprived family is very low. Among the other countries, an increase in the test score penalty from coming from a deprived family of 20 points is associated with a stronger association between childhood deprivation and adult poverty of around 5 points. Given that the OECD equates 30 PISA test points with a year's worth of schooling, these penalties are large.²²

The two sets of results suggest that the intergenerational transmission of disadvantage is transmitted by educational penalties associated with deprivation. Whilst Denmark stands out as country where educational disadvantage associated with childhood deprivation does not translate into poverty in adulthood, Ireland and the UK produce a stronger intergenerational transmission of disadvantage for women than the test score penalties would predict. Belgium and Germany stand out as both having strong intergenerational transmission of disadvantage and large educational penalties. Finland and the Netherlands stand out at the other end as having small educational penalties from coming from a deprived childhood and low intergenerational transmission of disadvantage.

²² See Box I.2.1 in OECD (2016).

5. Conclusion

The most convincing results of international comparisons use harmonised data across countries. This study presents one of the first pieces of research to consider the intergenerational transmission of disadvantage with internationally comparable data. We use a commonly used indicator of social exclusion, the experience of a jobless household at the age of 14/15, to capture experiences of childhood deprivation. We consider for the first time the association between this and adult disadvantage in the labour market (intergenerational worklessness), adult poverty and education across countries. While intergenerational transfers across other domains such as income, social class and education have been widely researched, more often this is with a limited set of countries using country-specific data. Here we advance this literature by considering the transmission of disadvantage across a large range of countries with comparable data.

We use two different data sources to estimate the association between childhood household joblessness and adult worklessness (intergenerational worklessness), adult poverty, and education across a number of European countries. The cross-country patterns can then offer a suggestion about the role of education as the driver of the intergenerational transmission of disadvantage. We find some significant similarities across countries: those with high levels of intergenerational worklessness and stronger associations between childhood household joblessness and adult poverty typically have larger penalties to household joblessness in terms of education.

For males, Belgium, Ireland, the UK in particular exhibit strong associations between childhood deprivation and all three outcomes. These are all countries with a history of high levels of children growing up in jobless households. This research provides the first evidence that high levels of this indicator of social exclusion suggest large medium- and long-term penalties across generations. Other countries such as Netherlands, Denmark, Finland and Greece show little association between childhood deprivation, adult worklessness and poverty and only modest penalties in terms of educational attainment.

For females, the picture is less clear. There are some suggestive patterns of stronger associations in terms of adult worklessness, poverty and education and

childhood household joblessness in France, the UK and Belgium while women in Finland, Spain and Netherlands appear to face small or insignificant penalties to experiencing a jobless household in childhood in terms of labour market, poverty and education outcomes. Here, though, the education penalties to experiencing a jobless household do not map onto penalties in terms of labour market outcomes as well as they do for males, perhaps reflecting the heterogeneous range of options available to women upon leaving full time education.

Taken together, this research presents new evidence that there are long scars to experiencing a jobless household, and to the extent that this reflects childhood disadvantage, the intergenerational transmission of disadvantage in a particular set of countries. But this adverse set of outcomes is not universal. A smaller set of countries shows little or no issue with persistence in disadvantage across generations or evidence in just one domain (education in Denmark's case). Typically, countries with higher proportions of children in jobless households have worse medium- and longer-term outcomes for those children. This suggests that this is a powerful measure of social exclusion. Countries with a high proportion of children in jobless households are also worse at protecting those children from becoming the next generation of jobless households.

This also conforms with previous estimates of intergenerational income mobility for the small subset of countries (Scandinavia, Germany, France, Italy and the UK) where these are available (see Corak, 2013). Here, we are able to extend the number of countries considered, using comparable cross-national data on childhood deprivation and adult outcomes. Our findings suggest that Belgium and Ireland are among the low mobility countries, such as the UK and France. They also suggest that the Netherlands may be a country of high mobility, similar to Denmark and Finland.

The data has limitations about what it can tell us about childhood experiences and there are timing differences between the generations considered. Yet given these limitations, we argue that the fact that we find moderate to strong associations between countries across the two data sources and across three outcome domains (education, employment and poverty) is an important finding, which advances our understanding of this key indicator of social exclusion. Future research should

explore potential mechanisms to understand why countries have such different experiences of disadvantage across generations.

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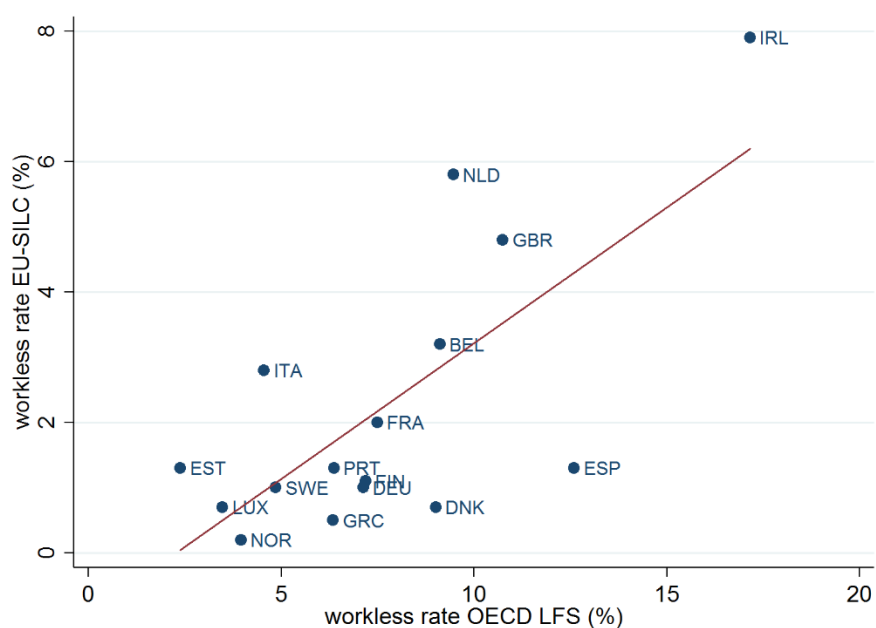
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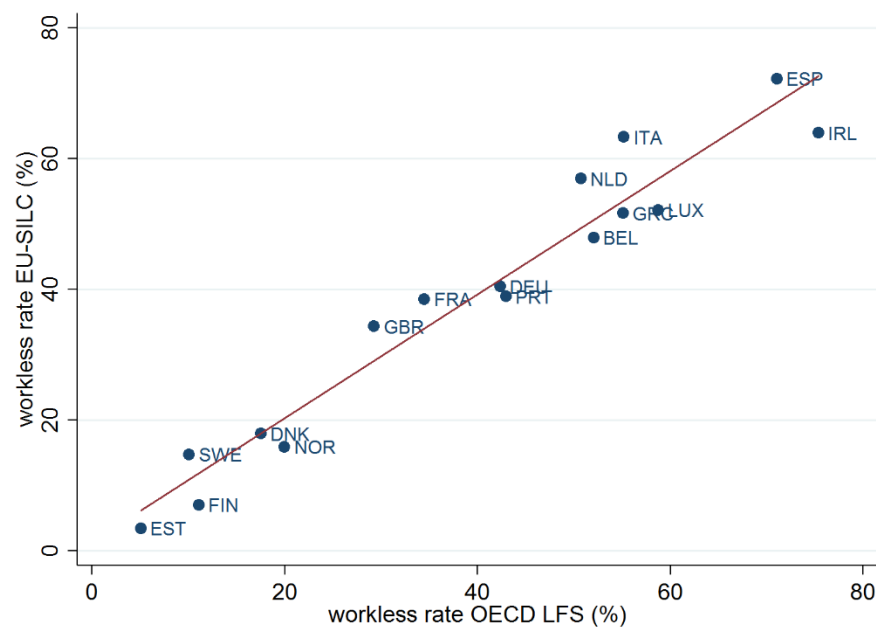
Figure 1: Workless rates among fathers and mothers in the EU-SILC compared to OECD LFS 1981-1990

Fathers



Pearson correlation: 0.717, Spearman rank: 0.612. Workless rate measured as $(1 - \text{employment} / \text{population ratio})$ in OECD LFS for men aged 40-44. Average taken from 1981-1990. Workless rate measured as fathers reported unemployed, sick/disabled or other inactive as main activity when respondent age 14 between 1981-1990 in EU-SILC.

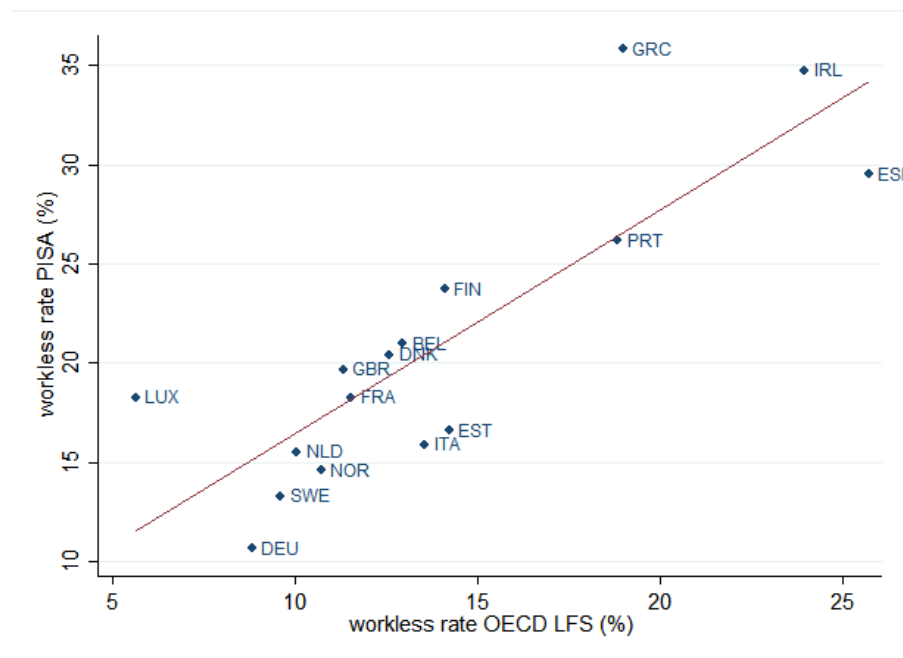
Mothers



Pearson correlation: 0.971, Spearman rank: 0.965. Workless rate measured as $(1 - \text{employment} / \text{population ratio})$ in OECD LFS for women aged 40-44. Average taken from 1981-1990. Workless rate measured as mothers reported unemployed, sick/disabled or other inactive as main activity when respondent age 14 between 1981-1990 in EU-SILC.

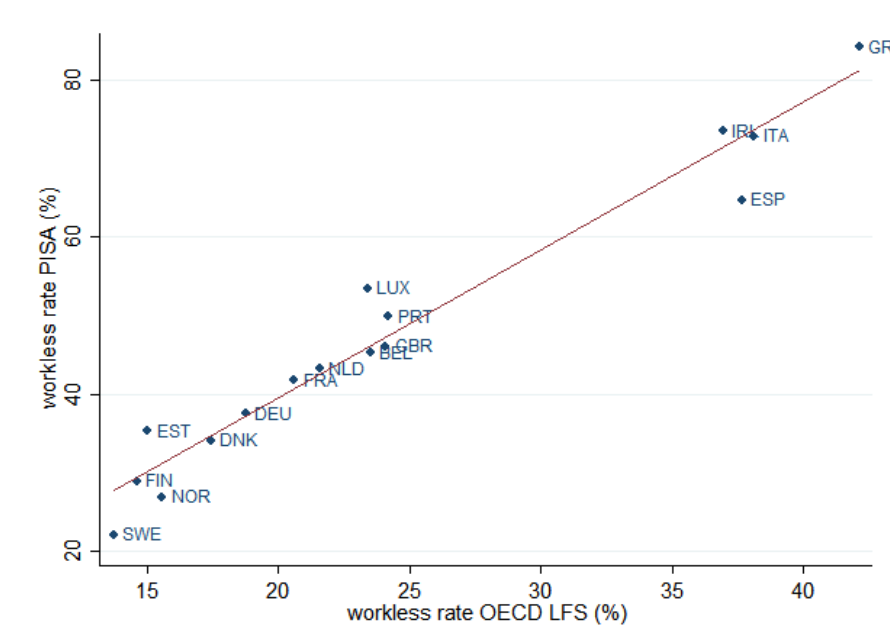
Figure 2: Workless rates among fathers and mothers in PISA compared to OECD LFS 2012

Fathers



Pearson correlation: 0.833, Spearman rank: 0.809. Workless rate measured as $(1 - \text{employment} / \text{population ratio})$ in OECD LFS for men aged 40-44 in 2012. Workless rate measured as fathers reported 'not working, but looking for a job' or 'not working' as main activity when respondent age 15 in 2012 in PISA.

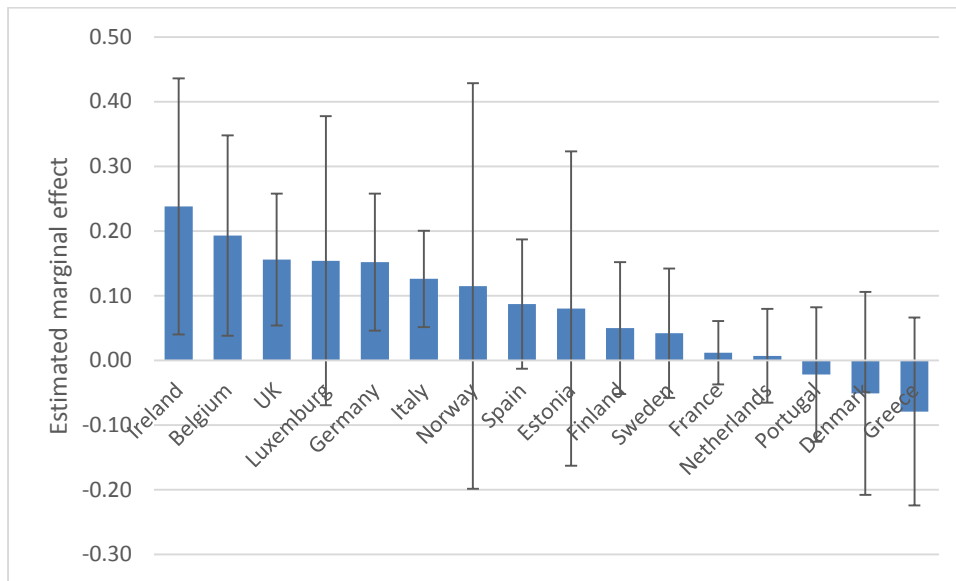
Mothers



Pearson correlation: 0.977, Spearman rank: 0.959. Workless rate measured as $(1 - \text{employment} / \text{population ratio})$ in OECD LFS for women aged 40-44 in 2012. Workless rate measured as mothers reported 'not working, but looking for a job' or 'not working' as main activity when respondent age 15 in 2012 in PISA.

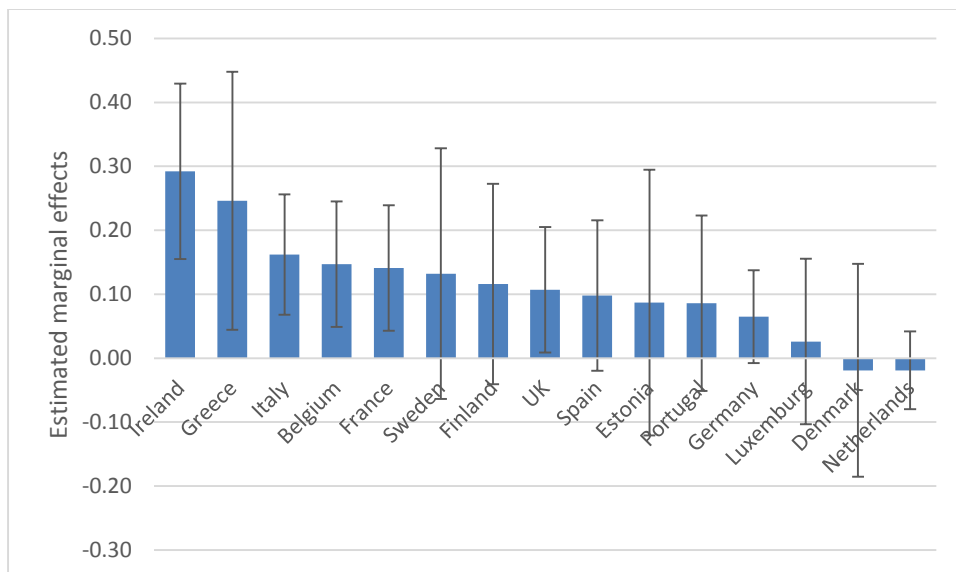
Figure 3: Estimated intergenerational worklessness in the EU-SILC for sons and daughters

Sons



Estimated associations from country-specific regressions: probit of sons spending a whole year workless on an indicator of jobless household at 14, quadratic age controls for head of household and sons and a dummy for immigration status. Sample restricted to those reporting the main activity of the parent(s) they lived with at 14 between 1981 and 2000 with a full 12 month activity history. Intergenerational unit weights applied.

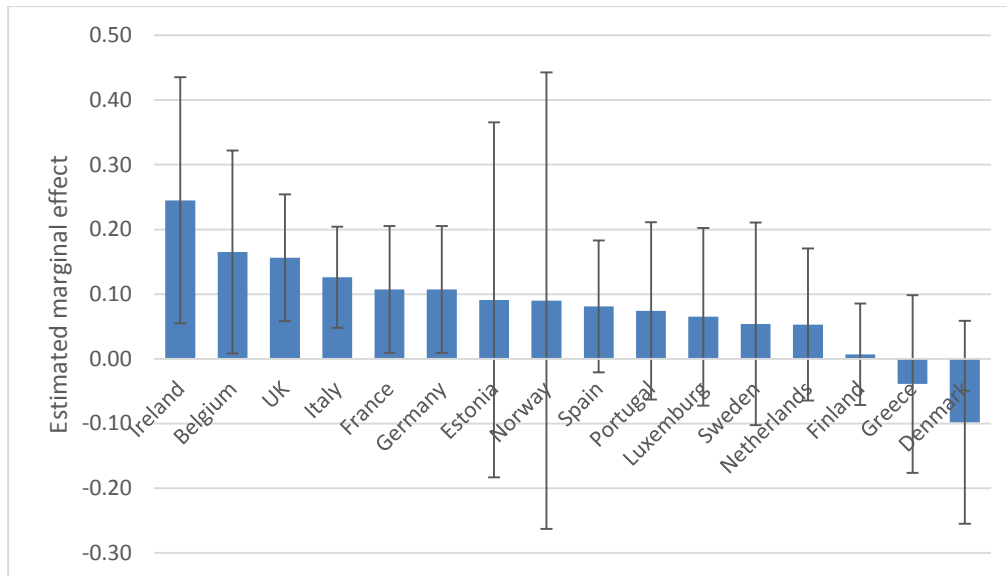
Daughters



Estimated associations from country-specific regressions: probit of daughters spending a whole year workless on an indicator of jobless household at 14, quadratic age controls for head of household and daughters and a dummy for immigration status. Sample restricted to those reporting the main activity of the parent(s) they lived with at 14 between 1981 and 2000 with a full 12 month activity history. Intergenerational unit weights applied. Norway excluded given extreme values based on small number of obs.

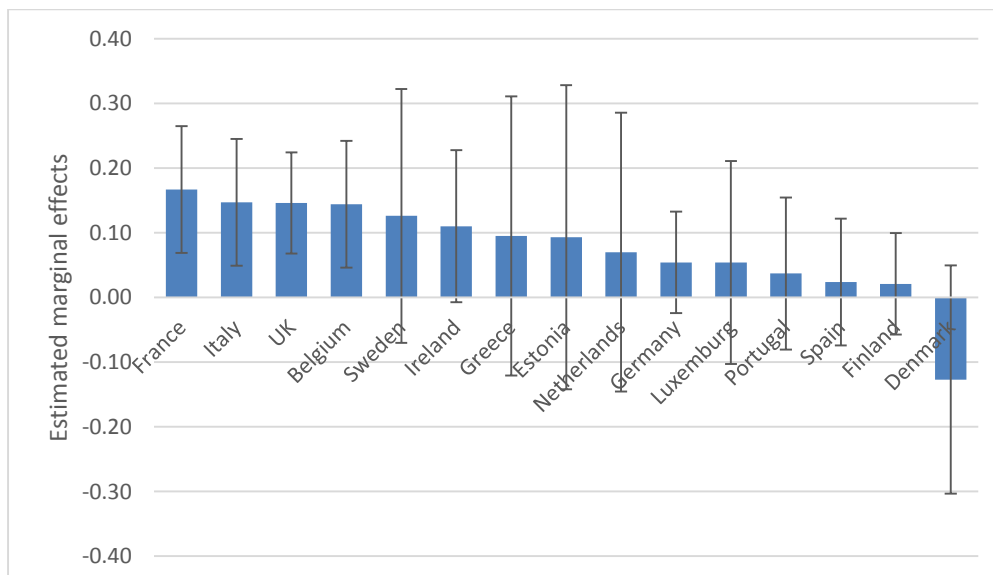
Figure 4: Estimated association between experiencing a jobless household in childhood and adult poverty in the EU-SILC for sons and daughters

Sons



Estimated associations from country-specific regressions: probit of an indicator of poverty for sons (measured as at or below the at-risk-of-poverty threshold, 60% of median equivalised disposable income after transfers) on an indicator of jobless household at 14, quadratic age controls for head of household and sons and a dummy for immigration status. Sample restricted to those reporting the main activity of the parent(s) they lived with at 14 between 1981 and 2000 with information on equivalised disposable household income. Intergenerational unit weights applied.

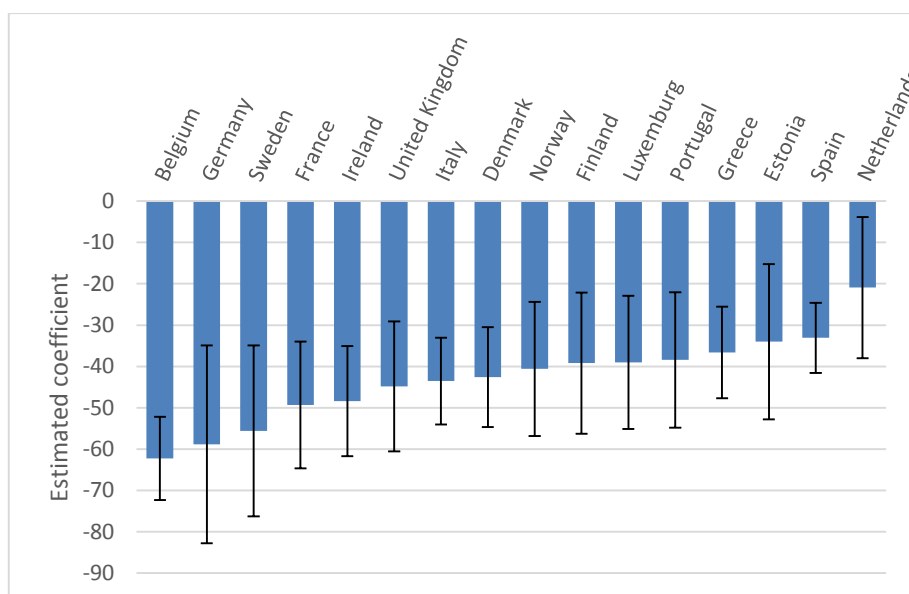
Daughters



Estimated associations from country-specific regressions: probit of an indicator of poverty for daughters (measured as at or below the at-risk-of-poverty threshold, 60% of median equivalised disposable income after transfers) on an indicator of jobless household at 14, quadratic age controls for head of household and daughters and a dummy for immigration status. Sample restricted to those reporting the main activity of the parent(s) they lived with at 14 between 1981 and 2000 with a information on equivalised disposable household income. Intergenerational unit weights applied. Norway excluded given extreme values based on small number of observations.

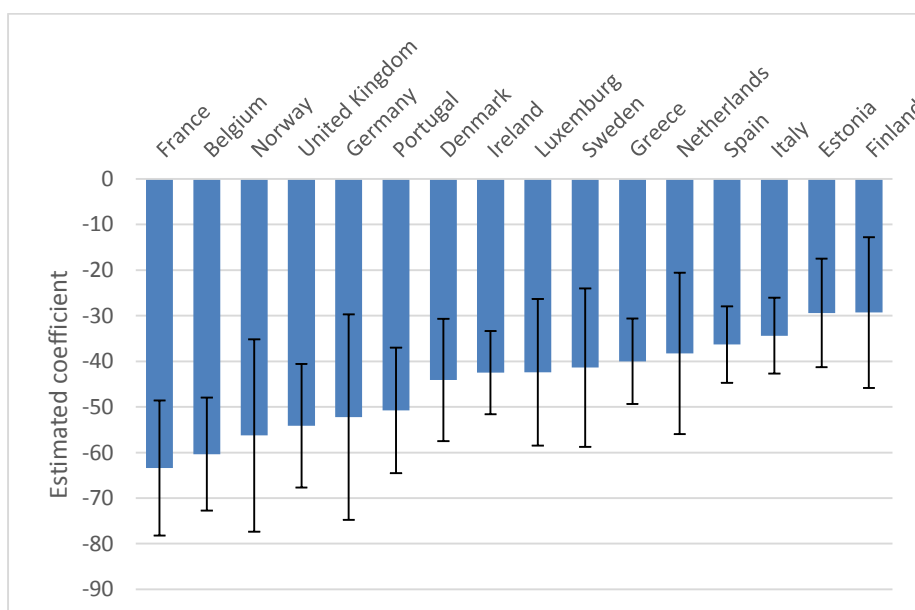
Figure 5: Estimated relationship between experiencing a jobless household in childhood and maths scores in PISA for sons and daughters

Sons



Estimated associations from country-specific regressions: OLS of sons' and daughters' (estimated separately) standardised maths score on an indicator of jobless household at time of survey and a dummy for immigration status. Standard PISA weights applied.

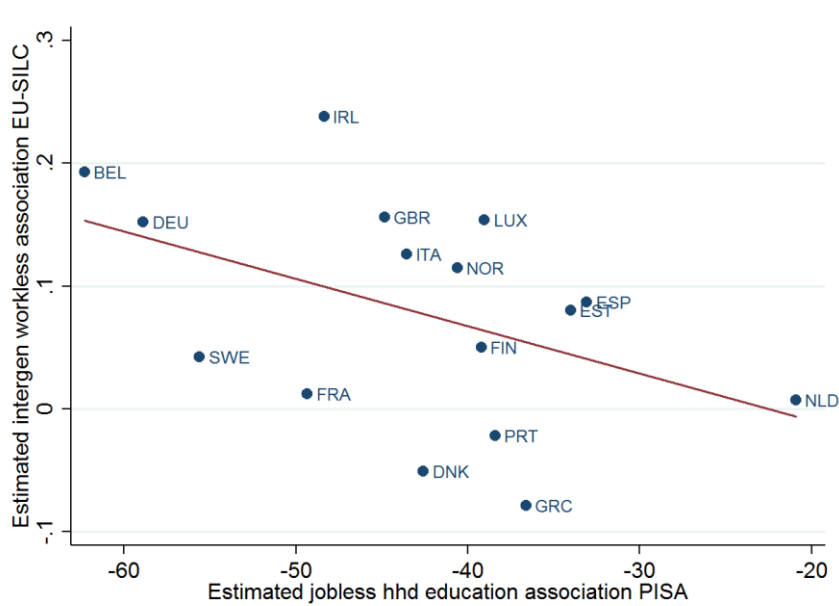
Daughters



Estimated associations from country-specific regressions: OLS of sons' and daughters' (estimated separately) standardised maths score on an indicator of jobless household at time of survey and a dummy for immigration status. Standard PISA weights applied.

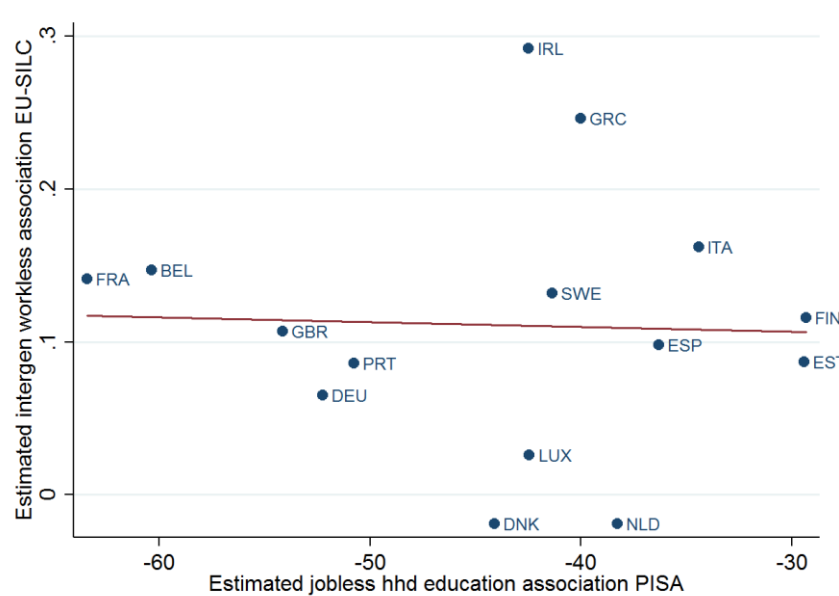
Figure 6: Relationship between intergenerational worklessness in the EU-SILC and experiencing a jobless household in childhood and maths associations in PISA

Sons



Pearson correlation: -0.443, Spearman rank: -0.468.

Daughters

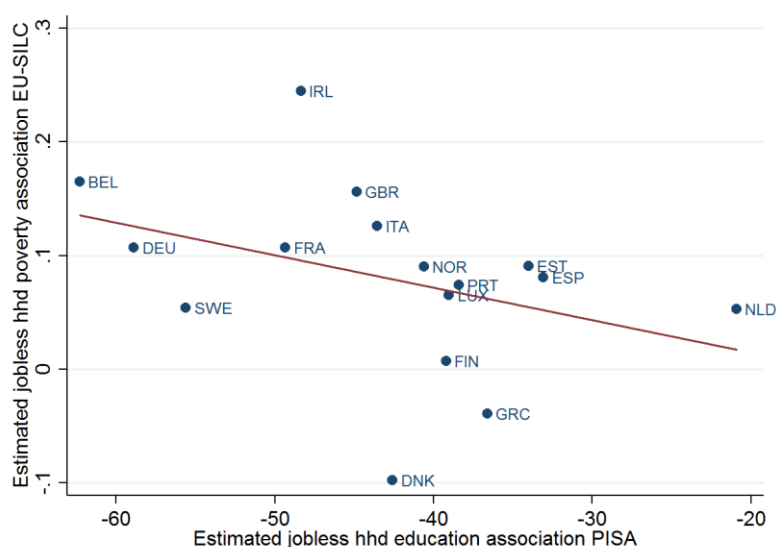


Pearson correlation: -0.038, Spearman rank: -0.013. Norway excluded for daughters given extreme values based on small number of observations. See Table 3.

EU-SILC estimated associations from country-specific regressions: probit of sons and daughters (estimated separately) spending a whole year workless on an indicator experiencing a jobless household at 14, quadratic age controls for head of household and sons/daughters and a dummy for immigration status. Sample restricted to those reporting their head of household's main activity between 1981 and 2000 with a full 12 month activity history. Intergenerational unit weights applied. PISA estimate associations from country-specific regressions: OLS of sons' and daughters' (estimated separately) standardised maths score on an indicator of workless household at time of survey and a dummy for immigration status. Standard PISA weights applied.

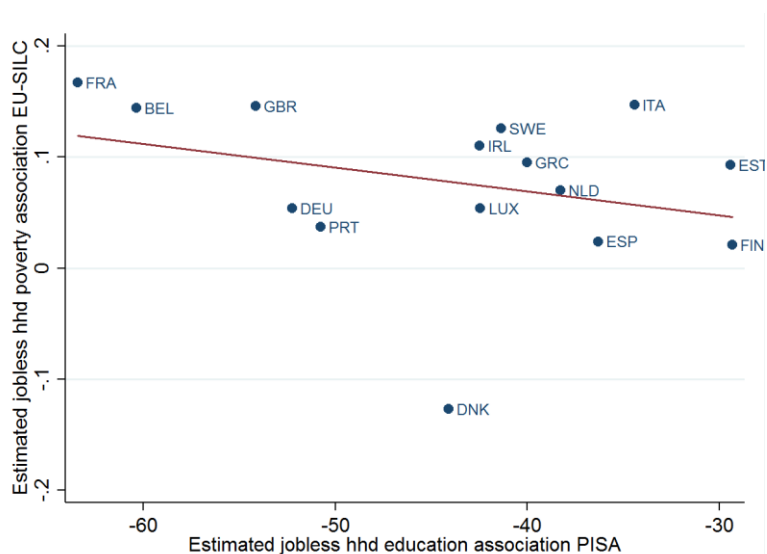
Figure 7: Relationship between experiencing a jobless household in childhood and adult poverty in the EU-SILC and experiencing a jobless household in childhood and maths associations in PISA

Sons



Pearson correlation: -0.369, Spearman rank: -0.539.

Daughters



Pearson correlation: -0.300, Spearman rank: -0.336. Norway excluded for daughters given extreme values based on small number of obs. See Table 4.

EU-SILC estimated associations from country-specific regressions: probit of sons' and daughters' poverty indicator (measured as at or below the at-risk-of-poverty threshold, 60% of median equivalised disposable income after transfers) on an indicator of jobless household at 14, quadratic age controls for head of household and daughters and a dummy for immigration status. Sample restricted to those reporting the main activity of the parent(s) they lived with at 14 between 1981 and 2000 with information on equivalised disposable household income. Intergenerational unit weights applied. PISA estimate associations from country-specific regressions: OLS of sons' and daughters' (estimated separately) standardised maths score on an indicator of the head of household workless at time of survey and a dummy for immigration status. Standard PISA weights applied.

Table 1: Average proportion jobless households at 14, and adult sons and daughters workless and poverty rates across countries in the EU-SILC for our sample

Country	Percent Jobless Hhd	Son workless	N	Daughter workless	N	Son Poverty	N	Daughter Poverty	N
Austria	2.6	5.7	1429	20.7	1637	14.0	1504	13.6	1712
Belgium	6.4	11.6	1501	17.4	1595	12.3	1535	13.8	1638
Czech Republic	1.2	6.0	1494	25.0	2040	7.9	1530	11.6	2075
Denmark	2.1	7.0	563	11.5	619	14.9	601	15.8	693
Estonia	0.9	12.3	1286	20.1	1290	13.7	1311	14.9	1331
Finland	3.8	7.4	1120	15.4	1064	11.0	1221	7.9	1173
France	3.6	6.7	2563	15.3	2724	10.2	2614	12.6	2798
Germany	4.1	6.6	2353	18.7	2817	12.8	2547	14.3	2986
Greece	1.2	17.1	1549	33.5	1561	15.9	1594	19.1	1601
Hungary	1.0	8.5	2774	27.6	3174	14.0	2857	13.9	3229
Iceland	1.5	4.6	415	8.5	399	9.3	458	13.3	478
Ireland	5.8	22.2	652	33.4	970	8.4	679	11.8	1011
Italy	4.4	11.6	4969	33.7	5300	16.0	5144	21.1	5568
Luxemburg	2.4	5.1	1688	15.4	1895	10.1	1742	13.9	1943
Netherlands	7.0	5.9	1326	11.2	1490	7.9	1371	12.2	1552
Norway	0.6	5.3	693	7.5	596	9.9	725	7.8	652
Poland	1.6	8.1	3357	19.7	3794	15.4	3402	14.8	3850
Portugal	2.8	11.8	1385	17.5	1483	13.3	1428	14.7	1529
Slovak Republic	0.5	10.9	1784	22.4	1837	11.1	1845	12.3	1897
Slovenia	2.6	5.9	1274	10.9	1253	9.7	1356	13.1	1364
Spain	3.6	16.5	3616	27.3	3785	17.3	3769	19.6	3934
Sweden	2.3	2.0	747	6.2	813	9.3	789	12.4	898
Switzerland	3.7	2.9	1411	16.4	1728	8.3	1471	9.8	1796
UK	6.9	8.4	1357	20.9	1726	10.4	1383	12.1	1772

Table 2: Average proportion jobless households and average maths scores in PISA for our sample

Country	Percent Jobless Hhd	Sons' maths scores	N	Daughters' maths scores	N
Austria	5.1	517	2398	494	2357
Belgium	10.6	520	4310	509	4287
Czech Republic	6.2	505	2647	493	2680
Denmark	8.1	507	3704	493	3777
Estonia	6.6	523	2370	518	2409
Finland	6.4	517	4459	520	4370
France	8.2	499	2238	491	2375
Germany	5.7	520	2539	507	2462
Greece	14.9	457	2549	449	2576
Hungary	11.8	482	2281	473	2529
Iceland	4.7	490	1769	496	1739
Ireland	14.1	509	2471	494	2545
Italy	7.7	494	15830	476	15243
Luxemburg	6.4	502	2677	477	2581
Netherlands	6.0	528	2315	518	2145
Norway	4.4	490	2395	488	2291
Poland	11.4	520	2219	516	2388
Portugal	9.9	493	2869	481	2853
Slovak Republic	11.3	486	2447	477	2231
Slovenia	6.6	503	3212	499	2699
Spain	10.4	492	12623	476	12690
Sweden	4.9	477	2358	480	2378
Switzerland	4.5	537	5650	524	5579
UK	10.0	500	6351	488	6308

Table 3: Estimates of intergenerational worklessness across countries for sons and daughters in the EU-SILC

Country	Sons'			Daughters'		
	Estimated marginal effects	Standard error	N	Estimated marginal effects	Standard error	N
Austria	0.071	0.06	1429	0.103	0.09	1637
Belgium	0.193	0.08	1501	0.147	0.05	1595
Czech Republic	0.184	0.12	1494	0.148	0.08	2040
Denmark	-0.051	0.08	563	-0.019	0.09	619
Estonia	0.080	0.12	1286	0.087	0.11	1290
Finland	0.050	-0.05	1120	0.116	0.08	1064
France	0.012	0.03	2563	0.141	0.05	2724
Germany	0.152	0.05	2353	0.065	0.04	2817
Greece	-0.079	0.07	1549	0.246	0.10	1561
Hungary	0.095	0.06	2774	0.117	0.10	3174
Iceland	0.226	0.18	413	0.487	0.26	399
Ireland	0.238	0.10	652	0.292	0.07	970
Italy	0.126	0.04	4969	0.162	0.05	5300
Luxemburg	0.154	0.11	1688	0.026	0.07	1895
Netherlands	0.007	0.04	1326	-0.019	0.03	1490
Norway	0.115	0.16	693	0.574	0.34	596
Poland	0.060	0.05	3357	0.123	0.07	3794
Portugal	-0.022	0.05	1385	0.086	0.07	1483
Slovak Republic	0.470	0.20	1784	0.090	0.16	1837
Slovenia	0.108	0.07	1274	0.040	0.06	1253
Spain	0.087	0.05	3616	0.098	0.06	3785
Sweden	0.042	0.05	747	0.132	0.10	813
Switzerland	0.001	0.03	1411	0.122	0.08	1728
UK	0.156	0.05	1357	0.107	0.05	1726

Estimated associations from country-specific regressions: probit of sons and daughters (estimated separately) spending a whole year workless on an indicator of jobless household at 14, quadratic age controls for head of household and sons/daughters and a dummy for immigration status. Sample restricted to those reporting their head of household's main activity between 1981 and 2000 with a full 12 month activity history. Intergenerational unit weights applied.

Table 4: Estimates of the association between adult poverty and experiencing a jobless household in childhood across countries for sons and daughters in the EU-SILC

Country	Sons'			Daughters'		
	Estimated marginal effects	Standard error	N	Estimated marginal effects	Standard error	N
Austria	0.088	0.08	1504	0.082	0.05	1712
Belgium	0.165	0.08	1535	0.138	0.03	1638
Czech Republic	0.180	0.13	1530	0.210	0.06	2075
Denmark	-0.098	0.08	601	-0.143	0.09	693
Estonia	0.091	0.14	1311	0.091	0.09	1331
Finland	0.007	0.04	1221	0.024	0.04	1173
France	0.107	0.05	2614	0.164	0.03	2798
Germany	0.107	0.05	2547	0.059	0.03	2986
Greece	-0.039	0.07	1594	0.105	0.08	1601
Hungary	0.214	0.08	2857	0.293	0.07	3229
Iceland	-0.091	0.01	456	0.043	0.14	478
Ireland	0.245	0.10	679	0.112	0.04	1011
Italy	0.126	0.04	5144	0.146	0.03	5568
Luxembourg	0.065	0.07	1742	0.057	0.05	1943
Netherlands	0.053	0.06	1371	0.078	0.03	1552
Norway	0.090	0.18	725	-0.036	0.16	652
Poland	0.170	0.07	3402	0.150	0.05	3850
Portugal	0.074	0.07	1428	0.035	0.05	1529
Slovak Republic	0.335	0.20	1845	0.157	0.10	1897
Slovenia	0.169	0.09	1356	0.160	0.06	1364
Spain	0.081	0.05	3769	0.021	0.03	3934
Sweden	0.054	0.08	789	0.136	0.07	898
Switzerland	0.142	0.07	1471	0.159	0.04	1796
UK	0.156	0.05	1383	0.146	0.03	1772

Estimated associations from country-specific regressions: probit of sons' and daughters' (estimated separately) poverty indicator on an indicator of jobless household at 14, quadratic age controls for head of household and sons/daughters and a dummy for immigration status. Sample restricted to those reporting their head of household's main activity between 1981 and 2000 and reporting an equivalised disposable household income (after transfers). Intergenerational unit weights applied.

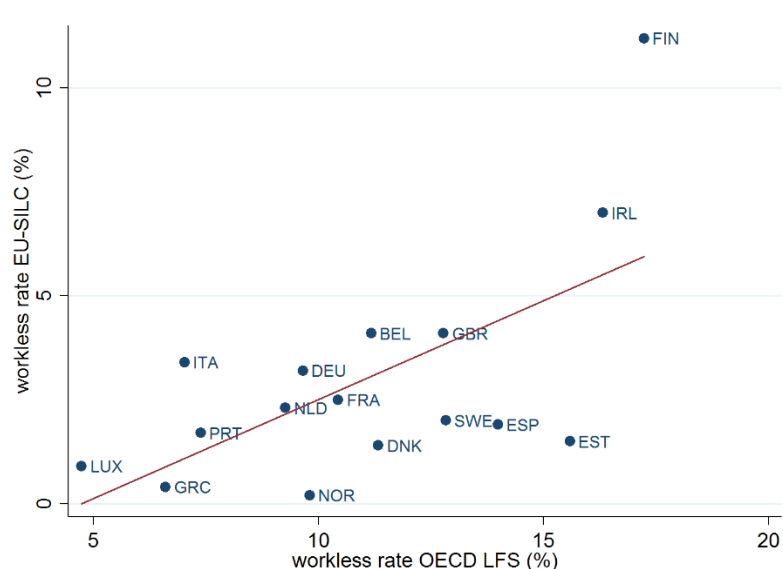
Table 5: Estimates of the relationship between children’s maths scores and experiencing a jobless household in childhood across countries for sons and daughters in PISA

Country	Sons’			Daughters’		
	Estimated coefficient	Standard error	N	Estimated coefficient	Standard error	N
Austria	-62.28	5.06	4127	-48.09	12.69	2316
Belgium	-67.80	10.90	2588	-60.36	6.22	4158
Czech Republic	-42.58	6.06	3537	-55.78	12.81	2653
Denmark	-34.01	9.44	2267	-44.11	6.74	3655
Estonia	-39.21	8.60	4239	-29.42	8.32	2335
Finland	-49.33	7.72	2130	-29.32	5.98	4274
France	-58.87	12.03	2039	-63.42	7.45	2304
Germany	-36.62	5.58	2451	-52.24	11.32	2067
Greece	-75.01	8.86	2209	-40.02	4.71	2536
Hungary	-45.10	12.04	1669	-71.67	9.59	2478
Iceland	-48.36	6.69	2435	-36.80	10.87	1679
Ireland	-43.54	5.27	15485	-42.48	4.58	2521
Italy	-39.03	8.11	2551	-34.41	4.18	15016
Luxembourg	-20.93	8.58	2225	-42.44	8.08	2509
Netherlands	-40.61	8.14	2282	-38.28	8.88	2085
Norway	-59.01	7.18	2101	-56.27	10.59	2227
Poland	-38.42	8.24	2745	-45.01	6.02	2307
Portugal	-102.02	7.96	2342	-50.77	6.93	2751
Slovak Republic	-39.60	9.04	3058	-96.79	8.30	2176
Slovenia	-33.08	4.25	12270	-43.71	8.37	2630
Spain	-55.59	10.38	2205	-36.31	4.21	12444
Sweden	-15.20	8.73	5481	-41.37	8.73	2289
Switzerland	-44.84	7.89	6148	-30.71	7.21	5477
UK	-36.31	10.35	2333	-54.14	6.80	6131

Estimated associations from country-specific regressions: OLS of sons’ and daughters’ (estimated separately) standardised maths score on an indicator of jobless household at time of survey and a dummy for immigration status. Standard PISA weights applied.

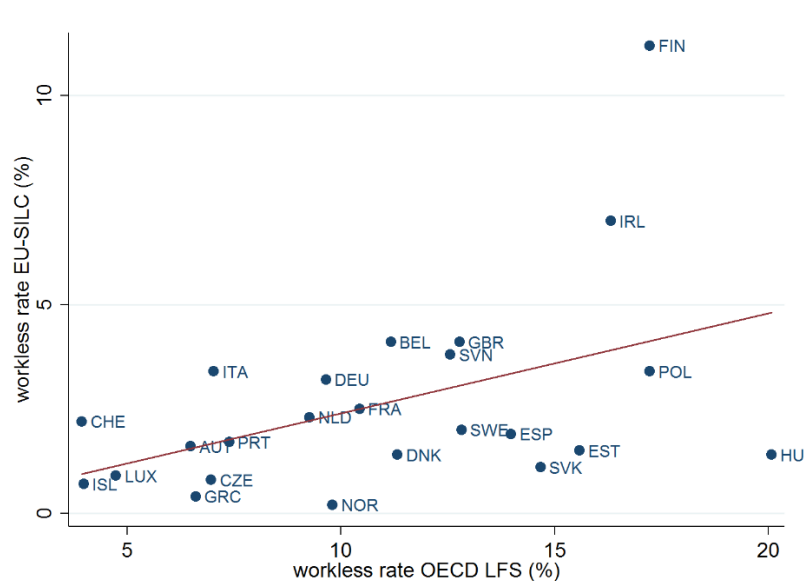
Figure A1: Workless rates among fathers in the EU-SILC compared to OECD LFS 1991- 2000 for the restricted and extended sample

Restricted



Pearson correlation: 0.627, Spearman rank: 0.462.

Extended

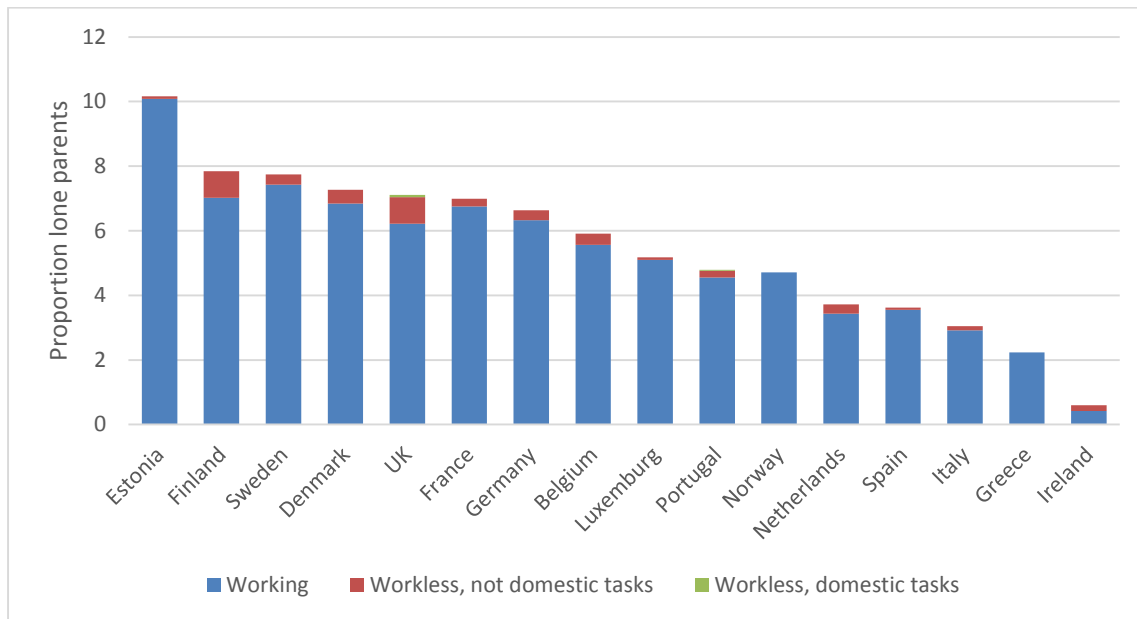


Pearson correlation: 0.416, Spearman rank: 0.455.

Workless rate measured as $(1 - \text{employment} / \text{population ratio})$ in OECD LFS for men aged 40-44. Average taken from 1991-2000. Workless rate measured as fathers reported unemployed, sick/disabled or other inactive as main activity when respondent age 14 between 1991-2000 in EU-SILC.

Figure A2: Lone parent (mother) rates across countries by main activity

EU-SILC



PISA

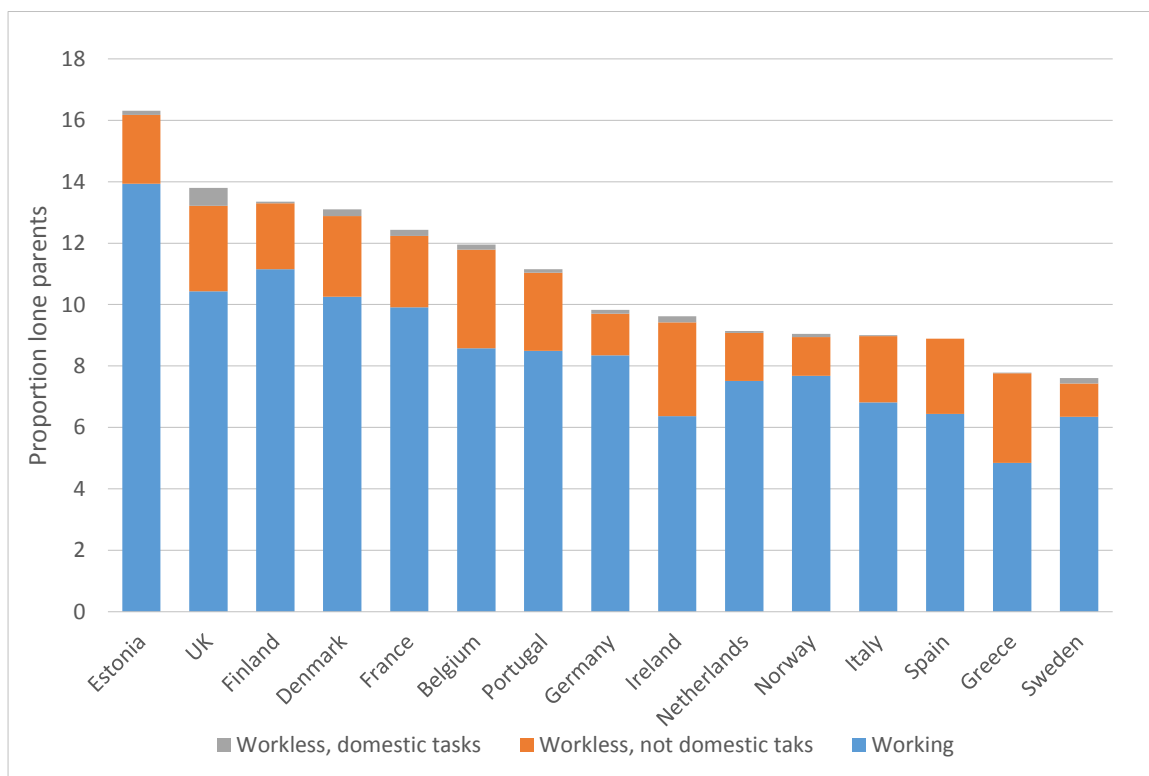
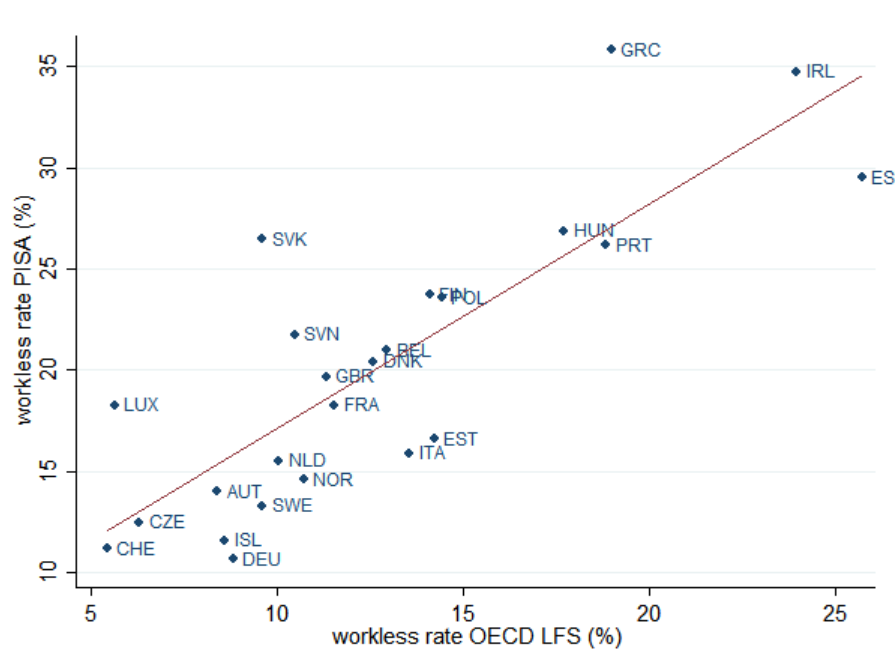


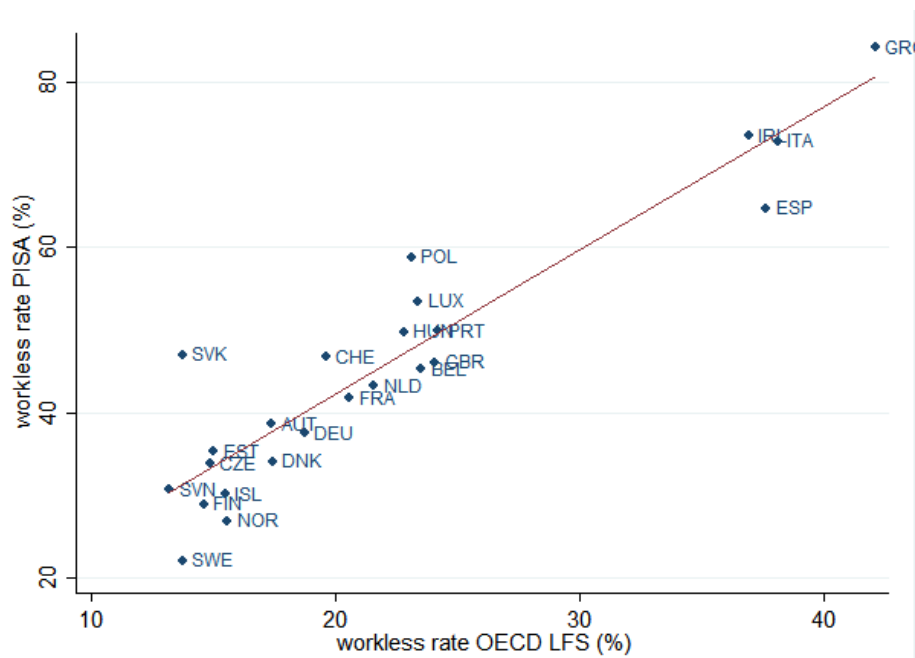
Figure A3: Workless rates among fathers and mothers in PISA compared to OECD LFS 2012 for the extended sample

Fathers



Pearson correlation: 0.817, Spearman rank: 0.798. Workless rate measured as $(1 - \text{employment} / \text{population ratio})$ in OECD LFS for men aged 40-44 in 2012. Workless rate measured as fathers not working at the time of the survey in PISA.

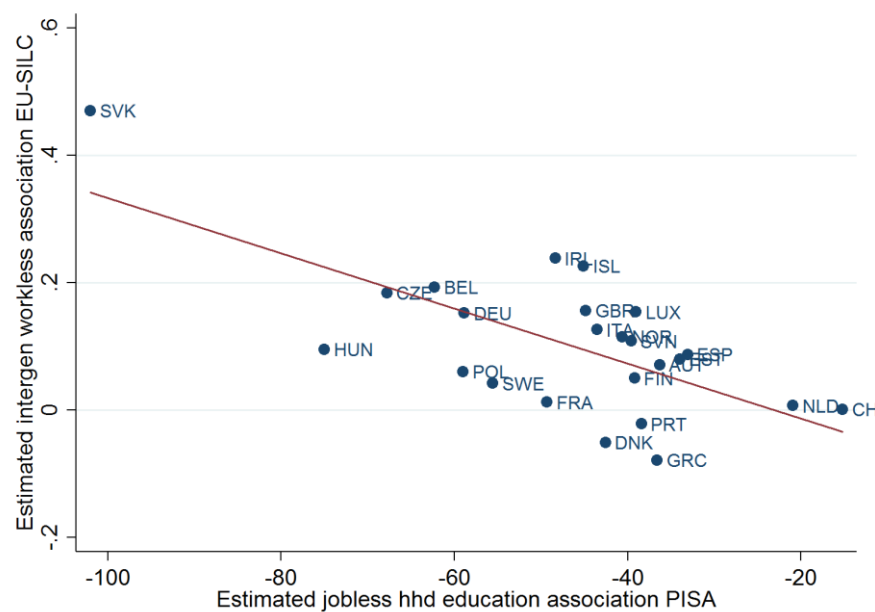
Mothers



Pearson correlation: 0.934, Spearman rank: 0.841. Workless rate measured as $(1 - \text{employment} / \text{population ratio})$ in OECD LFS for women aged 40-44 in 2012. Workless rate measured as mothers not working at the time of the survey in PISA.

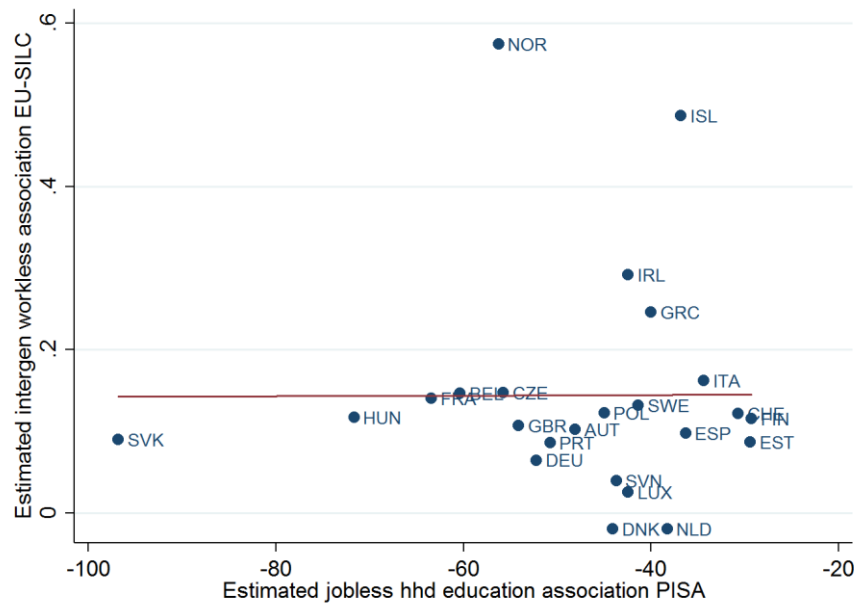
Figure A4: Relationship between intergenerational worklessness in the EU-SILC and experiencing a jobless household in childhood and maths associations in PISA for the extended sample

Sons



Pearson correlation: -0.680, Spearman rank: -0.544

Daughters

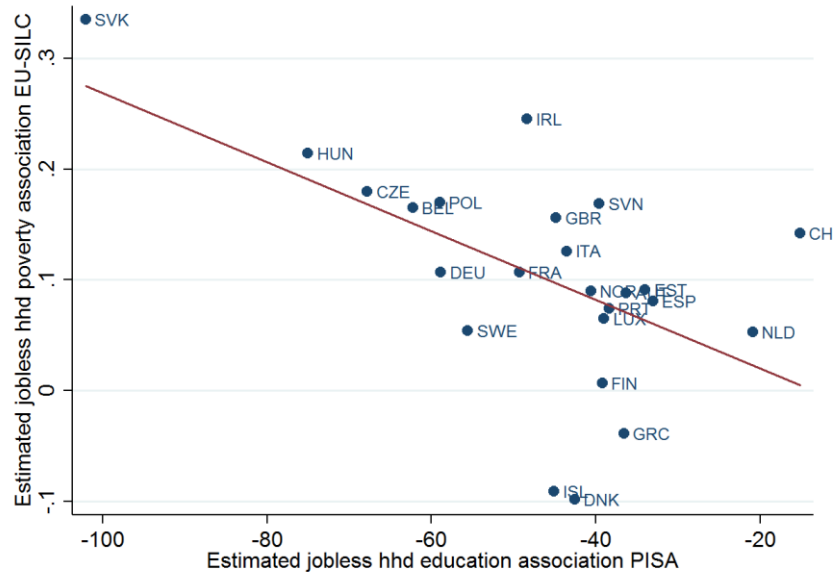


Pearson correlation: 0.004, Spearman rank: -0.057.

EU-SILC estimated associations from country-specific regressions: probit of sons and daughters (estimated separately) spending a whole year workless on an indicator experiencing a jobless household at 14, quadratic age controls for head of household and sons/daughters and a dummy for immigration status. Sample restricted to those reporting their head of household's main activity between 1981 and 2000 with a full 12 month activity history. Intergenerational unit weights applied. PISA estimate associations from country-specific regressions: OLS of sons' and daughters' (estimated separately) standardised maths score on an indicator of workless household at time of survey and a dummy for immigration status. Standard PISA weights applied.

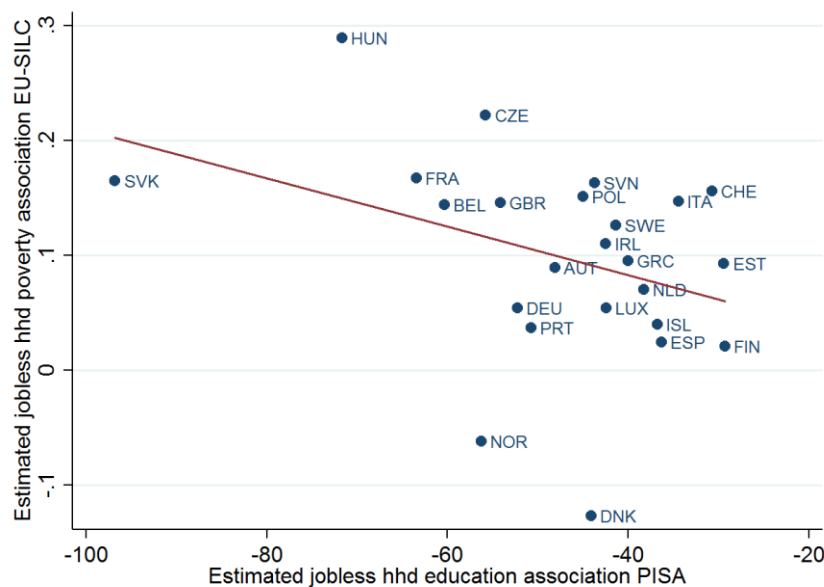
Figure A5: Relationship between experiencing a jobless household in childhood and adult poverty in the EU-SILC and experiencing a jobless household in childhood and maths associations in PISA for the extended sample

Sons



Pearson correlation: -0.565, Spearman rank: -0.554

Daughters



Pearson correlation: -0.362, Spearman rank: -0.384.

EU-SILC estimated associations from country-specific regressions: probit of sons' and daughters' poverty indicator (measured as at or below the at-risk-of-poverty threshold, 60% of median equivalised disposable income after transfers) on an indicator of jobless household at 14, quadratic age controls for head of household and daughters and a dummy for immigration status. Sample restricted to those reporting the main activity of the parent(s) they lived with at 14 between 1981 and 2000 with information on equivalised disposable household income. Intergenerational unit weights applied. PISA estimate associations from country-specific regressions: OLS of sons' and daughters' (estimated separately) standardised maths score on an indicator of the head of household workless at time of survey and a dummy for immigration status. Standard PISA weights applied.

