Office for National Statistics

Intergenerational transmission of disadvantage in the UK & EU

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Abstract

This report examines the extent to which the circumstances children grow up in affect their future life chances. Logistic regression techniques are used to analyse the relationship between childhood factors, such as parents' education level and employment status, and educational attainment; as well as the extent to which these factors predict income poverty and material deprivation in adulthood. As well as presenting analysis for the UK, comparisons with a number of other EU countries are also provided.

1. Key points

- Previous research has shown that the UK has relatively low levels of intergenerational earnings mobility compared with other OECD countries. By identifying the childhood factors that matter the most to the intergenerational transmission of poverty and disadvantage observed in the UK, it may be possible to gain a better understanding of the policies needed to improve income mobility across generations.
- Educational attainment has the largest impact on the likelihood of being in poverty and severely materially deprived as an adult, both in the UK and the other EU countries studied. Holding all else equal, in the UK, those with a low level of educational attainment are almost five times as likely to be in poverty now and 11 times as likely to be severely materially deprived as those with a high level of education.
- Growing up in a workless household also appears to have an impact on future poverty in the UK. Holding all else equal, those who lived in a workless household at age 14 are around 1.5 times as likely to be in poverty compared with those where one adult was working. However, this specific effect of worklessness was identified as a significant factor in only one other EU country.
- An individual's assessment of their childhood household financial situation is not a significant predictor of poverty and material deprivation in the UK once educational attainment is accounted for. This suggests that household income during childhood mainly impacts future life chances through the educational attainment of the child. However, these factors remain significant predictors of poverty and severe material deprivation in the Southern and Eastern European countries, even after controlling for educational attainment.
- The father's level of education has the largest impact on the likelihood of low educational attainment in the UK out of the factors examined. Holding all else equal, people are 7.5 times more likely to have a low educational outcome themselves if their father had a low level of

education, compared with having a highly educated father. Parental education level also has the largest effect on the likelihood of low educational attainment across the other EU countries, though the extent of this transmission varies and is highest for the Southern European countries, as well as some Eastern European countries and Baltic States.

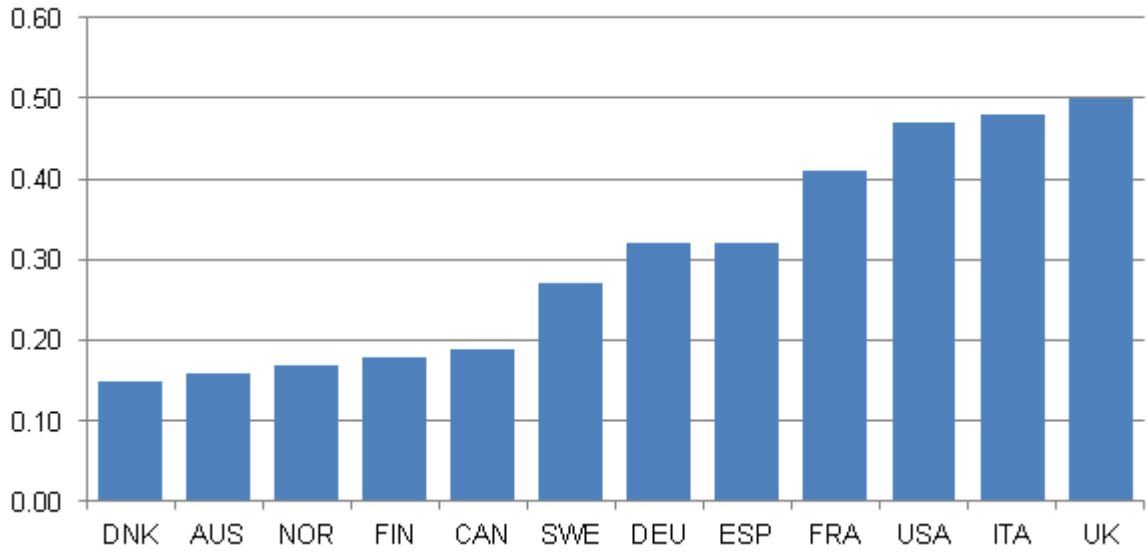
- In the UK, there is also a relationship between people's educational outcomes and their mother's educational level, the number of adults and children living in the household, the employment status of the parents and the childhood household's financial situation.

2. Introduction

2.1 Why analyse the link between childhood circumstances and future life chances?

In recent years there has been considerable research into the degree to which children born into poor families grow up to become poor adults. These studies have typically shown that intergenerational earnings mobility varies considerably across countries. Intergenerational earnings mobility measures the extent to which the economic status of children differs from that of their parents. A report by the OECD (d'Addio, 2007) highlighted that, along with the US and Italy, the UK has a relatively low level of earnings mobility, meaning that there is a strong relationship between the economic position of the parents in the earnings distribution and that of their children. By contrast, intergenerational mobility is a lot higher in the Nordic countries, Canada and Australia, indicating a relatively weak relationship between the economic status of parents and that of their children (Figure 1).

Figure 1: Intergenerational earnings elasticity from various studies



Notes:

1. Intergenerational earnings elasticity relates the earnings of parents to that of their children. A high value indicates high persistence of earnings across generations and therefore low intergenerational mobility.
2. Source: d'Addio (2007), from Corak (2006) & others

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As well as making for a fairer society, improving intergenerational mobility has a number of potential additional outcomes of interest to policymakers: It has been argued that greater equality of opportunity could reduce the need for welfare support, encourage greater social cohesion and make use of the potential of all individuals, increasing economic efficiency (see e.g. d'Addio, 2007).

By identifying the childhood factors that matter the most to the intergenerational transmission of poverty and disadvantage observed in the UK, it may be possible to gain a better understanding of the policies needed to improve intergenerational income mobility.

The primary aim of the analysis presented in this paper is to therefore provide further evidence regarding the intergenerational transmission of disadvantage in the UK. In particular, it seeks to identify which childhood factors are the most important predictors of educational outcome, poverty status and severe material deprivation. A further aim is to investigate to what extent the evidence supports the view that the primary mechanism for the intergenerational transmission of disadvantage is through educational attainment or whether, after accounting for educational attainment, other factors still appear to play a role.

The analysis uses data from EU Statistics on Income and Living Conditions (EU-SILC). In 2011, EU-SILC included an ad hoc module on the intergenerational transmission of disadvantage, providing an opportunity to extend the analysis conducted for the UK to other EU countries, enabling the comparison of the factors associated with intergenerational disadvantage across different welfare regimes.

2.2 What does previous research say about factors associated with the intergenerational transmission of disadvantage?

The following section provides a brief discussion of some of the childhood factors that have been associated with poverty and disadvantage in later life. For further detail of the previous evidence associated with these and other potential factors, there are a number of published evidence reviews, including one by the UK Government (2014), which builds on work by Jenkins and Seidler (2007a), Corak (2006), d'Addio (2007) and others.

Educational attainment

Education is consistently identified as the key mechanism explaining intergenerational income mobility, with the majority of childhood factors associated with the intergenerational transmission of poverty mainly operating by affecting the child's educational outcomes (see D'Addio, 2007 and HM Government, 2014 for a fuller discussion of the evidence). It is well established that higher levels of educational attainment are associated with better employment prospects and higher earnings, and therefore a reduced risk of poverty (see literature review by Smith & Middleton, 2007). Across the EU as a whole, an adult with poor qualifications is more likely to be in poverty than one that is highly educated (Grundiza & Lopez Vilaplana, 2013).

Parental qualifications

The level of parental qualifications has been proposed as one of the most important factors in the intergenerational transmission of poverty (Blanden & Gibbons, 2006; d'Addio, 2007). In the UK, evidence suggests that parental qualifications are more important to future outcomes than income and social class (Field, 2010). Parental education is generally viewed as the most important predictor of a child's educational outcomes (Ermisch & Pronzato, 2010; HM Government, 2014) affecting the likelihood of a child being well-educated in a number of ways; more educated parents are more likely to engage their children in educationally stimulating activities, are better able to help their children with education and have higher aspirations for them (Sylva et al., 2004; Bird, 2007). However, the precise nature of the relationship between parental qualifications and children's attainment is uncertain and the transmission mechanism may be through genetic traits or a relationship between educational success and parenting ability (Field, 2010).

Across the EU as a whole, there is a high degree of persistence of educational attainment between generations. In 2011, among those aged 25-59 whose parents had a low level of education, 34% had a low level themselves. By comparison, 8% of those whose parents had a medium level of education and 3% of those whose parents had a high level of education had a low level themselves (Grundiza & Lopez Vilaplana, 2013).

Childhood poverty

Parental income has also often been identified as one of the best predictors of a child's future life chances (d'Addio, 2007; HM Government, 2014). In the UK, someone in poverty as a teenager in the mid 1980s was almost four times as likely to be in poverty as an adult compared to those who were not in poverty as teenagers (Blanden and Gibbons, 2006). The evidence suggests that the impact of parental income on future poverty acts mainly through impacting on the child's educational attainment (HM Government, 2014). In 2012/13 38.7% of pupils eligible for free school meals achieved an A*-C grade in English and Mathematics GCSEs, compared with 65.3% of all other pupils. There is some evidence that a lack of income itself can be a cause of poorer educational outcomes (Cooper and Stewart, 2013) . However, poverty is also to a considerable extent a proxy for other family background factors that reduce attainment such as a less educationally stimulating home learning environment (Blanden & Gibbons, 2006).

Household composition

Previous research suggests that families with large numbers of children may be more vulnerable to poverty; a high ratio of children to adults affects the number of household members that limited resources need to provide for and there is evidence of a negative correlation between the number of children in a household and their educational outcomes (HM Government, 2014). In the US, families with two adults on average have higher incomes than those with different family structures (Bird, 2007) and it has been suggested that lone parenthood may increase the likelihood of poverty being transmitted across the generations (Bird, 2007; HM Government, 2014); this is likely to be related in part to the adverse impact of parental separation on the child's health and development (d'Addio, 2007), which is likely in turn to impact on their educational outcomes.

Parental employment

Beyond having a direct impact on the current risk of poverty, parental employment has also been identified as one of the key factors in the transmission of poverty from childhood to adulthood (Blanden & Gibbons, 2006; Field, 2010). Evidence suggests that children who grow up in households where one or more parents is out of work, are more likely to be out of work themselves as adults (Grundiza & Lopez Vilaplana, 2013), although the mechanism by which worklessness is transmitted is unclear. Macmillan (2011) found evidence to suggest that the intergenerational transmission of worklessness is relatively strong in weak labour markets with high unemployment, but there is no relationship where unemployment is low. There is also some evidence of a relationship between the job that parents do and the outcomes for their children (HM Government, 2014). Sylva et al. (2004) found that higher parental occupational status is associated with better educational attainment among children.

3. Research Methods

This section provides an overview of the methods and definitions used. For further details, please see the Technical Appendix.

3.1 Data used

EU-SILC is coordinated by Eurostat (the European Commission's statistical agency) under EC regulation and provides cross sectional and longitudinal data on income, poverty and living conditions across Europe. In 2011, a number of additional variables were collected from adults aged 25-59 inclusive, relating to their circumstances when they were approximately 14 years old. These additional variables covered details of the household composition, parents' employment statuses, economic situation of the household, and parents' education levels and country of birth/citizenship. (For the full list of the variables see Annex 1 in the data section of this release).

Data for the other EU countries was obtained from Eurostat's User Database (UDB). The 15 additional countries studied were chosen based mainly on low levels of missing data in the variables of interest. However, some countries with relatively high levels of missing data were included to ensure a representative spread of countries from all geographical locations across the EU.

The intergenerational transmission of disadvantage module on EU-SILC, and therefore this analysis, focussed on individuals aged 25-59 inclusive at the time of interview. Additionally, because the intention of this analysis to compare the differing experiences of individuals growing up in different EU countries, the sample for each country was further restricted to respondents who were expected to have been resident in the survey country at the time of the reference period and for the rest of their childhood. Those who were born elsewhere but had moved to the survey country by age 14 and those who were born in the survey country were therefore included; although respondents born in the survey country may not have grown up there, it was expected that sufficient numbers of them would have done so, to justify including them.

3.2 Logistic regression modelling

Logistic regression modelling is a statistical technique which can be used to assess how different factors may affect the likelihood of a particular event happening or not. In the current analysis, it is

used to determine the extent to which childhood factors predict low educational outcome, poverty and severe material deprivation in adulthood.

The advantage of using logistic regression is that it allows the relationship between poverty and a combination of different childhood characteristics to be examined simultaneously. In analysis which looks at the relationship between two variables, it can be tempting to infer that one variable is directly related to the other. For example, those whose household financial situation during childhood was poor may be more likely to be in poverty as adults, but does this mean that the differences in poverty now are primarily about differences in income? It has been argued that the impact of childhood poverty on future poverty is largely through its impact on an intermediate variable - educational attainment. Logistic regression helps isolate which of these factors – the financial situation of the household during childhood or educational attainment – has the strongest association with an increase in the odds of being in poverty once all other factors are held constant and equal. Nevertheless, it is important to bear in mind that in practice these factors are interrelated and that focusing only on the direct effect of childhood poverty on future poverty can potentially understate its importance.

3.3 Key definitions

Low educational attainment

Educational attainment in EU-SILC is reported using the International Standard Classification of Education (ISCED), which is maintained by the United Nations. The ISCED 1997 levels go from 0 (pre-primary education) to 6 (second stage of tertiary (e.g. PhD) level). Low educational attainment is defined throughout the analysis as reaching levels 0 to 2.

When considering educational attainment as a predictor of future life chances, ISCED levels 3-6 are further sub-divided into medium educational attainment, ISCED levels 3 and 4, and high educational attainment, ISCED levels 5 and 6.

Poverty

Poverty is based on the standard EU at-risk-of-poverty measure: living in a household with an equivalised disposable income (after social transfers) below the at-risk-of-poverty threshold. This threshold is set at 60 per cent of the national median equivalised disposable income after social transfers. This type of relative indicator does not measure wealth or poverty, but low income in comparison to other residents in that country, which does not necessarily imply a low standard of living.

Material Deprivation

Severe material deprivation also uses the standard EU definition - being unable to afford at least 4 of the following 9 items:

1. To pay their rent, mortgage, utility bills or loan repayments,
2. To keep their home adequately warm,
3. To face unexpected financial expenses,
4. To eat meat or protein regularly,

5. To go on holiday for a week once a year,
6. A television set,
7. A washing machine,
8. A car,
9. A telephone.

In order to investigate the impact of educational attainment on the predictors of poverty and severe material deprivation, logistic regressions were run for both these outcomes both excluding and including educational outcomes.

It should be noted that the outcomes being predicted relate to poverty or material deprivation in a single year, rather than looking at persistence over time. It is likely that some of the respondents experiencing poverty or severe material deprivation at the time of the 2011 data collection may well not have been experiencing poverty in an earlier or later year, although their childhood characteristics would remain the same.

3.4 Explanatory variable

The potential explanatory factors that were included in the modelling process are shown in Table 1. Further details regarding the derivation of these variables are included in the Technical Appendix. Table 1 also highlights the variables in the final models for education, poverty and severe material deprivation.

Table 1. Predictors of education, poverty and severe material deprivation in the UK

Factor	Education	Poverty	Severe material deprivation
Gender	●	● ●	● ●
Age group	●	● ●	● ●
Respondent's educational attainment		●	●
Father's educational attainment	●		
Mother's educational attainment	●		
Parents' educational attainment		● ●	●
Respondent's country of birth			
Father's country of birth			
Mother's country of birth			
Country of birth of respondent and parents		● ●	
Presence of parents in the household			● ●
Number of adults in the household	●		
Number of children in the household	●		● ●
Number of workers in the household		● ●	
Father's activity status			
Mother's activity status		●	
Father's employment status	●		● ●
Mother's employment status	●		● ●
Financial situation of the household		●	●
Ability to make ends meet	●	●	

● Variables included in the final models when not controlling for respondent's educational level

● Variables included in the final models when controlling for respondent's educational level

Many of these variables are based on retrospective recall of various childhood characteristics, most notably a subjective assessment of the income of the household during childhood. There is, therefore, a risk of bias and error in such measures. These issues are discussed in depth in the Technical Appendix.

3.5 Interpreting the results of the logistic regression analysis

The results of the regression model show the individual effect each childhood factor has on the odds of an adult having low educational attainment (or being in poverty or being severely materially deprived), compared with an adult with the baseline set of reference characteristics. Childhood factors with an odds ratio greater than 1 imply an increased likelihood of an individual with that particular characteristic being in poverty now compared with the reference characteristic. Conversely, an odds ratio less than 1 implies a reduced likelihood – holding all other characteristics constant and equal.

For example, an odds ratio of 2 for having a father who was unemployed compared to a father employed in a supervisory role can be interpreted as meaning that those whose fathers were

unemployed when they were age 14 are twice as likely to be in poverty now, compared with those whose fathers worked in a supervisory role.

Detailed regression outputs for the UK models are provided in Annex 3 (in the data section of this release). Similar outputs are available for the other countries on request.

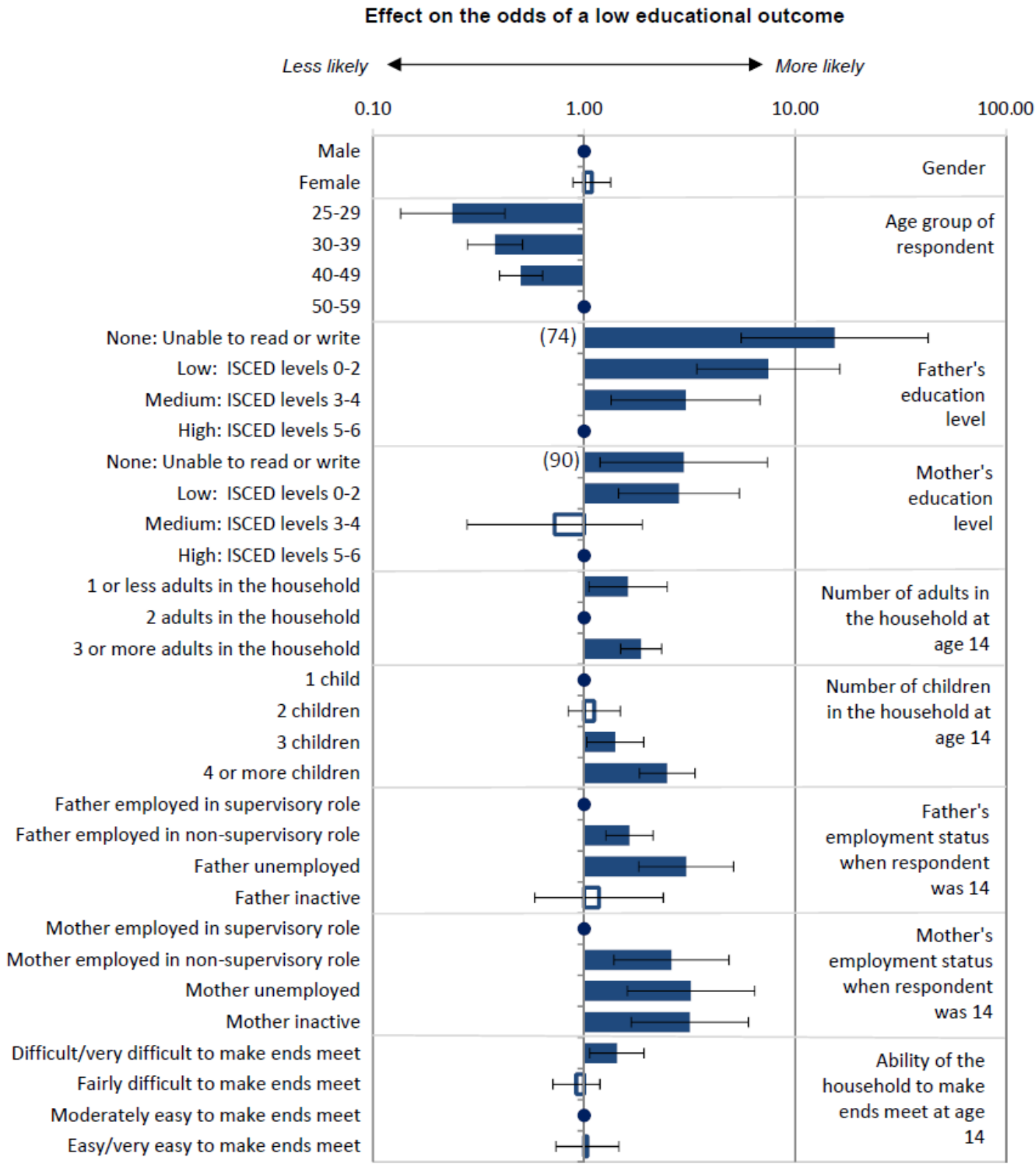
The odds ratios provide an indication of the size of the effect that each childhood factor has on the likelihood of future disadvantage. However, it should be noted that a strongly influential factor may only affect a very small number of people and so not be as useful in developing our overall understanding of the intergenerational transmission of poverty and disadvantage. Therefore, the tables in Annex 3 also include the percentage of the study population that have experienced each characteristic in order to better put these effects into context.

4. What are the predictors of low educational attainment?

Key findings:

- In the UK, the father's level of education has the largest impact on the likelihood of low educational attainment out of the factors examined. People are 7.5 times more likely to have a low educational outcome themselves if their father has a low level of education compared with having a highly educated father.
- The mother's education level also has an impact, though to a lesser degree; people are around 3 times more likely to have a low educational outcome if their mother has a low level of education.
- There is also a relationship between educational outcomes and the number of adults and children living in the household, the employment status of the parents and the childhood household's financial situation.

Figure 2: The effect of childhood factors on the odds of a low educational outcome as an adult in the UK



Interpreting this figure
This figure shows the effect each childhood characteristic has on the odds of a low educational outcome, relative to a set of reference characteristics (shown by the solid dots). Where the odds ratio is greater than 1 (bars to the right), there is an increased likelihood of a low educational outcome compared to the reference characteristic, holding all other characteristics constant and equal. An odds ratio less than 1 (bars to the left) indicates a reduced likelihood.

Solid bars indicate statistically significant effects ($p<0.05$). Hollow bars show non-significant results. The error bars show the 95% confidence intervals for each effect. Sample sizes of less than 100 respondents are shown in brackets.

Source: Office for National Statistics

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The analysis in this section looks at the likelihood of people attaining a low level of education, based on their circumstances as a child (age 14). Figure 2 shows that, holding all other characteristics constant and equal, the factor with the largest impact on the odds of a low educational outcome is the father's education level: A respondent is 7.5 times more likely to have a low educational outcome if their father has a low level of education compared to a highly educated father . Mother's education level is also important though to a lesser degree; a person is approximately 3 times as likely to have a low educational outcome if their mother has a low level of education. While the results for those with fathers who are unable to read or write are even more striking, it should be noted that only a small proportion of individuals reported having a mother or father unable to read or write.

Previous research has suggested that while both maternal and paternal qualifications are both important influences on children's educational attainment, it is maternal qualifications that appear to have the largest influence. However, the current research suggests that, holding all else equal, it is the level of qualifications of the father that has the largest influence on the odds of a low educational outcome.

Other childhood factors which proved to be significant predictors are parental employment status and the household composition.

Compared with those whose father was employed in a managerial position when they were aged 14, those whose father was unemployed are around three times as likely to have a lower educational outcome. Similarly, the odds of low educational outcomes increase approximately threefold when the mother was unemployed, with a comparably sized increase in likelihood also evident where the mother was inactive. The model also indicates an impact on educational attainment where parents were not in managerial roles.

In terms of the household composition, growing up in a single adult household and in a household with more than two children significantly increases the likelihood of a low educational outcome. Holding all else equal, the odds of a low educational outcome is 1.6 times higher for those who grew up in a single adult household compared to households with two adults. Growing up in a household with three or more adults also increases the odds of low educational attainment by a factor of almost 2.

Growing up in a household with three or more children increases the likelihood of a low level of education by 1.4 times compared with being the only child, while those growing up in a household with four or more children are 2.5 times as likely to have low educational attainment.

There is also a relationship between educational attainment and individuals' subjective assessment of their household financial situation as a child. Holding all else equal, those growing up in households experiencing difficulty or great difficulty in making ends meet are around one and a half

times as likely to have a low educational outcome compared with those in households that found it moderately easy to make ends meet.

Notes

1. Low parental educational attainment is defined as ISCED levels 0-2. High attainment is ISCED levels 5-6

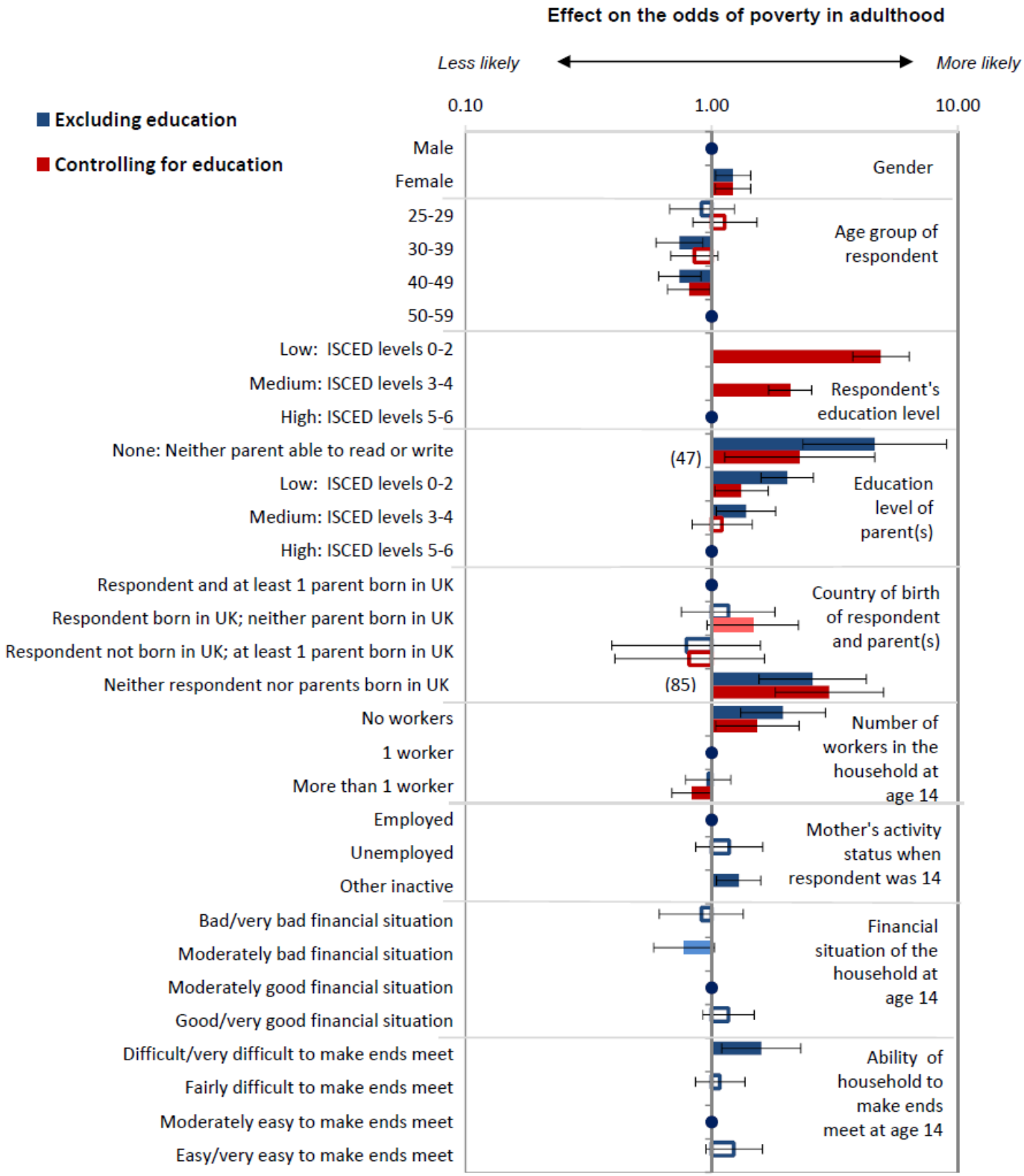
2. ($p<0.05$)

5. What are the childhood predictors of future poverty?

Key findings:

- Of those studied, educational attainment is the most important factor in explaining poverty in the UK. Those with a low level of educational attainment are almost five times as likely to be in poverty now as those with a high level of education.
- Growing up in a workless household also appears to have an impact. Holding all else equal, those who lived in a workless household at age 14 are around 1.5 times as likely to be in poverty compared with those where one adult was working.
- Once educational attainment is controlled for, the financial situation of the household as a child is not a significant predictor of childhood poverty. This suggests that household income during childhood mainly impacts future life chances through the educational attainment of the child.

Figure 3: The effect of childhood factors on the odds of experiencing poverty in adulthood in the UK



Interpreting this figure

This figure shows the effect each childhood characteristic has on the odds of poverty in adulthood, relative to a set of reference characteristics (shown by the solid dots). The results including the respondent's own educational outcome (in red) are shown alongside those where it was not included, to enable comparison.

Where the odds ratio is greater than 1 (bars to the right), there is an increased likelihood of a low educational outcome compared to the reference characteristic, holding all other characteristics constant and equal. An odds ratio less than 1 (bars to the left) indicates a reduced likelihood.

Solid bars indicate significant results; darker solid bars show results with $p<0.05$ while lighter solid bars show results with $p<0.1$. Hollow bars show non-significant results. The error bars show the 95% confidence intervals for each effect. Sample sizes of less than 100 respondents are shown in brackets.

Source: Office for National Statistics

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The analysis in this section models the extent to which various childhood factors predict the likelihood of being in relative low income poverty as an adult. When the respondent's own educational attainment is included in the model, this is the most important predictor of current poverty status (Figure 3), in terms of the strength of its effect. Those with a low level of educational attainment are almost five times as likely to be in poverty now as those with a high level of education.

There is also some evidence that the relationship between some of the childhood factors and future disadvantage may be at least partly explained by educational attainment. For example, there is some evidence of a relationship between current poverty and individuals' subjective assessment of their financial situation as a child, when the respondent's own educational attainment is not considered. Holding all else equal, the ability to make ends meet impacts on the future poverty status with those growing up in households experiencing difficulty or great difficulty making ends meet increasing the odds of adult poverty by 1.6 times compared with those who found things moderately easy.

However, this effect disappears when controlling for the respondent's educational outcome. This is consistent with previous research indicating that income itself is not the primary driver of poverty persisting through the generations (Blanden & Gibbons, 2006). Taken with the finding that the ability to make ends meet does have an impact on the child's educational outcome, this provides further evidence to suggest that household income during childhood impacts future life chances through the educational attainment of the child. It has been suggested that one such mechanism of transmission is through parents investing in their children through the home environment (e.g. home learning activities, health and nutrition) (UK Government, 2014).

Amongst the childhood factors examined, whilst several of them are no longer significant when educational attainment is included in the model, this is not the case for all the factors. In many cases, these factors continue to predict the level of disadvantage experienced in adulthood, though the odds ratios associated with them are reduced. For example, before considering the individual's own educational attainment, those with low parental educational levels are twice as likely to be in poverty now as those children who had at least one highly educated parent. Controlling for the individual's own education reduces the importance of parental education level as a predictor, though it remains significant. Holding all else equal, those with low parental qualifications are 1.3 times more likely to be in poverty than those where at least one parent had high educational attainment. This suggests that while part of the impact of parental education on future poverty may be through its relationship with the child's educational attainment, it may also be impacting through alternative mechanisms.

The number of workers in the household in childhood was also found to be a significant predictor of current poverty status. Holding all else equal, those growing up in a workless household are almost twice as likely to experience poverty in adulthood, compared with those growing up in households

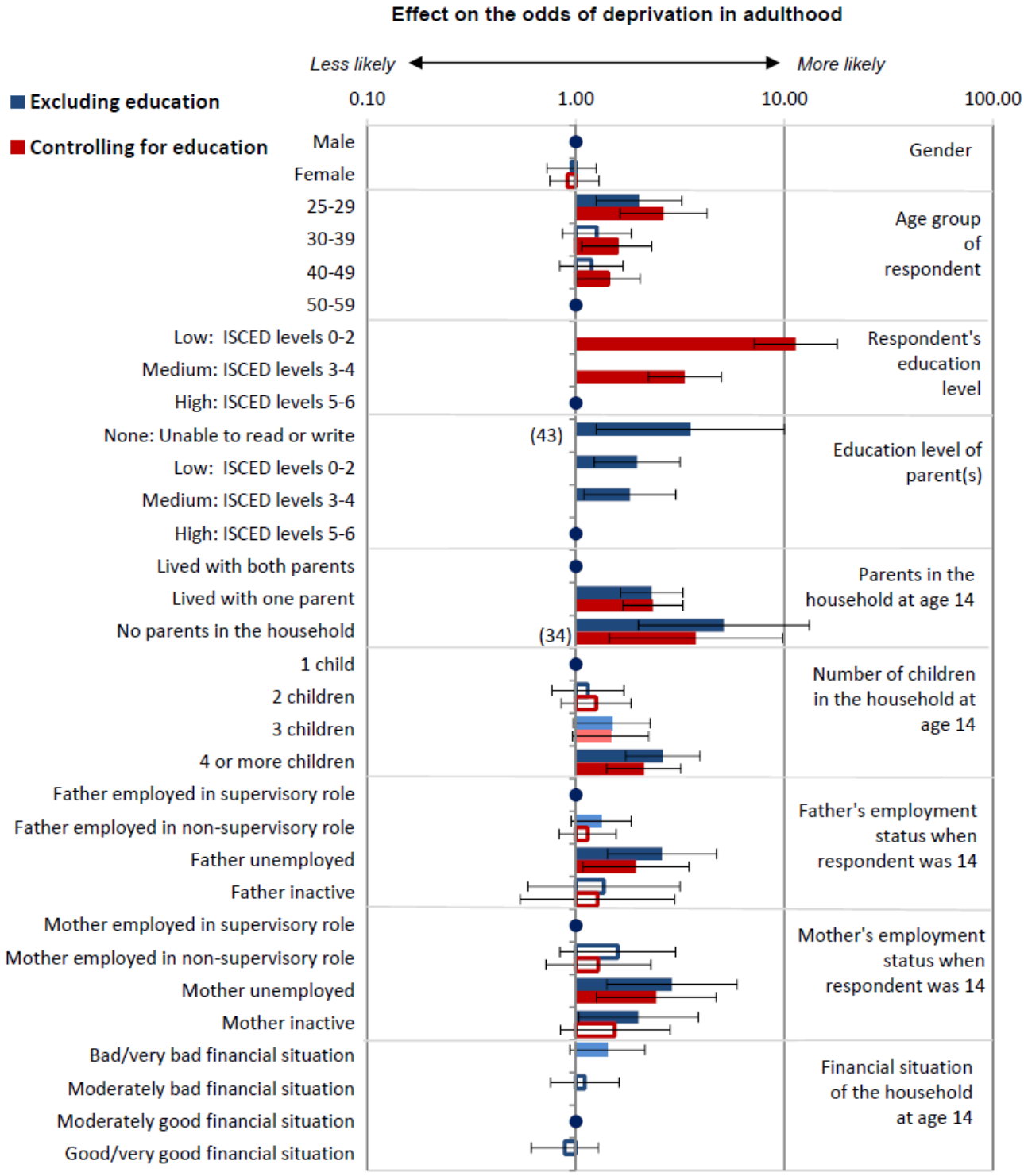
with at least 1 worker. Introducing the educational attainment of the individual slightly reduces the effect of worklessness on the odds of being in poverty, but also resulted in a significant effect for those who grew up in households with more than one worker, with lower odds that these children would be in poverty as adults compared with households with just 1 working adult.

6. What are the childhood predictors of future material deprivation?

Key findings:

- Educational attainment is also the most important predictor of severe material deprivation in the UK. Holding all else equal, those with low attainment are 11 times as likely to be severely deprived as those with a high level of education.
- The number of parents and children in the childhood household also has a large effect. Those growing up in a single parent household are over twice as likely to be severely materially deprived as those who lived with both parents. The odds of severe material deprivation are twice as high for those who grew up in households with four or more children compared with a single child.
- Parental unemployment as a child also has an impact on the odds of being severely materially deprived now.
- There is no evidence of a relationship between severe material deprivation now and the financial situation of the household as a child, once educational attainment is controlled for.

Figure 4: The effect of childhood factors on the odds of experiencing severe material deprivation in adulthood in the UK



Interpreting this figure

This figure shows the effect each childhood characteristic has on the odds of deprivation in adulthood, relative to a set of reference characteristics (shown by the solid dots). The results including the respondent's own educational outcome (in red) are shown alongside those where it was not included, to enable comparison.

Where the odds ratio is greater than 1 (bars to the right), there is an increased likelihood of a low educational outcome compared to the reference characteristic, holding all other characteristics constant and equal. An odds ratio less than 1 (bars to the left) indicates a reduced likelihood.

Solid bars indicate significant results; darker solid bars show results with $p<0.05$ while lighter solid bars show results with $p<0.1$. Hollow bars show non-significant results. The error bars show the 95% confidence intervals for each effect. Sample sizes of less than 100 respondents are shown in brackets.

Source: Office for National Statistics

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The analysis in this section looks at the likelihood of people being materially deprived now, based on their circumstances as a child. As with relative income poverty, the results of the model for severe material deprivation in Figure 4 show that the respondent's own educational attainment is the most important predictor of their deprivation status, in terms of the size of its effect on the odds of being materially deprived. Compared with those with a high level of education and holding all else equal, those with low educational attainment are 11 times as likely to be severely materially deprived. Again, compared with those with high educational attainment, the odds of being severely deprived are three times higher for those with a medium level of education (ISCED 3-4).

After educational attainment, the presence of parents has the next largest impact on the odds of being severely materially deprived: An individual is 2.3 times as likely to be severely materially deprived if they lived in a single parent household at age 14, compared with living in a household with two parents. This effect is not affected by controlling for the individual's level of education, suggesting that the impact may be through alternative mechanisms. The number of children in the household also has a significant effect on deprivation, with the odds over twice (2.1 times) as high for those who grew up in households with four or more children compared with a single child, after controlling for educational attainment.

Parental employment has an impact on the deprivation status, with the odds of severe material deprivation in adulthood 1.9 times higher for those whose father was unemployed compared with those who worked in a managerial role. There is a similar effect for maternal unemployment, with the odds of experiencing severe material deprivation 2.4 times higher, compared with those whose mother worked as a manager.

There is some evidence that the financial situation of the household as a child has an effect on the likelihood of deprivation status in adulthood, with those growing up in what they perceived to be households in a bad or very bad financial situation 1.4 times as likely to be severely materially deprived. Again, this effect disappears once educational outcomes have been controlled for. Similarly, the education level of the parents is no longer a significant predictor of severe material deprivation after accounting for educational attainment, suggesting that parental education impacts on current deprivation status through influencing the educational outcomes of the child.

7. Comparisons with other EU countries

Key findings:

- The intergenerational transmission of disadvantage is an issue across all the countries examined, though the scale varies considerably. Similarly, while there are certain factors that are important for all (or nearly all) countries, there are clear patterns across different geographical areas, possibly reflecting differences in the nature of welfare regimes in these countries.

- Parental education has the largest effect on the likelihood of a low educational outcome across Europe. However, the magnitude of this effect varies and is highest for the Southern European countries, as well as some Eastern European countries and Baltic States.
- As in the UK, educational attainment has the greatest impact on the likelihood of future disadvantage across the entire geographical range.
- Unlike in the UK, the variables relating to the household financial situation during childhood remain significant predictors of poverty and severe material deprivation for the Southern and Eastern European countries even after controlling for educational attainment.
- While living in a workless household during childhood is an important predictor of poverty in the UK, after controlling for other factors, it was identified as significant in only one other country.
- The relative lack of childhood predictors of future disadvantage in all of the Danish models is consistent with the assertion that Denmark has one of the highest levels of intergenerational mobility in the EU.

Table 2 shows the proportion of people with low educational outcomes, in poverty and experiencing severe material deprivation for each of the countries included in this analysis. This shows clearly that there is considerable variability across the different EU member states. Low educational outcomes affect much larger proportions of the section of the population studied in Southern Europe compared with the other member states. Northern Europe and Scandinavia have relatively low poverty and severe material deprivation rates, with Scandinavian and Dutch study populations showing particularly low rates of severe material deprivation. By comparison, Italy, the Baltic States and Eastern Europe have relatively high rates of severe material deprivation among respondents. Southern Europe is characterised by relatively high poverty rates, but relatively low severe material deprivation rates, except in the case of Italy.

Table 2. Numbers of respondents in total and for each outcome category (unweighted), with the corresponding percentages of the study population (weighted)

Region	Country Code	Country	Total number of respondents (unweighted)	Low educational outcome		In poverty		Severely materially deprived	
				Unweighted N	%	Unweighted N	%	Unweighted N	%
	UK	UK	5 073	473	9	699	12	240	5
Northern Europe	FR	France	8 495	1 286	17	742	11	303	5
	AT	Austria	5 106	567	13	359	8	128	3
	BE	Belgium	4 002	715	20	265	9	118	4
	NL	Netherlands	4 671	627	18	211	9	37	2
Scandinavia	DK	Denmark	2 208	292	20	99	11	27	3
	SE	Sweden	1 640	73	8	127	11	11	2
Southern Europe	IT	Italy	18 756	6 961	42	2 818	17	1 545	10
	PT	Portugal	5 025	3 354	65	729	15	340	7
	ES	Spain	13 420	5 840	42	2 497	18	351	3
Baltic States	EE	Estonia	4 027	451	10	702	17	349	9
	LV	Latvia	4 175	551	15	844	20	1 184	30
	LT	Lithuania	4 355	327	9	695	20	606	17
Eastern Europe	BG	Bulgaria	5 906	1 119	21	915	17	2 159	39
	HU	Hungary	12 619	2 175	17	1 790	13	2 932	23
	PL	Poland	13 661	1 351	10	2 513	17	1 695	12

Table source: Eurostat

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Guide to interpreting Tables 3-7

The odds ratios for the significant predictors in each of the models are shown in Tables 3-7. The numbers should be interpreted as indicating how many times more likely an individual is to experience the outcome if they have this characteristic compared to the baseline set of reference characteristics. Where the odds ratio is less than 1, this indicates a reduced likelihood of the outcome, while an odds ratio greater than 1 indicates an increased likelihood of the outcome. For

example, from Table 3, for Italy, the corresponding odds ratio relating to having a father with a low level of educational attainment is 11.44. This indicates that an individual in Italy whose father had a low level of educational attainment is 11.44 times as likely to have a low level of educational attainment themselves compared to someone whose father had a high level of education, holding all other characteristics equal and constant

The size of the odds ratio is also reflected in the intensity of the colour coding; the darker the blue, the larger the increased likelihood, with red indicating a reduced likelihood. The country codes used in the tables are shown in Table 2. An X in the table indicates no statistically significant relationship. All figures indicate a significance level of $p<0.05$, except for those in italics, where $p<0.1$. A red border indicates a sample size of less than 100 respondents.

7.1 Educational attainment

Overall, many of the same factors predict educational outcomes across the EU countries examined (Table 3 a&b). For all the countries, the level of education of the parents either has the largest or one of or the largest impacts on the odds of a low educational outcome for the individual, whether this is for each parent individually or for both parents combined. There is some variation in the odds ratios across countries. For example, in Denmark, holding all else equal, those whose parents had low educational attainment are around 3 times as likely to have a low level of education themselves when compared with those for whom at least one parent had a high education level. By comparison, in Italy, the odds of having low educational attainment are around 13.5 times higher for those with a mother with low qualifications and 11.5 times higher for those with a father with low qualifications, compared with having a mother/father who had a high level of education. In general, the relative impact of parental education is particularly high in the Southern and Eastern European countries and the Baltic States, in contrast with relatively lower rates in most of the Northern European and Scandinavian countries studied.

In the UK and France, father's low educational level has a larger impact on the odds of the respondent having low educational attainment themselves than the mother's education, whereas in most of the other countries, the mother's educational attainment is generally slightly more important.

Beyond parental qualifications, the almost universal significance of one or other of the subjective income variables in predicting education provides clear evidence of the importance of income on educational achievements in almost all the countries across the EU, highlighting that the pattern of children from low income households not performing as well in education is not limited to the UK.

Other factors that appear to be almost universally important are the household composition in terms of number of adults and children, as well as one or other of the subjective assessments of household income (ability to make ends meet or financial situation of the household). Overall the odds ratios for these factors are fairly similar across all the countries.

Table 3 (a&b) also reveals a notable lack of predictors of educational outcomes in the Netherlands, Latvia and the Scandinavian countries among the variables included in this analysis. In particular, for Denmark, only two of the variables are identified as significant predictors of a low educational outcome: parental educational attainment and the number of children in the household. Neither

of the subjective income variables predicts low educational outcome in either of the Scandinavian countries included in this study.

Father's employment status is a predictor of educational outcomes in all but 6 countries and generally having a father who was employed in a non-supervisory role rather than a managerial position increases the likelihood of a low educational outcome by between 1.3 and 1.8 times. The figures related to unemployed fathers are more variable but for some countries small sample sizes for this category may have presented an issue.

One childhood predictor that had a particularly strong impact on the odds of low educational attainment in the UK compared with other countries is the mother's employment/activity status. In the UK, those whose mother was unemployed or inactive are 3 times as likely to have low educational outcomes compared with those whose mother was in a managerial role, holding all else equal. Apart from the UK, the mother's employment status is a significant predictor of educational outcomes only in Portugal, though the related variable mother's activity status is a predictor in 5 additional countries, spread across the different areas of Europe. In these cases, having an inactive mother increases the likelihood of poor educational outcomes, while maternal unemployment is not significant. It should be noted though that in all these cases the sample size of unemployed mothers was small.

Table 3a: Odds ratios for the significant predictors of the respondent's educational outcomes across the EU

Education	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Gender																
Male (reference group)																
Female	X	1.24	2.22	X	1.23	X	*0.64*	0.88	0.56	0.80	0.47	0.39	0.54	X	1.42	X
Age																
25-29	0.24	0.35	X	0.40	0.57	0.45	X	0.48	0.45	0.78	5.72	4.41	6.99	2.39	X	X
30-39	0.38	0.39	0.63	0.31	0.44	0.34	X	0.64	0.58	0.58	4.00	4.45	5.77	2.01	1.17	0.75
40-49	0.50	0.53	0.62	0.48	0.69	0.73	0.35	0.92	X	0.72	X	X	X	X	X	0.62
50-59 (reference group)																
Father's educational attainment																
None: Unable to read or write	15.37	4.47	X	-	11.48	-	-	36.40	20.24	14.33	X	47.66	-	19.36	12.14	3.90
Low: ISCED levels 0-2	7.45	2.98	2.05	-	3.80	-	-	11.44	6.08	5.81	2.18	6.12	-	6.78	6.91	2.07
Medium: ISCED levels 3-4	3.02	X	X	-	1.70	-	-	X	*2.03*	3.66	X	*2.68*	-	*2.37*	5.49	X
High: ISCED levels 5-6 (reference group)																
Mother's educational attainment																
None: Unable to read or write	2.96	2.85	10.13	-	18.02	-	-	36.90	17.54	16.37	*12.07*	48.54	18.88	26.25	14.76	3.64
Low: ISCED levels 0-2	2.81	1.77	6.30	-	5.90	-	-	13.57	7.12	4.28	4.71	22.90	10.92	8.33	8.56	4.40
Medium: ISCED levels 3-4	X	X	*2.54*	-	3.51	-	-	X	X	*2.41*	2.25	6.19	4.44	X	*4.37*	X
High: ISCED levels 5-6 (reference group)																
Parents' educational attainment																
None: Unable to read or write	-	-	-	15.27	-	-	-	X	-	X	-	X	-	-	X	-
Low: ISCED levels 0-2	-	-	-	8.11	-	3.04	3.81	X	-	X	-	0.22	-	-	X	-
Medium: ISCED levels 3-4	-	-	-	2.77	-	2.03	*1.92*	X	-	X	-	X	-	-	X	-
High: ISCED levels 5-6 (reference group)																
Derived country of birth																
Respondent and at least 1 parent born in survey country (reference group)																
Respondent born in survey country; neither parent born in survey country	-	-	*1.68*	-	-	-	-	-	X	*1.78*	-	-	-	-	-	-
Respondent not born in survey country; at least 1 parent born in survey country	-	-	X	-	-	-	-	-	0.51	0.65	-	-	-	-	-	-
Neither respondent nor parents born in survey country	-	-	2.83	-	-	-	-	-	0.30	X	-	-	-	-	-	-
Presence of parents in the household																
Lived with both parents (reference group)																
Lived with one parent	-	1.46	-	1.48	-	-	-	-	X	-	-	-	-	-	X	*1.43*
No parents in the household	-	*1.81*	-	X	-	-	-	-	3.24	-	-	-	-	-	3.31	2.52

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

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Table 3b: Odds ratios for the significant predictors of the respondent's educational outcomes across the EU

Education	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Number of adults in the household																
1 or less	1.61	X	1.90	-	2.11	-	3.90	X	X	X	-	-	X	-	X	X
2 (reference group)																
3 or more	1.86	1.32	*1.20*	-	X	-	X	1.39	1.20	1.17	-	-	1.34	-	1.33	1.16
Number of children in the household																
1 (reference group)																
2	X	X	X	X	-	*0.73*	-	1.20	*1.19*	1.17	X	X	X	*1.22*	X	X
3	1.40	1.25	*1.26*	X	-	X	-	1.63	1.86	1.46	*1.37*	X	1.53	4.15	1.68	X
4 or more	2.47	1.60	1.44	1.62	-	1.65	-	2.56	2.67	1.86	1.78	1.85	2.18	7.16	4.01	1.58
Number of workers in the household																
No workers	-	-	-	-	-	-	-	X	X	X	-	-	-	-	-	2.00
1 worker (reference group)																
More than 1 worker	-	-	-	-	-	-	-	1.39	1.39	1.24	-	-	-	-	-	1.23
Father's activity status																
Employed (reference group)																
Unemployed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other inactive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mother's activity status																
Employed (reference group)																
Unemployed	-	X	-	-	-	-	X	X	-	-	-	-	-	2.95	X	-
Other inactive	-	1.23	-	-	-	-	2.14	1.22	-	-	-	-	-	1.52	1.69	-
Father's employment status																
Employed in supervisory role (reference group)																
Employed in non-supervisory role	1.64	1.76	1.31	1.53	-	-	-	1.31	1.48	1.83	1.57	-	-	-	1.77	1.76
Unemployed	3.04	X	4.17	2.56	-	-	-	1.84	X	2.67	X	-	-	-	5.33	2.51
Other inactive	*X*	1.68	2.12	X	-	-	-	1.40	3.58	2.48	X	-	-	-	2.65	X
Mother's employment status																
Employed in supervisory role (reference																
Employed in non-supervisory role	2.59	-	-	-	-	-	-	-	2.00	-	-	-	-	-	-	-
Unemployed	3.21	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
Other inactive	3.17	-	-	-	-	-	-	-	2.21	-	-	-	-	-	-	-
Financial situation																
Bad/very bad	-	1.40	1.86	1.80	-	-	-	2.28	2.45	2.23	-	-	2.66	1.63	2.10	1.90
Moderately bad	-	X	X	X	-	-	-	1.44	1.44	1.49	-	-	*1.36*	1.41	X	1.47
Moderately good (reference group)																
Good/very good	-	X	X	X	-	-	-	X	0.78	0.84	-	-	-	0.80	0.84	*0.87*
Ability to make ends meet																
Difficult/very difficult	1.43	-	-	-	*1.34*	-	-	1.24	-	X	1.72	1.38	-	-	-	-
Fairly difficult	X	-	-	-	*0.74*	-	-	1.17	-	X	1.42	1.31	-	-	-	-
Fairly easy (reference group)																
Easy/very easy	X	-	-	-	X	-	-	X	-	0.85	X	X	-	-	-	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

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7.2 Relative income poverty

Table 4 (a&b) shows that, before accounting for the respondent's own educational attainment, across almost all the EU countries examined, parental educational levels, of either one or both parents, are significant predictors of poverty in adulthood. The largest impacts on poverty are evident in Bulgaria, where, holding all else equal, the odds of being in poverty now are 7 times higher for those with mothers with a medium level of education, 23 times higher for those whose mothers had low qualifications, and 46 times higher for mothers unable to read or write, all compared with those whose mothers had a high level of educational attainment.

In contrast to the UK model, household composition (the number of adults and children) at age 14 proves to be a significant predictor in the majority of countries, while living in a workless household during childhood was identified as a predictor in no country other than the UK; however, for Hungary, Estonia and Lithuania, having more than one worker in the household as a child does reduce the likelihood of current poverty.

As in the UK, when the individual's own educational attainment is included in the modelling (Table 5 a&b), this proves to have the largest impact on the likelihood of future poverty for all the countries analysed. A low educational outcome has the biggest relative impact in the Eastern European countries, increasing the likelihood of poverty by between 11 and 15 times compared with respondents with high educational attainment.

In almost all countries except the Baltic States, parental education remains as a predictor of current poverty even after controlling for the respondent's education level, though its impact is reduced. However the results for the two Scandinavian countries and the Netherlands are somewhat surprising in that they reveal, after holding all else equal and constant, lower odds of being in poverty now if the father had a lower education level than a highly educated father. It is not immediately apparent why this might be the case.

In the Southern and Eastern European countries, one or other of the subjective childhood income variables, most often the financial situation of the household during childhood, remains as an important predictor of poverty even after controlling for the respondent's educational attainment. This suggests that, for these countries, income is a significant predictor of future disadvantage in its own right, and does not operate entirely through educational outcomes. However in most of the Northern European, Scandinavian and Baltic states, these variables are no longer significant once educational attainment is included in the model, as was found in the UK.

There is a difference between the UK poverty models and the poverty models for the remaining member states in terms of the relative importance of household composition and worklessness. For example, living in a workless household during childhood is identified as a predictor in the final UK poverty model but was only included in the model for one other country. The UK finding is consistent with previous research using cohort study data on the intergenerational transmission of worklessness in the UK (Macmillan, 2010), though it should be noted that no evidence for a causal relationship was found.

Table 4a: Odds ratios for the significant predictors of poverty across the EU

Poverty (excluding education)	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Gender																
Male (reference group)																
Female	1.22	1.20	X	X	1.38	X	X	1.16	X	X	0.81	*0.87*	X	X	X	X
Age																
25-29	X	X	*1.41*	*1.46*	1.88	8.03	3.06	2.48	X	1.34	X	*0.75*	X	2.17	1.87	1.33
30-39	0.74	*1.21*	X	X	X	X	X	1.66	1.38	X	X	X	1.57	1.91	1.85	1.31
40-49	0.74	X	*0.77*	X	X	X	X	1.53	1.26	1.44	X	X	1.52	1.37	1.60	1.32
50-59 (reference group)																
Father's educational attainment																
None: Unable to read or write	-	2.74	-	-	-	-	-	6.22	-	2.21	-	4.81	-	*3.96*	3.00	*2.20*
Low: ISCED levels 0-2	-	1.58	-	-	-	*0.59*	-	X	-	1.60	1.74	1.74	-	5.32	2.37	1.44
Medium: ISCED levels 3-4	-	X	-	-	-	*0.61*	-	X	-	X	1.44	*X*	-	X	1.47	X
High: ISCED levels 5-6 (reference group)																
Mother's educational attainment																
None: Unable to read or write	-	1.94	8.99	4.57	-	-	-	4.95	4.29	3.05	-	*2.48*	-	46.24	4.06	3.36
Low: ISCED levels 0-2	-	*1.44*	1.97	1.76	-	-	-	*2.04*	*2.19*	1.70	1.74	2.32	-	23.05	2.42	2.69
Medium: ISCED levels 3-4	-	X	X	X	-	-	-	X	X	X	1.44	1.46	-	6.86	X	1.71
High: ISCED levels 5-6 (reference																
Parents' educational attainment																
None: Unable to read or write	4.60	-	-	-	-	-	-	X	-	-	-	-	3.82	X	-	-
Low: ISCED levels 0-2	2.03	-	-	-	-	-	-	X	-	-	-	-	2.15	0.20	-	-
Medium: ISCED levels 3-4	1.38	-	-	-	-	-	-	X	-	-	-	-	1.38	X	-	-
High: ISCED levels 5-6 (reference																
Derived country of birth																
Respondent and at least one parent born in survey country (reference group)																
Respondent born in survey country; neither parent born in survey country	X	1.39	X	1.80	2.89	-	-	-	-	1.88	1.75	-	-	-	-	-
Respondent not born in survey country; at least 1 parent born in	X	X	X	*2.23*	X	-	-	-	-	1.88	X	-	-	-	-	-
Neither respondent nor parents born in survey country	2.57	1.84	2.36	2.87	2.74	-	-	-	-	2.07	1.69	-	-	-	-	-
Presence of parents in the household																
Lived with both parents (reference group)																
Lived with one parent	-	1.73	-	X	-	-	-	-	-	-	-	-	2.01	-	-	-
No parents in the household	-	2.87	-	8.70	-	-	-	-	-	-	-	-	X	-	-	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

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Table 4b: Odds ratios for the significant predictors of poverty across the EU

Poverty (excluding education)	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Number of adults in the household																
1 or less	-	X	-	-	-	-	1.93	X	-	1.53	0.58	-	0.39	X	-	X
2 (reference group)																
3 or more	-	*1.15*	-	-	-	-	2.00	1.15	-	X	*0.82*	-	X	1.37	-	1.12
Number of children in the household																
1 (reference group)																
2	-	1.22	X	X	-	-	-	1.16	-	X	X	X	-	X	X	X
3	-	1.30	X	X	-	-	-	1.66	-	X	X	X	-	1.98	1.23	X
4 or more	-	1.90	1.48	1.62	-	-	-	2.04	-	1.23	1.46	1.48	-	2.96	2.31	1.29
Number of workers in the household																
No workers	1.95	-	-	-	-	-	-	-	-	-	X	-	X	-	X	-
1 worker (reference group)																
More than 1 worker	X	-	-	-	-	-	-	-	-	-	0.55	-	0.56	-	0.80	-
Father's activity status																
Employed (reference group)																
Unemployed	-	-	-	2.23	X	-	7.37	-	-	-	-	3.03	-	-	2.68	-
Other inactive	-	-	-	X	2.40	-	4.10	-	-	-	-	X	-	-	1.39	-
Mother's activity status																
Employed (reference group)																
Unemployed	X	-	-	3.87	-	-	-	X	-	3.86	-	-	X	-	X	-
Other inactive	1.29	-	-	X	-	-	-	1.39	-	X	-	-	0.67	-	1.41	-
Father's employment status																
1: Employed in supervisory role (reference group)																
Employed in non-supervisory role	-	1.29	-	-	-	-	-	*1.11*	-	1.26	-	-	-	-	-	-
Unemployed	-	3.55	-	-	-	-	-	3.30	-	1.99	-	-	-	-	-	-
Other inactive	-	X	-	-	-	-	-	X	-	1.53	-	-	-	-	-	-
Mother's employment status																
Employed in supervisory role (reference																
Employed in non-supervisory role	-	-	-	-	-	0.43	-	-	*1.92*	-	-	-	-	-	-	1.70
Unemployed	-	-	-	-	-	X	-	-	X	-	-	-	-	-	-	3.25
Other inactive	-	-	-	-	-	X	-	-	2.17	-	-	-	-	-	-	1.41
Financial situation																
Bad/very bad	X	-	X	-	-	-	-	1.95	1.55	1.57	*1.40*	-	-	1.98	1.78	1.52
Moderately bad	*0.77*	-	0.67	-	-	-	-	1.31	X	1.27	X	-	-	1.44	X	1.25
Moderately good (reference group)																
Good/very good	X	-	X	-	-	-	-	X	X	0.89	*0.81*	-	-	0.77	1.28	X
Ability to make ends meet																
Difficult/very difficult	1.59	X	*1.49*	1.68	-	-	-	*0.77*	1.57	-	-	-	1.45	-	-	-
Fairly difficult	X	X	1.60	*1.39*	-	-	-	X	X	-	-	-	X	-	-	-
Fairly easy (reference group)																
Easy/very easy	X	1.32	X	0.67	-	-	-	X	X	-	-	-	X	-	-	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

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Table 5a: Odds ratios for the significant predictors of poverty across the EU

Poverty	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Gender																
Male (reference group)																
Female	1.22	1.19	*X*	*1.29*	1.36	X	X	1.22	X	1.10	X	1.18	1.20	X	X	X
Age																
25-29	X	1.36	1.50	1.75	2.48	8.46	3.19	2.92	*1.37*	1.42	0.50	0.59	X	1.70	1.86	1.60
30-39	X	1.49	*1.30*	X	X	X	X	1.84	1.50	1.24	0.76	X	1.45	1.59	1.80	1.45
40-49	0.81	1.24	X	X	X	X	X	1.57	1.26	1.54	X	X	1.46	1.38	1.63	1.40
50-59 (reference group)																
Educational attainment																
Low: ISCED levels 0-2	4.87	5.65	4.29	5.55	3.65	X	X	4.45	9.63	3.45	8.33	10.78	4.98	15.20	12.17	10.71
Medium: ISCED levels 3-4	2.09	2.94	2.03	2.52	2.49	*1.60*	1.78	1.95	3.94	1.78	3.61	4.69	3.02	4.58	3.66	4.73
High: ISCED levels 5-6 (reference group)																
Father's educational attainment																
None: Unable to read or write	-	2.00	-	-	X	-	-	4.11	-	-	-	-	-	-	*1.59*	-
Low: ISCED levels 0-2	-	X	-	-	0.06	0.49	0.59	X	-	-	-	-	-	-	*1.36*	-
Medium: ISCED levels 3-4	-	X	-	-	0.13	0.53	0.57	X	-	-	-	-	-	-	X	-
High: ISCED levels 5-6 (reference group)																
Mother's educational attainment																
None: Unable to read or write	-	-	8.58	2.41	-	-	-	3.30	X	2.35	-	-	-	7.48	2.48	2.96
Low: ISCED levels 0-2	-	-	X	X	-	-	-	X	X	1.43	-	-	-	5.01	1.56	1.80
Medium: ISCED levels 3-4	-	-	X	X	-	-	-	X	X	X	-	-	-	2.42	X	X
High: ISCED levels 5-6 (reference group)																
Parents' educational attainment																
None: Unable to read or write	2.28	-	-	-	X	-	-	*0.39*	-	-	-	X	X	-	-	X
Low: ISCED levels 0-2	1.32	-	-	-	11.26	-	-	X	-	-	-	1.50	X	-	-	X
Medium: ISCED levels 3-4	X	-	-	-	*5.68*	-	-	X	-	-	-	X	X	-	-	X
High: ISCED levels 5-6 (reference group)																
Derived country of birth																
Respondent and at least one parent born in survey country (reference group)																
Respondent born in survey country; neither parent born in survey country	*1.47*	1.51	-	2.12	3.09	-	-	-	-	X	1.58	-	-	-	-	-
Respondent not born in survey country; at least one parent born in survey country	X	X	-	2.38	X	-	-	-	-	2.15	X	-	-	-	-	-
Neither respondent nor parents born in survey country	3.01	2.08	-	2.98	2.75	-	-	-	-	1.88	*1.53*	-	-	-	-	-
Presence of parents in the household																
Lived with both parents (reference group)																
Lived with one parent	-	*1.30*	-	X	-	-	-	-	-	-	-	-	2.31	-	-	-
No parents in the household	-	2.73	-	5.97	-	-	-	-	-	-	-	-	X	-	-	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

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(50 Kb)

Table 5b: Odds ratios for the significant predictors of poverty across the EU

Poverty	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Number of adults in the household																
1 or less	-	-	-	-	-	-	1.81	X	-	1.48	-	-	*0.49*	X	-	-
2 (reference group)																
3 or more	-	-	-	-	-	-	2.05	1.12	-	X	-	-	*0.83*	1.36	-	-
Number of children in the household																
1 (reference group)																
2	-	X	X	-	-	-	-	*1.12*	-	-	-	X	-	X	*0.86*	X
3	-	X	X	-	-	-	-	1.52	-	-	-	X	-	1.33	X	X
4 or more	-	1.65	1.41	-	-	-	-	1.73	-	-	-	X	-	1.82	1.56	*1.13*
Number of workers in the household																
No workers	1.53	-	-	-	-	-	-	X	-	1.88	X	-	X	-	*2.01*	-
1 worker (reference group)																
More than 1 worker	0.83	-	-	-	-	-	-	0.83	-	X	0.61	-	0.74	-	0.78	-
Father's activity status																
Employed (reference group)																
Unemployed	-	-	-	-	X	-	8.20	2.84	-	-	-	-	-	-	-	-
Other inactive	-	-	-	-	2.61	-	4.08	X	-	-	-	-	-	-	-	-
Mother's activity status																
Employed (reference group)																
Unemployed	-	-	-	4.27	-	-	-	X	-	4.31	-	-	-	-	X	-
Other inactive	-	-	-	X	-	-	-	1.21	-	X	-	-	-	-	1.24	-
Father's employment status																
Employed in supervisory role (reference group)																
Employed in non-supervisory role	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unemployed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other inactive	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mother's employment status																
Employed in supervisory role (reference group)																
Employed in non-supervisory role	-	-	-	-	-	0.42	-	-	-	-	-	-	-	-	-	1.39
Unemployed	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	2.58
Other inactive	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	X
Financial situation																
Bad/very bad	-	-	-	-	-	-	-	1.70	-	1.35	-	-	-	1.82	1.48	1.40
Moderately bad	-	-	-	-	-	-	-	1.23	-	1.18	-	-	-	1.79	X	1.18
Moderately good (reference group)																
Good/very good	-	-	-	-	-	-	-	X	-	X	-	-	-	1.33	1.32	X
Ability to make ends meet																
Difficult/very difficult	-	-	-	1.66	-	-	-	0.72	1.67	-	-	-	-	-	-	-
Fairly difficult	-	-	-	*1.43*	-	-	-	*0.90*	X	-	-	-	-	-	-	-
Fairly easy (reference group)																
Easy/very easy	-	-	-	*0.72*	-	-	-	X	X	-	-	-	-	-	-	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

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7.3 Severe material deprivation

Similar patterns emerge when considering the results of the deprivation models in Tables 6 (a&b) and 7 (a&b). Again, parental education is generally the factor with the largest impact on the odds of deprivation in the absence of the respondent's own educational level, but once the latter is included it becomes the most important predictor. Parental education persists as a predictor after controlling for the respondent's education in fewer countries compared with the poverty model (generally in Southern and Eastern Europe and the Baltic States), but in those where it does persist, its magnitude is generally reduced.

Household composition during childhood is again of importance even when controlling for the respondent's educational outcome, though generally the impacts are slightly reduced when education is included.

Before taking account of the individuals' educational attainment, one or both of the subjective childhood income variables are significant predictors for nearly all the countries except Scandinavia, France and the Netherlands. As with poverty, these childhood household income variables remain in the models once education is controlled for in the Southern and Eastern European countries. In addition, these variables also persist as predictors of severe material deprivation after accounting for educational attainment in the Baltic States, Austria and Belgium.

Perhaps unexpectedly, the largest relative impact of educational attainment on severe material deprivation is evident for Sweden, with a respondent 47 times more likely to be severely materially deprived if they have a low educational level compared to a high one. The results for Sweden should be interpreted with considerable caution though, due to the very small number of respondents in the sample experiencing severe material deprivation. Odds ratios for the remaining EU countries for this category range from 4.2 to 12.3 times, so are considerably lower.

The results for Denmark suggest that, from among the childhood factors considered in this analysis, the relative likelihood of severe material deprivation (and relative low income poverty) is almost entirely dependent on the educational attainment of an individual and that this is itself broadly independent of many of the childhood factors associated with disadvantage.

Table 6a: Odds ratios for the significant predictors of severe material deprivation across the EU

Severe material deprivation (excluding education)	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Gender																
Male (reference group)																
Female	X	1.44	X	X	X	2.69	*3.97*	X	X	X	X	X	X	X	1.13	X
Age																
25-29	2.01	X	X	X	X	*3.28*	X	2.43	1.68	2.10	X	X	1.52	1.24	1.50	*1.18*
30-39	X	X	X	X	0.34	X	X	1.70	1.96	1.57	X	*1.19*	1.34	1.24	1.21	X
40-49	X	X	*0.63*	X	*0.51*	2.87	X	1.24	1.32	1.40	X	X	1.29	X	1.24	X
50-59 (reference group)																
Father's educational attainment																
None: Unable to read or write	-	-	-	7.38	-	-	-	9.09	-	5.97	-	X	5.40	3.16	*1.45*	-
Low: ISCED levels 0-2	-	-	-	X	-	-	-	X	-	3.69	1.90	3.50	2.73	2.11	1.33	-
Medium: ISCED levels 3-4	-	-	-	X	-	-	-	X	-	3.21	X	2.30	X	1.45	X	-
High: ISCED levels 5-6 (reference group)																
Mother's educational attainment																
None: Unable to read or write	-	-	-	X	-	-	-	5.57	8.35	12.90	-	5.76	-	3.27	3.83	2.74
Low: ISCED levels 0-2	-	-	-	*2.20*	-	-	-	X	X	3.80	-	4.53	-	1.99	2.74	2.69
Medium: ISCED levels 3-4	-	-	-	X	-	-	-	X	X	X	-	2.85	-	1.34	1.67	1.52
High: ISCED levels 5-6 (reference group)																
Parents' educational attainment																
None: Unable to read or write	3.54	5.95	-	-	-	-	-	X	-	-	-	X	-	-	-	-
Low: ISCED levels 0-2	1.97	1.70	-	-	-	-	11.24	X	-	-	-	0.35	-	-	-	-
Medium: ISCED levels 3-4	1.82	X	-	-	-	-	X	X	-	-	-	0.47	-	-	-	-
High: ISCED levels 5-6 (reference group)																
Derived country of birth																
Respondent and at least 1 parent born in survey country (reference group)																
Respondent born in survey country; neither parent born in survey country	-	1.62	2.59	2.51	X	-	-	-	-	4.22	2.49	1.39	-	-	-	1.61
Respondent not born in survey country; at least 1 parent born in survey country	-	X	X	X	X	-	-	-	-	X	X	X	-	-	-	X
Neither respondent nor parents born in survey country	-	1.66	3.76	2.44	13.04	-	-	-	-	3.11	X	1.78	-	-	-	X
Presence of parents in the household																
Lived with both parents (reference group)																
Lived with one parent	2.31	1.89	-	-	-	-		-	X	-	-	-	2.40	-	X	
No parents in the household	5.12	3.57	-	-	-	-		-	2.08	-	-	-	8.15	-	2.10	

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. A red border indicates results based on a sample size of less than 100

Download chart

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(50 Kb)

Table 6b: Odds ratios for the significant predictors of severe material deprivation across the EU

Severe material deprivation (excluding education)	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Number of adults in the household																
1 or less	-	-	-	-	-	24.31	-	1.89	-	5.08	-	-	0.33	2.43	-	-
2 (reference group)																
3 or more	-	-	-	-	-	X	-	1.17	-	1.45	-	-	*1.21*	X	-	-
Number of children in the household																
1 (reference group)																
2	X	X	0.50	-	-	-	-	1.17	X	X	X	X	X	0.86	X	X
3	*1.49*	X	X	-	-	-	-	1.75	X	X	X	X	0.67	X	1.33	0.82
4 or more	2.61	2.00	X	-	-	-	-	2.25	1.91	1.73	1.50	1.32	0.72	1.50	2.21	X
Number of workers in the household																
No workers	-	-	-	-	-	-	-	X	*0.23*	-	3.03	X	X	-	2.20	-
1 worker (reference group)																
More than 1 worker	-	-	-	-	-	-	-	0.86	X	-	X	0.62	0.74	-	0.88	-
Father's activity status																
Employed (reference group)																
Unemployed	-	-	-	-	13.45	-	-	2.60	-	X	-	-	-	-	2.30	2.45
Other inactive	-	-	4.51	-	X	-	-	1.44	-	1.67	-	-	-	-	1.37	X
Mother's activity status																
Employed (reference group)																
Unemployed	-	-	-	-	-	-	-	-	-	5.92	-	-	-	-	-	-
Other inactive	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-
Father's employment status																
Employed in supervisory role (reference group)																
Employed in non-supervisory role	*1.32*	-	-	-	-	-	-	-	-	-	*1.49*	-	-	-	-	-
Unemployed	2.59	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
Other inactive	X	-	-	-	-	-	-	-	-	-	2.62	-	-	-	-	-
Mother's employment status																
Employed in supervisory role (reference gr																
Employed in non-supervisory role	X	-	-	-	-	-	-	0.63	-	-	-	1.36	-	1.60	-	1.45
Unemployed	2.89	-	-	-	-	-	-	X	-	-	-	3.58	-	X	-	2.37
Other inactive	2.00	-	-	-	-	-	-	X	-	-	-	X	-	X	-	1.54
Financial situation																
Bad/very bad	*1.42*	-	2.17	4.38	X	-	-	2.54	1.81	2.56	X	-	-	1.61	1.56	2.21
Moderately bad	X	-	X	2.00	X	-	-	1.49	X	1.45	1.52	-	-	X	X	1.53
Moderately good (reference group)																
Good/very good	X	-	X	X	X	-	-	X	X	X	0.67	-	-	X	1.30	0.86
Ability to make ends meet																
Difficult/very difficult	-	-	-	-	-	-	-	-	2.87	-	-	1.53	2.10	1.55	1.66	-
Fairly difficult	-	-	-	-	-	-	-	-	1.78	-	-	1.54	X	X	1.18	-
Fairly easy (reference group)																
Easy/very easy	-	-	-	-	-	-	-	-	X	-	-	X	X	0.78	X	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. A red border indicates results based on a sample size of less than 100

Download chart

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(50 Kb)

Table 7a: Odds ratios for the significant predictors of severe material deprivation across the EU

Severe material deprivation	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Gender																
Male (reference group)																
Female	X	1.45	X	X	X	2.93	5.50	1.13	X	X	X	1.27	1.23	X	1.15	*1.10*
Age																
25-29	2.63	1.83	X	X	X	5.47	X	2.93	1.88	2.46	0.63	*0.76*	*1.47*	*1.03*	1.50	1.43
30-39	1.57	1.53	1.60	X	*0.38*	X	X	1.91	1.98	1.91	X	X	X	X	1.18	X
40-49	1.43	X	X	X	X	3.63	X	1.27	X	1.58	X	X	1.25	X	1.26	X
50-59 (reference group)																
Educational attainment																
Low: ISCED levels 0-2	11.33	6.02	9.48	6.23	5.02	8.19	46.87	4.79	5.70	4.11	8.10	7.13	4.20	6.26	7.91	12.31
Medium: ISCED levels 3-4	3.33	2.58	2.98	2.44	*2.29*	3.12	*7.42*	1.82	2.86	2.14	3.06	2.75	2.63	2.51	3.09	5.11
High: ISCED levels 5-6 (reference group)																
Father's educational attainment																
None: Unable to read or write	-	-	-	-	-	-	-	5.49	-	3.69	-	7.57	3.01	2.48	-	-
Low: ISCED levels 0-2	-	-	-	-	-	-	-	X	-	*2.24*	-	1.67	1.69	1.72	-	-
Medium: ISCED levels 3-4	-	-	-	-	-	-	-	X	-	*2.57*	-	*1.31*	X	*1.24*	-	-
High: ISCED levels 5-6 (reference group)																
Mother's educational attainment																
None: Unable to read or write	-	-	-	-	-	-	-	*3.72*	X	7.26	-	-	-	-	3.10	X
Low: ISCED levels 0-2	-	-	-	-	-	-	-	X	X	X	-	-	-	-	2.10	*1.37*
Medium: ISCED levels 3-4	-	-	-	-	-	-	-	X	X	X	-	-	-	-	1.65	X
High: ISCED levels 5-6 (reference group)																
Parents' educational attainment																
None: Unable to read or write	-	2.71	-	-	-	-	-	X	-	-	-	-	-	-	X	-
Low: ISCED levels 0-2	-	X	-	-	-	-	-	X	-	-	-	-	-	-	X	-
Medium: ISCED levels 3-4	-	X	-	-	-	-	-	X	-	-	-	-	-	-	0.74	-
High: ISCED levels 5-6 (reference group)																
Derived country of birth																
Respondent and at least 1 parent born in survey																
Respondent born in survey country;	-	1.66	*2.01*	3.24	X	-	-	-	-	3.92	2.40	1.39	-	-	-	1.84
Respondent not born in survey country;	-	X	X	X	X	-	-	-	-	X	X	X	-	-	-	X
Neither respondent nor parents born in	-	1.79	2.59	2.23	11.70	-	-	-	-	3.74	X	1.60	-	-	-	X
Presence of parents in the household																
Lived with both parents (reference group)																
Lived with one parent	2.34	1.55	-	-	-	-	-	-	X	-	-	-	2.40	-	-	-
No parents in the household	3.76	2.64	-	-	-	-	-	-	2.07	-	-	-	8.22	-	-	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

Download chart

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(51 Kb)

Table 7b: Odds ratios for the significant predictors of severe material deprivation across the EU

Severe material deprivation	UK	Northern Europe				Scandinavia		Southern Europe			Baltic states			Eastern European		
		FR	AT	BE	NL	DK	SE	IT	PT	ES	EE	LV	LT	BG	HU	PL
Number of adults in the household																
1 or less	-	-	-	-	-	28.32	-	1.98	-	4.59	-	X	0.35	2.62	-	-
2 (reference group)																
3 or more	-	-	-	-	-	X	-	X	-	1.41	-	0.77	X	X	-	-
Number of children in the household																
1 (reference group)																
2	X	X	0.52	-	-	-	-	X	X	X	-	-	X	0.83	X	X
3	*1.47*	X	X	-	-	-	-	1.57	X	X	-	-	0.62	*0.81*	1.17	0.78
4 or more	2.12	1.64	X	-	-	-	-	1.83	1.85	1.48	-	-	0.62	X	1.57	X
Number of workers in the household																
No workers	-	-	-	-	-	-	-	X	-	-	3.09	X	X	-	2.28	X
1 worker (reference group)																
More than 1 worker	-	-	-	-	-	-	-	0.81	-	-	X	0.62	0.75	-	X	0.86
Father's activity status																
Employed (reference group)																
Unemployed	-	-	-	-	19.25	-	-	2.58	-	-	-	-	-	-	X	2.42
Other inactive	-	-	3.67	-	X	-	-	1.46	-	-	-	-	-	-	*1.31*	X
Mother's activity status																
Employed (reference group)																
Unemployed	-	-	-	-	-	-	-	-	-	6.53	-	-	-	-	-	-
Other inactive	-	-	-	-	-	-	-	-	-	*0.80*	-	-	-	-	-	-
Father's employment status																
Employed in supervisory role (reference group)																
Employed in non-supervisory role	X	-	-	-	-	-	-	-	-	-	*1.43*	-	-	-	-	-
Unemployed	1.94	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-
Other inactive	X	-	-	-	-	-	-	-	-	-	2.64	-	-	-	-	-
Mother's employment status																
Employed in supervisory role (reference group)																
Employed in non-supervisory role	X	-	-	-	-	-	-	0.59	-	-	-	1.39	-	*1.51*	-	-
Unemployed	2.43	-	-	-	-	-	-	X	-	-	-	*2.82*	-	X	-	-
Other inactive	X	-	-	-	-	-	-	0.72	-	-	-	X	-	X	-	-
Financial situation																
Bad/very bad	-	-	1.75	3.82	-	-	-	2.10	1.61	-	X	-	-	1.55	1.39	1.96
Moderately bad	-	-	X	*1.82*	-	-	-	1.32	X	-	1.44	-	-	X	X	1.42
Moderately good (reference group)																
Good/very good	-	-	X	X	-	-	-	X	X	-	0.68	-	-	1.09	1.31	X
Ability to make ends meet																
Difficult/very difficult	-	-	-	-	-	-	-	-	2.57	1.96	-	1.59	1.95	1.49	1.63	-
Fairly difficult	-	-	-	-	-	-	-	-	1.70	X	-	1.57	X	X	1.18	-
Fairly easy (reference group)																
Easy/very easy	-	-	-	-	-	-	-	-	X	X	-	X	X	0.78	X	-

Source: Eurostat, Office for National Statistics

Notes:

1. X No statistically significant relationship
2. - Not included in the model
3. Figures in italics are significant at the 0.1 level of significance. All other figures are significant at the 0.05 level
4. Red border indicates a sample size of less than 100 respondents

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8. Calculating the predicted probability of being in poverty

It is possible to convert the odds ratios described in the previous sections into probabilities of being in poverty for individuals with any particular combinations of childhood factors from the models. The individual effects (taken from Annex 3 in the data section of this release) are multiplied together to find an overall effect which is then converted to a probability. The box below provides an example:

Calculating the predicted probability of being in poverty

Individual A	Odds ratio		Individual B	Odds ratio
Female	1.222		Female	1.222
Age 30-39	1.333		Aged 30-39	1.333
Low level of education	4.872		High level of education	1.000
Parental education: Low	1.323		Parental education: High	1.000
Self and at least one parent UK born	1.000		Self and at least one parent UK born	1.000
No workers in household	1.533		2 or more workers in household	0.828
Multiplied effects	16.096		Multiplied effects	1.349
Odds for reference individual (intercept)	0.065		Odds for reference individual (intercept)	0.065

16.096 * 0.065 = 1.04622	1.349 * 0.065 = 0.08767
1.04622 / (1 + 1.04622) = **51% predicted probability of being in poverty**	0.08767/(1 + 0.08767) = **8% predicted probability of being in poverty**

Table source: Office for National Statistics

Download table

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(28 Kb)

9. Technical Appendix

9.1 Explanatory variables

The survey collected data on a number of variables relating to the intergenerational transmission of disadvantage (see Annex 1 in the data section of this release). Some of these raw variables were used directly in the analysis. However, a number of additional variables were derived from this raw data. In some cases this was to reduce the number of overall variables in the model and aid interpretation. In others, recoding of the variables allowed information to be included that would otherwise cause unacceptably high levels of missing values. The logistic procedure automatically deletes observations which include a missing value for any of the independent variables in the model. Including a variable with a high level of missing values therefore results in the loss of valuable information in these observations. For example father's and mother's employment status combined information on whether or not the parent was employed as well as the managerial position of employed parents. This allowed information on managerial status to be included where use of the raw variable would have resulted in all observations where parents were not employed being lost.

In some cases, it was not possible to recode variables to reduce the number of missing values. Those variables with unacceptably high levels of missing values were excluded from the analysis. This was the case for the variables relating to the father and mother's socio-economic class. Certain key variables were retained regardless of the level of missingness, for example parents' education levels. Citizenship was dropped in favour of country of birth since both reflect differences in ethnicity but country of birth had greater explanatory power than citizenship. The final set of explanatory variables used in the analysis is shown in Annex 2 in the data section of this release.

9.2 Building the models

Age group and gender were included in all the models as control variables. Variables were chosen for testing in the models based on previous research. For the UK models, variables were entered into the model one at a time. The decision of whether or not to retain variables in the model was based on two criteria:

- Whether the variables were significant predictors of the outcome, measured by the significance of the Wald chi-square measure.
- Assessment of the goodness-of-fit of the model.

When it comes to assessing goodness-of-fit of a logistic regression model, there are a number of measures that can be used, none of which are used universally (Tabachnick & Fidell, 2007). In this analysis, the Akaike Information Criterion (AIC) was the main measure used. The AIC provides a relative measure of the fit of two models. By comparing the value of the AIC for the intercept only model with the AIC of the model including covariates, it is possible to assess if the inclusion of the covariates has improved the model. This improvement is evident by a reduction in the AIC for the model including covariates. Variables were retained in the UK model if they improved its fit, based on this criterion. The final models for the UK are found in Annex 3 in the data section of this release.

The AIC is not an absolute measure so it is only possible to assess an improvement directly by the relative reduction within a model. In order to compare across models, the percentage reduction in the AIC is reported, to provide some measure of the differences in the fits of the different models.

Other goodness-of-fit statistics used are the statistical significance of the likelihood ratio and the score. In both these cases, a statistically significant result indicates that including the covariates significantly improves the model compared to the intercept only model.

In addition to these measures, the results of Hosmer and Lemeshow tests are also reported below. This test assesses the distribution of the observations among deciles of risk and a non-significant result indicates a good model; observations among those in the outcome category are clustered in the higher deciles of risk. Finally the c measure is provided. This gives an indication of the probability that a randomly selected pair of cases from each outcome category will be correctly classified, ranging from 0.5 for a correct classification based entirely on chance, to 1 for a perfect prediction from the model (Tabachnick & Fidell, 2007). Therefore the closer the c measure is to 1, the better the model.

Educational attainment

The final model for the UK resulted in a 16% reduction in the AIC and gave a significantly better model when compared with the intercept only model ($p<0.0001$ for both Likelihood ratio and score). The c measure of 0.80 indicated a good chance of accurately predicting the outcome for the respondents. However, the Hosmer and Lemeshow test indicated that the model was significantly different from the perfect model ($p<0.05$).

Relative low income poverty

The goodness-of-fit measures for the UK model indicated that inclusion of the variables in the poverty models provided relatively low improvements in the model compared to the intercept only model. The reduction in the AIC for the model in which the respondent’s educational attainment

was excluded was only 2.4% and the c measure was 0.63. Including the educational attainment of the respondent improved the model, giving a reduction in the AIC of 5.3% and a c measure of 0.67. Both models were significantly better than the intercept only model ($p<0.0001$) and neither was significantly different from the perfect model ($p>0.05$).

Severe material deprivation

The inclusion of the variables in the models of severe material deprivation caused a reduction in the AIC of 6.1% when the respondent's educational attainment was excluded, and 11.1% when it was included. Both models were significantly better with the inclusion of the variables compared to the intercept only models ($p<0.0001$) and neither was significantly different from the perfect model ($p>0.05$). C measures of 0.71 for the model excluding the respondent's educational attainment and 0.77 when it was included, suggest a good chance of accurately classifying a respondent.

9.3 Limitations to logistic regression analysis

Multicollinearity

If two or more independent variables in the regression model are highly correlated with each other, the reliability of the model as a whole is not reduced but the individual regression coefficients cannot be estimated precisely. This means that the analysis may not give valid results either about individual independent variables, or about which independent variables are redundant with respect to others. This problem becomes increasingly important as the size of correlations between the independent variables (i.e. multi-collinearity) increases. Where very high correlations between potential explanatory variables were observed, the models were rationalised by removing the variable with the weaker relationship with well-being.

Omitted variable bias

In an ideal world, a logistic model should include all the relevant variables that are associated with the outcome (i.e. variable being analysed such as poverty). In reality, however, we cannot ever observe in the survey data all the potential factors that may potentially be important in the intergenerational transmission of disadvantage. Factors which have previously been suggested as being of relevance include that were not included in this analysis include genetic ability (Field, 2010), the quality and nature of early childcare (Bird, 2007) and the nature of the home environment more broadly (Field 2010). If a relevant factor is not included in the model, this may result in the effects of the variables that have been included being mis-estimated.

9.4 Limitations of EU-SILC retrospective recall data

This analysis was based on retrospective recall of various childhood characteristics, most notably a subjective assessment of the income of the household during childhood. This reliance on the respondent's recall of key variables of interest, particularly income, has the disadvantage that it may be inaccurate (Jenkins & Siedler, 2007b).

It is also important to note the limitation of using data which is based on a point in time. This analysis used childhood characteristics when the respondent was a teenager, but research suggests that much of the impact of childhood factors has already happened by this point, and that children's

life chances are shaped most in the first five years of their lives (Field, 2010). Income and broader circumstances vary over time so using a single year on which to base the childhood factors also has limitations (Jenkins & Siedler, 2007a). A study in the US found that average family income tends to be higher in later childhood compared to earlier childhood, and that only a minority of families with low incomes in early childhood, still had low incomes in adolescence (Duncan et al, 1998). This same study also found that family income in early childhood has a larger impact on completed schooling than later in childhood, suggesting that by measuring income in later childhood, this analysis may be missing the critical period in which income might impact on educational outcomes and maybe the other future life chances.

Clearly it would be unrealistic to expect respondents to provide retrospective information on a period from early childhood or even for a period of time between early childhood and adolescence, so taking age 14 as the reference point remains a sensible approach. Furthermore, it should be noted that many of the key variables relating to parental characteristics are unlikely to change significantly over the course of childhood, e.g. parental education.

In addition to the childhood characteristics relating to a single point in time, the outcomes being predicted are also based on the situation at the time the survey was completed. Recent evidence indicates that while poverty rates as a whole remain fairly static within a country, the people experiencing poverty change and it is chronic or persistent poverty that is most associated with future adult poverty (HM Government, 2014). This introduces the possibility that some of the respondents experiencing poverty or severe material deprivation at the time of the 2011 data collection may well not have been experiencing poverty in an earlier or later year, although their childhood characteristics would remain the same. Investigating the childhood factors predicting persistent poverty may therefore prove to be a valuable area for future research using this EU-SILC dataset.

Despite these potential limitations, the 2011 EU-SILC module provides an important new source of evidence for research on intergenerational disadvantage, in particular providing data that is both relatively up to date and broadly comparable across a range of countries.

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Background notes

1. Details of the policy governing the release of new data are available by visiting www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html or from the Media Relations Office email: media.relations@ons.gsi.gov.uk

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