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The Effects of Childhood Poverty on Unemployment in Early
Working Life: Evidence from British Work History Data

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The Effects of Childhood Poverty on Unemployment in Early Working Life: Evidence from British Work History Data[*]

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Abstract

This paper investigates the effects of childhood poverty on unemployment risks after leaving full-time education up to their early thirties for those born in 1970, using work history data from the British Cohort Study. This empirical analysis aims to examine the validity of poverty reduction policy based on the idea that the provision of generous out-of-work benefits would result in the increase of poverty for future generations (the welfare-dependency model). It finds that childhood poverty is associated with the slow exit from unemployment in early working life, but there is more strong evidence that childhood poverty affects the rapid onset of unemployment. The latter evidence suggests that it is inappropriate to allow policy changes to be delivered only in line with the welfare-dependency model, but rather highlights the importance of mitigating the relationship between childhood poverty and the later risk of remaining trapped in precarious employment. The paper also reports other findings on the mediating effects of education and training on these unemployment risks.

1.   Introduction

Children are one of the groups at the highest risk of poverty. In the UK, the rate of child poverty[1] was 23% in 2008, with 2.9 million children living in poverty (Brewer et al., 2009). Although the previous Labour Government substantially reduced the rate, particularly between 1998 and 2004, it still remains higher than in the early 1980s and previously (Stewart, 2009). Against this background, all of the main political parties, including the current Coalition, now agree that child poverty should be 'eradicated' by some form of government intervention. However, while income redistribution is an obvious way of alleviating child poverty in purely financial terms, whether this effectively improves the life chances of children growing up in relative disadvantage is debated. In particular, the idea that the provision of generous out-of-work benefits would result in the increase of poverty for future generations has become influential in the UK in the 2000s,[2] even though many academics have criticised it due to the lack of supporting empirical evidence.[3] The idea is described as the welfare-dependency model in the literature on intergenerational persistence of poverty.

With a view to assessing the appropriateness of policy changes influenced by the welfare-dependency model, I investigate the effects of childhood poverty on unemployment dynamics in early working life. Although a straightforward test of the welfare dependency model might be to estimate a causal effect of parents' benefit receipt on their children's benefit receipt in their adulthood, it would be very difficult to know what the long-term outcomes would have been for children had their parents not received benefit. A more effective research approach would be to investigate whether there is a relationship between childhood poverty and young people's outcomes that suggests the limitation of policy primarily driven by the model.

The welfare-dependency model is based on the assumption that those who grew up in poverty tend to remain workless for a long time because they have learnt to depend on benefits and gained little motivation to work. In order for this assumption to be valid, childhood poverty should only affect the duration of unemployment, but not the onset of unemployment, at least as a necessary condition. If those who grew up in poverty faced a higher risk of becoming unemployed even when they are working, it would be inappropriate to conclude that they have the dependency attitude that triggers long-term unemployment. Although one may argue that a dependency attitude could lead these individuals not to make efforts to stay in employment, it is unlikely that such an attitude, if any, is the main reason for their unemployment. Previous studies have

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[1] The rate of child poverty here refers to the percentage of children living in households with an income below 60% of the contemporary population-wide median income (before housing costs).

[2] Over 50% of the respondents to the British Social Attitudes (BSA) survey agreed that the benefits for the unemployed were too high and discouraged work in 2006, while the equivalent percentage was around or below 30% between 1987 and 1997 (Sefton, 2009).

[3] Both quantitative (Gallie, 1994; Heath, 1992) and qualitative studies (Bradshaw and Holmes, 1989; Kempson, 1996) have found no evidence of the dependent attitudes among the long-term unemployed or members from workless households. A study from the US more directly suggests that the evidence on the intergenerational transmission of welfare dependency obtained so far is simply spurious or not robust, and found that most women who grew up in families receiving welfare (in the American sense) did not receive welfare in adulthood (Page, 2004).

found that there are people who remain trapped in a no-pay/low-pay cycle due to the poor quality of low-wage jobs, controlling for their observed and unobserved initial characteristics (Stewart, 2007; Stewart and Swaffield, 1999).

By using data from the British Cohort Study (BCS), I analyse work histories of those who were born in 1970 after leaving full-time education up to their early thirties. The dataset which contains data on both childhood variables and long-term employment dynamics is valuable, although the sample members are much older than contemporary children and young people. The data also enables us to analyse the effect of the timing of childhood poverty and the mediating effects of education and training, which are relevant to policy concerns. Particularly in the present context in which early intervention is increasingly addressed, [4] it is worth scrutinising whether it is reasonable to assume that poverty in late childhood is less problematic.

I review the relevant literature in the next section, and discuss the data and methods in Section 3. I report the results from analysis in Section 4, and discuss the validity and limitation of the analysis in Section 5. In Section 6, I conclude by discussing the implications for the policies to improve the employment prospects of those growing up in poverty.

2.   Literature review

Previous findings suggest that unemployment in early working life is a pathway of intergenerational persistence of poverty. Gregg and Machin (1999) and McKnight (2000) found that those who grew up in poverty are more likely to be unemployed in their early twenties and thirties, and this is only partly explained by their low educational attainment. Bynner and Parsons (2002) found that the indicators of childhood poverty are associated with the probability of not being in education, employment or training (NEET) between the ages of 16 and 18, even after controlling for educational attainment. There is also evidence for the scarring effect of unemployment on future employment and earnings in the UK (Arulampalam et al., 2000; Burgess et al., 2003; Gregg, 2001; Gregg and Tominey, 2005; Gregory and Jukes, 2001; Narendranathan and Elias, 1993; Nickell et al., 2002).

However, the effects of childhood poverty across the onset and exit stages of unemployment have never been explored separately. In what follows, I review the relevant literature to clarify why childhood poverty possibly affects the onset of and exit from unemployment in adulthood. I also discuss the socio-economic and policy contexts under which the 1970 birth cohort experienced transitions from education to work.

2.1 Childhood poverty and the onset of and exit from unemployment in adulthood
Entry into unemployment occurs when workers leave their jobs and have not found another job to start immediately, when they leave education and have not found a job, or when they exit from other economic inactivity states without finding a job. With respect

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[4] Both academics (Esping-Andersen, 2004; Heckman and Lochner, 2000; Waldfogel, 2006) and the previous and current Government (HM Government, 2009, , 2010; HM Treasury et al., 2008) have stressed the importance of early investment.

to job loss, there is a theoretical proposition that, given that some human capital is firm specific, firms are more likely to retain employees with higher human capital and that such employees are less likely to leave (Oi, 1962; Parsons, 1972). If firm-specific human capital is highly correlated with educational attainment, employees with more education are more likely to remain in work. Empirical research has confirmed this (Ashenfelter and Ham, 1979; Kiefer, 1985; Nickell, 1979). This could indicate a higher risk of job loss for those who grew up in poverty because of their educational disadvantage.

There is also a possibility that childhood poverty influences human capital accumulation independently of education, thereby increasing the risk of job loss. This is plausible where employers increasingly demand not only knowledge and technical skills but also non-cognitive skills and work attitudes (Bartik, 2001; Heckman, 2000; Heckman and Lochner, 2000; Heckman et al., 2006; Kleinman et al., 1998). While the former can be acquired through formal education and training, the latter may need to be learnt through work experience (Bartik, 2001) or from working role models. If those who grew up in poverty are more likely to be trapped in precarious employment, they may hardly obtain supportive work environments to improve their non-cognitive skills. If their parents did not work, they may have had little chance of acquiring such skills from working role models. Another possibility is that they have only limited social networks and informational resources to make a good career choice, and thus their job matching quality may have been less developed than their more affluent counterparts with the same education. These could lead them to face a higher risk of job loss.

Childhood poverty may increase the risk of not having another job to go to upon job loss, due firstly to their low human capital and secondly to their job search behaviour. In terms of the latter, it is economically irrational to quit into unemployment because an on-the-job search is advantageous in gaining access to information, giving future employers good impressions, and consequently more productive in finding a better job (Blau and Robins, 1990; Layard et al., 2005). Exceptionally, people losing high-quality jobs may rationally choose to be unemployed rather than to take low-quality jobs temporarily with a view to improving their chances of finding high-quality jobs later (McCormick, 1990). However, this mechanism is not likely to explain the higher unemployment rate for those who grew up in poverty, because they are less likely to have high-quality jobs due to their lower educational attainment. Pissarides and Wadsworth (1994) found that those who undertake an on-the-job search make use of their personal networks and job advertisements in the newspapers more extensively than those who quit into unemployment. If those who grew up in poverty tend to have difficulties in using these networks and newspapers, they may be more likely to quit into unemployment.

The above explanations based on the human capital and job search theories can partly explain why it may take longer for those who grew up in poverty to find a job than others, although there is no direct empirical evidence for this. Alternatively, young people may be unemployed long term not necessarily because they were brought up by poor parents but because they live in an area with a weak local labour market. Even if

the intergenerational transmission of welfare dependency were a mechanism for lasting disadvantage of those experienced childhood poverty, the literature suggests that there are other mechanisms which may not be addressed by policy changes in line with the welfare-dependency model.

Unemployment risks in general (not necessarily the onset of unemployment) are associated with jobs/occupations, since low-paying semi-skilled and unskilled manual jobs/occupations are more fragile and lead to a greater risk of unemployment (Elias and McKnight, 2003; Layard et al., 2005). This association seems to have increased over time between those who entered the labour force in 1945 and 1985 respectively (Gershuny and Marsh, 1994). Therefore, one reason for the higher risks of unemployment for those who grew up in poverty may be that many of them are in jobs that are relatively insecure.

2.2 Socio-economic and policy contexts
The experience of the 1970 birth cohort is very different from that of contemporary young people in terms of the participation rates in education and training. Figure 1 shows that the participation rates in both post-16 and post-18 education and training increased over time, which is due partly to the implementation of the Education Reform Act 1988 and the major reforms to the benefit system. This obviously raises a question over whether the findings from this study are relevant to contemporary policy debates. However, the NEET rates among 16-18-year-olds are not lower in 2006 than between 1986 and 1988. This implies that the situations of the hardest to reach have never been solved from the late 1980s to the present.

Benefit eligibility requirements are expected to affect employment participation. Major changes took place in the UK benefit system from the 1980s to the present, which affected the young unemployed. These include the replacement of Supplementary Benefit by Income Support in 1988, and the replacement of Unemployment Benefit and Income Support for unemployed claimants by Jobseeker's Allowance (JSA) in 1996. The former replacement made means-tested benefits no longer available for most 16-17-year-olds,[5] and instead they began to be regarded as the dependents of parents who are entitled to Child Benefit as long as their 16-17-year-old children were in full-time education or training. For those who do not stay on and become unemployed, there have been no benefits available to support them or their parents since 1988. The 1970 birth cohort was eligible for Supplementary Benefit if unemployed between the ages of 16 and 17, although there was an official (and probably ineffective) statement that they were sanctioned by a reduction in Supplementary Benefit of 40% if they refused to participate in the Youth Training Scheme (YTS).[6] The introduction of JSA in 1996 affected the unemployed aged over 17, by which the receipt of benefit payment has

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[5] The exceptions are those who can receive JSA under the hardship rules, Income Support as lone parents, or Incapacity Benefit mainly for the long-term sick or disabled.
[6] The YTS was introduced in 1983, and emphasised developing skills for education leavers regardless of whether they were employed or non-employed. Its predecessor (the Youth Opportunity Programme) was evaluated as a partial failure due to low investment in training, although it provided the majority of participants with job opportunities (Deakin, 1996).

become conditional on a job search. While not affecting the 1970 cohort, the New Deal for Young People (NDYP) was additionally introduced in 1998 as a mandatory programme for 18-25-year-olds who have been claiming JSA for at least six months.

However, those born in 1970 were broadly placed in the same policy context as their contemporary counterparts with respect to youth employment. They already faced the deterioration of the youth labour market, which has been a common trend among many economically advanced countries since the 1980s. Figure 2 shows the unemployment rates by age group between the 1980s and 2009.[7] Although the youth unemployment rates, based on the statistics provided by the Office for National Statistics, were unavailable until 1993, the unemployment rate for those under 20 years old was reported to be 25.7% in 1983 (Marsden et al., 1986). Despite the fact that the overall unemployment rate is lower in the 2000s, before the financial crisis in 2008, than in the mid 1980s and early 1990s, the unemployment rate for 16-17-year-olds has always remained high. The recent rise in the 2000s may partly be because those who did not stay on in full-time education or training in the younger cohorts are more disadvantaged than their older counterparts.[8] The unemployment rate for 18-24-year-olds is almost parallel to the overall unemployment rate, but the former is always higher, by around 5 percentage points.

3.   Data and methods

3.1 Data

The data used in this study are collected from the BCS. The BCS is an ongoing longitudinal study of all the babies born in Great Britain in one week of April 1970. I use variables collected in 1975 (age 5), 1980 (age 10), 1986 (age 16), 2000 (age 30) and 2004 (age 34). The BCS has, in common with other longitudinal studies, suffered from attrition. It is nonetheless reasonable to assess that the attrition rate of the BCS is not as serious as to prevent its use, with 51% of the original sample remaining in the study at 34 years after the start. I will take care of issue of the non-randomness of attrition in Section 5.

The BCS also collected work histories by asking the respondents retrospectively to report all employment spells from the survey dates in 2000 and 2004 back to 1986.[9]

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[7] The unemployment rate for men is slightly higher and that for women is slightly lower than the average for both genders, but the trend is similar for both genders.

[8] A report by the Centre for Economic Performance (Petrongolo and Van Reenen, 2010) discusses how current youth unemployment after the 2008-09 recession is not notably worse than in previous recessions. However, it suggests that the youth unemployment rate began to rise after 2004 (until which point the rate had been falling) and this may be due to the Employment Service putting less emphasis on the young unemployed compared with other groups, such as lone parents and the recipients of incapacity benefits.

[9] A cleaned dataset for work histories is available from the Centre for Longitudinal Studies at the Institute of Education (Ward, 2007), via the UK Data Archive. However, the dataset does not include details about non-employment status, which makes it impossible to distinguish whether a person without a job was unemployed, economically inactive or in full-time education. Therefore, I create another dataset of work histories by using raw data collected in 2000 and 2004. The survey in 1996 separately collected information about a current spell of employment, but I do not use this information, as the same information is already available in the 2000 and 2004 surveys. For those who appear only in the 1996

Fortunately, 'left censoring' does not occur in the data. I use June 1986 as a possible starting month for the work histories of all of the respondents, because all of the BCS sample members were officially allowed to leave compulsory education in late May 1986.[10] For those who left full-time education later than that, the starting months of their employment spells are just as reported in the dataset.

Retrospective work history data are a useful source of information on unemployment dynamics, but there are some caveats regarding recall errors in such data. Recall errors are of particular concern when the respondents are asked to give information on experiences which were not very important and lasted only for a short period (Dex, 1995). However, recall errors are less serious when the respondents simply report whether they were in or out of work in the recent past (Elias, 1991; Freedman et al., 1988; Paull, 1997). Errors are more liable to occur when drawing a distinction between unemployment and inactivity; in other words, recalling whether or not they were searching for a job at a particular time (Dex and McCulloch, 2001). Comparing work histories collected in panel data (the British Household Panel Survey) and in retrospective data (the Family and Working Lives Survey), Dex and McCulloch (2001) show that men's unemployment recall is not very error prone, while that of women is. Therefore, for women, I analyse both unemployment and non-employment, including both unemployment and inactivity, where needed.[11]

In the BCS, a variable for employment status was collected in such a way that the respondents were asked to choose one of the following twelve choices: full-time employed, part-time employed, full-time self-employed, part-time self-employed, unemployed and seeking work, full-time education, on Government Supported Training (GST) without employment, temporarily sick/disabled, permanently sick/disabled, looking after home/family, wholly retired, and other. Using the variable, unemployment, non-employment and employment states are defined as follows.

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survey, the information is less useful, as it leaves unclear when the first employment spell started after leaving full-time education. The starting dates of the first employment spells are also unavailable for individuals whose employment transitions are extraordinary frequent. In the 2000 and 2004 surveys, the respondents were asked to recall up to ten employment spells including non-employment ones, and hence some of the earliest spells may not be recorded for those who experienced ten or more transitions. Although they may have distinctive characteristics, the proportion of such respondents is small (about 2%) and I have checked that excluding them from analysis does not affect the results.

[10] Some of the respondents reported that they had left full-time education and started to work earlier than that, which might have been a fact of life. However, I do not speculate that employment spells before the official school leaving age were so important that omitting them could lead to serious measurement errors for human capital. For those who left full-time education later than that, the starting months of their employment spells are just as reported in the datasets.

[11] Flinn and Heckman (1983), using data from young men in the US, showed that probabilities of entering employment after a non-employment spell are different between the unemployed and economically inactive. This is mainly because of different duration dependence governing employment probabilities for each group. While it is unclear whether this evidence can be inferred to young women in the UK, some may question whether it is meaningful to analyse the unemployed and economically inactive together. However, the aim of this study is not to examine duration dependency, and the explanatory variables of interest are those for childhood poverty and qualifications. Furthermore, although childhood poverty and educational attainment could influence non-employment duration, the contrary is not possible. Therefore, ignoring the potentially different effects of time on unemployment and on inactivity is not thought to bias the estimated coefficients for childhood poverty and educational attainment.

Unemployed: Without a job and searching for a job, or on GST without employment.[12]

Non-employed: Unemployed or economically inactive (e.g. temporarily or permanently sick/disabled, looking after home/family) and not undertaking full-time education.

Employed: Full-time or part-time employed including self-employed. Someone who is on paid or unpaid parental leave is defined as employed if they are still employed and intending to return.

3.2 Explanatory and control variables

Childhood poverty: In principle, I apply the concept of relative poverty rather than absolute. In the BCS at age 10 and age 16, household income data are collected, by asking parents to choose a range into which the combined gross income of the mother and father falls. The questionnaire explicitly suggests that Child Benefit should be excluded but that all other earned and unearned gross incomes should be included. By using the data, I firstly create a variable for net equivalised household income.[13] Secondly, I derive variables for relative income poverty (below 60% of the median income) at age 10 and age 16, by making use of the poverty rates estimated from more representative data from the Family Expenditure Survey (FES). However, the income variable is subject to the high rate of item non-response. Therefore, in addition to the variables for relative income poverty thus created, I further utilise other indicators for household low income available from the BCS in order to capture those who are highly likely to have experienced poverty. The indicators include receiving free school meals, parent(s) receiving income support or unemployment benefit at each age of 10 and 16. I create dummy variables to measure poverty status at each age, whose value is one if someone is identified as experiencing poverty based on at least one of the variables or indicators such as household incomes and benefit receipt. If someone failed to give information about their poverty status at either age, the dummy variables are set as missing for them. To check the sensitivity of these variables to the estimated effects, I will attempt to estimate alternative models by using other imputed variables for childhood poverty (see Subsection 5.1).

Table 1 shows that the poverty rate is 14% at age 10 and 19% at age 16 among the valid sample for analysis. Based on the statistics provided by the Institute of Fiscal Studies (IFS), using data from the FES, the rates of children living in households with an income below 60% of the contemporary median (before housing cost) are 16% in 1980 and 21% in 1986. A smaller proportion of children are defined as living in poverty in the data used in this study than in the more representative data, but the increase between the two years is similar across the data sources.

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[12] In the BCS, unemployment can be the main activity for those who are engaged in part-time work or part-time education, if they consider themselves to be unemployed and searching for jobs (Simmonds et al., 2007).

[13] I am grateful to Jo Blanden for providing her data program for creating household income variables using the BCS data. To create the variables for net equivalised household income, I mostly apply the procedures used by Blanden and Gibbons (2006), but I derive poverty thresholds in a different way from theirs.

Table 1 also shows the distributions of unemployment and non-employment incidence by childhood poverty status. Those who grew up in poverty are clearly more likely to experience unemployment in adulthood than those who did not, regardless of gender. Women are more likely to experience inactivity than unemployment, and childhood poverty is also associated with the incidence of non-employment. While 8-9% of men (the difference in the percentages of those never unemployed and those never non-employed) experience inactivity at least once, the major reasons for this include disability, sickness or taking a gap year.[14] Young men's inactivity seems to be barely related to the impact of childhood poverty. Therefore, I will focus only on unemployment for men. Although not presented, the distribution of unemployment and non-employment incidence for those whose childhood poverty status is missing is quite similar to that for all in the valid sample. This indicates that the item non-response for the poverty variables has only a small impact on the estimates below.

Highest qualification obtained: It is better to measure educational attainment by qualification attainment in the UK than by the number of years of schooling. I have identified six groups based on combinations of the highest academic and vocational qualifications obtained (labelled from 1 to 6 below), taking account of the differences in the earnings premium associated with qualification attainment (Conlon, 2001; Dearden et al., 2002; Dickerson and Vignoles, 2007; McIntosh, 2004) . This is also summarised in Appendix Table A1.

1. No or low GCSEs[15] with/out a low vocational qualification
2. No or low GCSEs with higher a vocational qualification
3. High GCSEs with/out a low vocational qualification
4. High GCSEs with higher a vocational qualification
5. A-levels[16] with/out a vocational qualification
6. Degree with/out a vocational qualification

Since some people obtained qualifications after they first left full-time education, I treat the qualification variables as time varying covariates in order to reduce the measurement errors in qualification attainment. Only the year of qualification acquisition is known from the data, and I interpret this as showing that people obtained the qualification in January of the year in which they report they obtained the qualification. Of course, the actual date of qualification acquisition is thought to be later than January in most cases. However, if their employers allowed them to start working before they have officially obtained the qualification, on the assumption that they would

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[14] In the BCS, it is speculated that a response of "other" to the question of employment status is most likely to mean taking a gap year.

[15] GCSE is an academic qualification at lower secondary education level. Those born in 1970 sat GCE O-levels or CSEs (the precursor to GCSEs) at school, but some of them also obtained GCSEs if they returned to secondary education after 1986. O-levels and CSE Grade 1 are regarded as equivalent to high GCSEs (Grades A to C), and CSEs Grades 2 to 5 are regarded as equivalent to low GCSEs (Grades D to G). Even though the respondents are more likely to have obtained O-levels or CSEs, the labels equivalent to contemporary qualifications would be useful.

[16] A-level is an academic qualification at upper secondary education level.

do so in due course, using the actual date of qualification acquisition, even if known, may overestimate the effect of the qualification on employment probability. Nonetheless it may be too early to assume that someone will obtain a degree or higher degree in January so, for these qualifications, I assume that people obtain them in June.

Pathways (apart from education): For pathways of the relationship between childhood poverty and the onset unemployment following an employment spell, I examine the intermittent work experience which could undermine or slow down human capital accumulation. I use the variables for currently being in part-time employment[17] and past unemployment duration. For female non-employment, I additionally examine the mediating effect of childbearing on un/non-employment because those women who grew up in poverty are more likely to have a child early and this is likely to interrupt their career (Hobcraft and Kiernan, 1999).

Drawing on the previous literature reviewed in Section 2, the coefficients for past unemployment durations may indicate the scarring effects on later unemployment, or the impacts of unobserved characteristics of the long-term unemployed and/or precarious employment that they experience. I measure past unemployment duration in two ways; firstly by including unemployment periods both in and out of training and secondly by including only unemployment periods out of training. The differences between the coefficients for the two variables could indicate benefits from undertaking training while unemployed compared with being unemployed without training, although they could also indicate differences in unobserved characteristics between those unemployed who participated in training and those who did not.

Control variables: I control for the family characteristics associated with income poverty so that estimated coefficients for the childhood poverty variables can have implications for income redistribution policy. The control variables for family characteristics include ethnicity, [18] father's social class, [19] mother's education. [20] Therefore, my findings possibly underestimate the scale of problems derived from

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[17] The higher unemployment risks among part-time workers may be simply a direct consequence of the precarious employment contract rather than for human capital reasons.

[18] Ethnicity is measured by a dummy variable equal to 1 if white and 0 if ethnic minority. The sample size of ethnic minority is too small for further disaggregation.

[19] It is possible to determine father or male head's social class measured at four points in childhood. If someone's father figure is classified as belonging to social class I, II or III (non-manual) at least twice, they are assigned 1 for this variable. This variable is also observed for those who have ever had a lone mother, unless information is missing at all four points in time. The number of such respondents is very small, and the findings of this paper do not change when I include them by assigning another value to flag the missing data to them. A division between non-manual and manual classes may be conventionally used to capture cultural differences between families. If social class was specified in more detail as in the Standard Occupational Group, it may be almost linearly associated with the risk of poverty and lead to a downward bias in the poverty effect. This may be misleading, particularly for those living in poverty while belonging to manual classes. However, this problem is expected to be minimised if I use the dummy variable, as there is a sufficient variation in poverty experience within each of the groups.

[20] Mother's education is measured by a continuous variable for mother's age when she left full-time education. Although qualification attainment is usually a better measure of education than the number of years in education, the mother's qualification is more strongly associated with the father's social class. Therefore, to avoid over-fitting the model, it would be better here to control for the number of years.

multi-dimensional poverty. I would also like to control for individual characteristics that have been influenced by poverty in early childhood in order to assess the effect of poverty in mid and late childhood without having a variable for poverty in early childhood. In this respect, the use of the BCS is an advantage as variables for cognitive ability as measured at age 5 [21] are available in it. In the bottom half of Table 1, descriptive statistics of these control variables as well as the qualification variable are presented.

The national and local unemployment rates are obviously thought to influence employment participation. As information is not available on the places of residence of the respondents over the period covered by the work history data, I include the variable for the national unemployment rates in the previous quarter as time varying covariates, to control for differences in the economic conditions across times. People with only compulsory education and those with higher education enter into work under different labour market conditions (see Figure 2). The unemployment rate for all of those aged 16 and over was 11.3% in 1986 and was 8.9 % in 1991, for instance. Without controlling for the unemployment rate, it is speculated that the high employment rates among degree holders may partly be because of the improved economy rather than the effect of possessing a degree.

3.3 Estimation method

Traditional statistical methods are problematic in dealing with event history data, such as the work history data, due mainly to the existence of censoring. In other words, it is usually impossible to observe full event histories for all individuals. For people who have never experienced the event of interest by the last survey date, it is unclear whether they will ever experience it in the future or will experience it soon. Also, the last survey dates are usually varied among the respondents because of attrition and so forth. Therefore, treating censored and uncensored individuals equivalently would lead to biased estimates. Event history analysis is designed to overcome this problem and makes it feasible to investigate the relationship between the onset of an event (or the duration until the onset) and the covariates of interest. I describe the definitions of the concepts and measures adopted to quantify the duration of employment and unemployment spells for the analysis of this study as follows.

Employment spell: The time from when people became employed to when they voluntarily or involuntarily leave employment. An employment spell can end with either an event (a transition to unemployment) or censoring (see below). Job-to-job turnover is not taken into account unless there is any unemployment spell between jobs. Therefore, the first employment spell is defined by the period worked continuously in one or more jobs before becoming unemployed for the first time (excluding any experience of unemployment immediately after leaving full-time education) or being censored. If a person has started to be employed again after some spell(s) of

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[21] Cognitive ability at age 5 is measured by the z scores for vocabulary and copying tests.

unemployment, non-employment or repeated full-time education, this employment spell is regarded as the second or subsequent employment spell.

Unemployment spell: The time from when people became unemployed to when they leave unemployment. An unemployment spell can end with either an event (a transition to employment) or censoring (without a transition to employment – see below). If a person has started to be unemployed again after some spell(s) of employment, this unemployment spell is called the second or subsequent unemployment spell. I do not specifically explain the concepts associated with non-employment, such as the non-employment spell, but they are straightforward extensions of those associated with unemployment.

Event: For the employment spell, a transition from employment to unemployment is regarded as an event. This is the onset of unemployment. For the unemployment spell, a transition from unemployment to employment is regarded as an event. This is the exit from unemployment.

However, as described above, the employment and unemployment spells can end without these events. In this case, the spells are treated as being censored in the following two ways.

Censoring: The first type of censoring is a general issue for event history analysis, in that a spell ends before the event is observed, with a person leaving the survey or the survey itself coming to an end. The second type of censoring is due to the fact that there are other destinations than unemployment and employment that can terminate employment and unemployment spells, respectively. Both employment and unemployment spells can end with a person becoming inactive or re-entering full-time education. If spells end with these transitions rather than the events defined above, they are treated as censored. The implications of this approach to multiple destinations for regression estimates are discussed below.

Survival: A person survives each spell under analysis until event occurrence or censoring.

Analysis time: One unit of analysis time t is a month, and t is set to zero when each spell under analysis begins.

To illustrate how I measure these concepts by using work history data, I have created Figure 3. It is the matrix of the possible transition patterns in work history from calendar time $m-1$ to m. At each time point, a person is in one of the four possible economic states; employment, unemployment, economic inactivity or full-time education. Hence, there are 16 possible transition patterns between the two consecutive times, such as a transition from employment to employment, that from employment to unemployment, that from unemployment to employment, and so forth.

How these transitions are treated depends firstly on whether we analyse the onset of unemployment or the exit from unemployment. To analyse the former, as shown in the unshaded cells in the matrix, a transition to employment from any other status marks the beginning of the analysis time ($t=0$), while the transitions to other destinations are not under analysis. A transition from employment to unemployment is the event, while that from employment to inactivity or full-time education is treated as censored. If someone were in employment at time $m-1$ and is also in employment at time m, they are treated as surviving the employment spell.

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To analyse the exit from unemployment, as shown in the shaded cells, a transition to unemployment from any other status marks the beginning of the analysis time (t=0), while the transitions to other destinations are not under analysis. A transition from unemployment to employment is the event, while that from unemployment to inactivity or full-time education is treated as censored. If someone were to be unemployed at time *m-1* and is also unemployed at time *m*, they are treated as surviving the unemployment spell.

To measure the rate of the onset of and exit from unemployment, I apply the concept of the hazard rate. This denotes the rate of event occurrence per time in the unit interval $[t, t + \Delta t]$, given that the spell has survived up to and beyond time t. There are several methods of estimating the hazard rate and its relationship with the covariates, broadly characterised by parametric and non-parametric (or semi-parametric) modelling. The limitation of the parametric modelling is that it depends on the accuracy of an estimated baseline hazard. The baseline hazard is a function of time; that is, the hazard rate which is explained simply by when (how long after entering a risk period) the event occurs. Although it is useful to obtain the baseline hazard if we are interested in the effect of time on status, in other words, how the status at time *t*-1 affects that at time *t*, strong theoretical assumptions are required to determine the baseline hazard. However, as this study does not aim to estimate such an effect of time, it would be more convenient if the hazard rate could be estimated without assumptions about the baseline hazard. In this respect, the Cox proportional hazards model is the most favoured one, as this does not make such assumptions.

In the Cox model, the hazard rate for the subject *i* is defined as

$$h_i(t) = h_0(t)\exp(\beta' X_i) \tag{1}$$

where $h_0(t)$ is the unspecified baseline hazard function and $\beta' X$ are the covariates and regression coefficients. The hazard rate for this model is proportional and the hazard ratio of the subject *i* with a set of covariates X_i and the subject *l* with a set of covariates X_l can be written as

$$\frac{h_i(t)}{h_l(t)} = \frac{h_0(t)\exp(\beta' X_i)}{h_0(t)\exp(\beta' X_l)} = \exp[\beta'(X_i - X_l)] \tag{2}$$

If one element x_j of X is increased by one unit and the other elements are held constant, the hazard is multiplied by $\exp(\beta_j)$ (the exponentiated coefficient).

Two methodological issues relating to the multiple destinations and multiple spells in event history analysis are noteworthy. Firstly, there are multiple destinations that can terminate an employment or unemployment spell, and the spell that ends with a transition to destinations other than unemployment or employment is treated as randomly censored in this study. This posits that those who had moved to inactivity or full-time education could have moved to unemployment or employment, if they

remained in the employment or unemployment spell, although only the earliest transition is observed for each person. For this method of modelling employment and unemployment spells to be valid, we need to assume that the probabilities of the onset of (exit from) unemployment relative to remaining in employment (unemployed) are the same for both those who remain in the employment (unemployment) spell and those who have left the spell to become inactive or to re-enter full-time education, after controlling for the observed covariates. This may be a strong assumption which is unrealistic in practice.

What is important to consider here is the possible impact of the violation of this assumption on the estimated coefficients for childhood poverty and qualification variables. It would violate the assumption if those who became inactive were more similar in terms of their unobserved characteristics to those who became unemployed or remained unemployed than to those who remained in employment or moved into employment from unemployment. However, for men, the impact of this violation is likely to be minor, because most non-working men describe themselves as unemployed rather than inactive in the data I use.[22] For women, this violation may have a substantial impact, but as addressed above, women's reporting of unemployment status is ultimately error prone, since the boundary between unemployment and inactivity is vague. Thus, a solution for women is to look at both unemployment and non-employment.

On the other hand, there is a non-negligible number of people who re-enter full-time education, although it is difficult to predict whether they are systematically different in terms of their unobserved characteristics from those who remain in the employment or unemployment spells. If they are, treating those who left the spell to re-enter full-time education as randomly censored may bias the estimates. Nonetheless, it may be more natural to believe that childhood poverty affects such unobserved characteristics rather than vice versa and, if this is the case, we do not have to be concerned about bias in the childhood poverty coefficients. The same is true of qualification coefficients if educational attainment affects the unobserved characteristics. However, it may be possible that the unobserved characteristics affect both educational attainment and re-entering full-time education, and in this case, the qualification coefficients may be biased. Furthermore, it is extremely difficult to hypothesise the directions of bias which depend on the directions of the effects of the unobserved characteristics on qualification attainment and re-entry into full-time education and on the directions of the effects of qualification attainment on the onset of and exit from unemployment.

There are few applications in social sciences that have addressed the non-randomness of multiple destinations and few analytical solutions are available, particularly when there are more than two alternative destinations (Box-Steffensmeier

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[22] If unemployment is defined by unemployment benefit receipt, for instance, introducing or strengthening benefit conditionality may cause some of the non-working, who would otherwise have received unemployment benefit, to give up receiving it and become inactive. In this case, the assumption of the independence of the competing risks may be more clearly problematic.

and Jones, 2004). Therefore, the event history analysis in this paper also makes the assumption discussed above. It is a task of future research to test whether the qualification coefficients will be changed by taking account of the non-randomness of multiple destinations.

The second methodological issue relates to the use of multiple spells per individual. In this estimation, the within-individual correlations between the lengths of the spells may bias the estimates. To allow for these correlations, there are broadly two solutions; namely, the variance-corrected models and the shared frailty models.[23] The variance-corrected models correct standard errors by clustering them by individual. Thus, the coefficients are the same as the so-called pooled estimates. The shared frailty models are analogous to the random effects models used in other kinds of multilevel or longitudinal analyses. I only report the variance-corrected models, but have checked that the shared frailty models produce basically consistent results.[24] In applying the variance corrected models, I take account of the spell correlations not only within individuals but also within sequences of employment spells. This is because the more frequently unemployment is repeated; in other words, the higher the sequence number of the employment spell, the shorter its duration tends to be.[25]

4.   Results

In this section, I present the results of the regression analyses investigating effects of childhood poverty on the unemployment outcomes as follows: the onset of unemployment following an employment spell for both genders and that of non-employment for women (Subsection 4.1); the exit from unemployment experienced after employment for both genders and that from non-employment for women (Subsection 4.2); and the onset of and exit from unemployment experienced upon leaving full-time education for both genders (Subsection 4.3).

Before estimating regression models, I present the descriptive statistics (Kaplan-Meier estimators) to illustrate the simple association between childhood poverty and the onset of unemployment. Figure 4 clearly shows that those men who grew up in poverty, (particularly at both ages 10 and 16), are more likely to leave the first employment spell rapidly than those who did not. Figure 5 shows the equivalent survival estimates for women. The association between the onset of unemployment and poverty at each age of 10 and 16 is much less clear for women than for men, but those women who experienced poverty at both ages 10 and 16 are more likely to become unemployed

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[23] There are also stratified models which are analogous to the fixed effects models. However, in stratified models, as in fixed effects models, coefficients can only be estimated for explanatory variables whose values can change between spells. This is not suitable for analyses of this paper which focus on the coefficients for childhood poverty, as childhood poverty status cannot change during adulthood by definition. Therefore I would not apply the stratified models.

[24] Unfortunately, as the shared frailty models did not converge when estimating the Cox model, which is not unusual, I switched to the parametric model (assuming the log normal distribution for the baseline hazard) for this purpose.

[25] Since the number of individuals decreases with increasing sequence number, I only distinguish the second employment spell from subsequent spells.

rapidly. The reason why the survival estimates are generally higher for women than for men is not that they are more likely to remain in employment but that they are less likely to become unemployed. If an employment spell terminates with a transition to inactivity, it is regarded as censored. Given that some women interpret their unemployment as economic inactivity, it would be more appropriate to look at a transition to non-employment to measure employment insecurity for women. Figure 6 shows survival estimates of employment spells for women until the onset of non-employment, where both transitions to unemployment and to inactivity are regarded as the events of interest. Those women who grew up in poverty, those who experienced poverty at both ages 10 and 16 in particular, are more likely to terminate their first employment spell with a transition to non-employment. Given that the major reason for women's inactivity is family care, the higher survival estimates for women from more advantaged backgrounds can be derived from two reasons: they are in employment with more security which allows them to take maternity leave, or they are delaying child bearing.

4.1 The onset of unemployment

For the onset of unemployment following an employment spell, I estimate the Cox proportional hazards models specifically for the first employment spell and then for the first and subsequent employment spells together.

Table 2 shows the results regarding the first employment spell for men. Column (3) suggests that, controlling for qualification attainment and other individual and family characteristics, the coefficients for poverty at age 10 and age 16 both remain statistically significant, with the risk of onset of unemployment being 1.5 and 1.3 times greater than otherwise, respectively. [26] The table also suggests that some of the association between childhood poverty and the later unemployment risk can be explained by educational attainment, by comparing the poverty coefficients between Columns (1) and (2). However, only A-levels and low GCSEs with higher vocational qualifications have a significantly negative effect in reducing the onset of unemployment following the first employment spell for men, while a degree does not.

Columns (4) to (6) of Table 2 examine the pathways of the effect of childhood poverty on the onset of unemployment. Firstly, Column (4) assesses whether being in part-time employment mediates the effect. Although there is evidence that people in part-time employment are more likely to become unemployed, this does not explain the effect of childhood poverty. Secondly, Column (5) assesses whether unemployment duration after leaving full-time education has a scarring effect on later unemployment risks, and whether this explains the effect of childhood poverty on unemployment. It shows that those who were unemployed for more than 12 months immediately after leaving full-time education are 1.8 times as likely as those who did not experience unemployment then to become unemployed during the first employment spell. This

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[26] An interaction term of poverty at age 10 and poverty at age 16 was not statistically significant (results not shown). Therefore, the effects of each experience of childhood poverty may be additive on the onset of unemployment after the first employment spell for men.

suggests either that the unemployment spell has a scarring effect or that they are in precarious jobs. The scale of this effect seems to be at least as great as the extent to which higher vocational qualifications reduce the unemployment risk for those who have no or only low GCSEs.

When I use an alternative variable, which excludes the length of time spent on GST from the unemployed duration, Column (6) of Table 2 shows that the equivalent coefficient increases. This suggests that participating in GST could reduce the effect of long-term unemployment for education leavers, although it is unclear whether it successfully removed it or not. Column (5) shows that the poverty coefficients somewhat decrease by controlling for the unemployment duration, and the coefficient for poverty at age 16 has become insignificant only at the 5% level. This indicates that long-term unemployment immediately after leaving full-time education may partly explain the effect of childhood poverty on the onset of unemployment.

Table 3 shows the results for female unemployment. Column (3) suggests that poverty at age 16 significantly increases the risk of onset of unemployment following the first unemployment spell by 1.4 times, even after controlling for educational attainment, individual and family characteristics, while poverty at age 10 does not. Similarly to men, some of the association between childhood poverty and the later unemployment risk can be explained by educational attainment, but only high GCSEs preferably combined with a higher vocational qualification has an effect in reducing the unemployment risk.

Column (5) of Table 3 shows that past unemployment immediately after leaving full-time education for between 1 and 6 months and for more than 12 months has positive effects on the later onset of unemployment. Those women who were unemployed for 7-12 months are less likely to become unemployed than those who were unemployed for 6 months or less. This is presumably because women may become inactive after some unsuccessful attempts to find a job, and thus, in one sense, those women who are unemployed long term may have stronger labour market attachment than those women who are unemployed short term but inactive long term. Similarly to men, the comparison of the coefficients between Columns (5) and (6) implies that participating in GST could reduce the effect of long-term unemployment for education leavers.

As noted earlier, women are more likely to become inactive than unemployed when they leave a job. Columns (7) to (9) present the effect of childhood poverty on the onset of non-employment (including both unemployment and inactivity but excluding full-time education) following the first employment spell. Poverty at both age 10 and age 16 significantly increases the onset of non-employment, after controlling for the other individual and family characteristics. All the qualification coefficients are significant for the onset of non-employment, but the absolute size of the coefficient is largest for those with high GCSEs with a higher vocational qualification, which is somewhat similar to the result for unemployment. Column (10) shows that women having a child are more likely to become non-employed rapidly. While this does not explain the residual effect of childhood poverty, women from non-poor backgrounds

seem to be less likely to become non-employed for child care reasons because they are more likely to have obtained a degree.

Table 4 shows whether the findings based on the first unemployment spell can be generalised to all employment spells. For those who have experienced the termination of employment spells more than twice, multiple employment spells are included in the sample (see Subsection 3.3 for the methodological issues involved in the use of multiple spells). Columns (1), (4) and (7) report the equivalent models to those reported in Column (3) of Table 2 and Table 3 and Column (9) of Table 3, respectively, controlling for educational attainment and other individual and family characteristics. Table 4 suggests that, for both men and women, the positive effect of poverty at age 16 on the onset of un/non-employment persists for all employment spells. However, there are also some differences. The effect of poverty at age 10 is smaller at the onset of unemployment for men, and at the onset of non-employment for women, when the second and subsequent employment spells are also considered. For men, the effect of possessing a degree has turned to negative and statistically significant, and this is partly because their past experience of unemployment for those who experienced it is shorter than others, by comparing the degree coefficients between Columns (1) and (2). However, Column (3) suggests that even a short spell of past unemployment generally increases the risk of becoming unemployed again, if not participating in training while unemployed.

4.2 The exit from unemployment
For the exit from unemployment experienced after an employment spell, I estimate the Cox proportional hazards models for all unemployment spells together, and report the results in Table 5.

Column (1) of Table 5 shows that those men who experienced poverty at each age of 10 and 16 are more likely to remain unemployed. Column (2) suggests that this association between childhood poverty and the duration of unemployment can partly be explained by qualification attainment. However, Column (3) makes it unclear whether income poverty at age 10 and age 16 are associated with the slow exit from unemployment, as the coefficients turns to insignificant after controlling for the other individual and family characteristics. Nonetheless, there is weak evidence (statistically significant only at the 10% level) that poverty in mid and late childhood is associated with the slow exit from unemployment for men. Those from disadvantaged backgrounds who have obtained higher qualifications might rather choose to stay unemployed than to get jobs that are available to lower-qualified people, even though it may take them longer to get jobs than those from more advantaged backgrounds with the same level of education. Stronger evidence is that those possessing a higher vocational qualification, A-levels or a degree are more likely to exit unemployment rapidly.

Column (5) of Table 5 shows that poverty at each age of 10 and 16 is not associated with the rapid onset of unemployment for women, while obtaining higher qualifications seems to be advantageous in escaping unemployment. Columns (9) to

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(11) show that the negative effect of poverty at age 10 persists at the exit from non-employment, controlling for other individual and family characteristics.

The estimates are obtained from the subsamples of those who experienced unemployment at least once. To avoid making the models too complicated, I have not dealt with the sample selection bias. Therefore, the poverty coefficients may possibly be underestimated because those who have ever experienced unemployment, on average, are relatively more disadvantaged than others. However, there is strong evidence that educational attainment persistently increases the chance of leaving unemployment.

Table 5 additionally reports whether training participation has a positive effect on the rapid exit from unemployment. Columns (4) and (8) include the time-varying covariate of training status (a dummy variable equal to 1 if participating in GST and 0 otherwise) for men and women, respectively. The coefficients are both negative, although that for men is not statistically significant, presumably because those who participate in training remain in training for some time rather than training helps them to escape unemployment as rapid as possible.

4.3 The experience of unemployment upon leaving full-time education

Advocates of the welfare-dependency model may argue that the analysis based on young people who have ever worked after leaving full-time education would not be sufficient, because the problem of welfare dependency is concentrated among those who have never worked. However, the first employment spell analysed above is observed for most respondents. The respondents who are regarded as having never worked since they left full-time education are those who remained in the survey either up to 2000 or 2004 but have no work history. 60 men and 106 women fall into this category, with 34 of those men and 22 of those women having described themselves as long term sick at age 30 or 34. 62 of those women were engaged in family care, although it is unclear whether they had always been in family care since they left education.

Nonetheless, it is worth investigating whether childhood poverty increases the risk of unemployment when young people leave full-time education. Table 6 shows the estimates from the logit models of unemployment versus employment upon leaving full-time education for men and women. If someone was recorded as unemployed in the next month of the month when they left full-time education, the outcome variable is 1 and 0 if employed. Those men who experienced poverty at age 10 or 16 are 1.6 or 1.9 times more likely to be unemployed, after controlling for qualification attainment and other individual and family characteristics. A possible explanation for the effect of childhood poverty on unemployment upon leaving full-time education is that those who grew up in poverty tend to leave full-time education at younger ages, and that simply being young may make it difficult for them to gain employment. Column (4) shows the model estimated only for those who left full-time education before the age of 18. The coefficients for poverty at both ages are still significant, and that for age 10 is even larger. For women, the experience of poverty at age 16 only has a positive effect in both the full and age-restricted sample.

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With respect to the effects of qualifications, possessing A-levels reduces the onset of unemployment upon leaving full-time education compared with having no or only low GCSEs. Holding a degree does not reduce the risk for men. This might be counter-intuitive, but is in line with previous research finding by Smith et al. (2000) that nearly 20% of male graduates in 1993 were unemployed or inactive six months after graduation. Their finding implies that male graduates were more likely than female graduates to be unemployed (or in further study) if they could not find graduate jobs, although it is unclear whether the situation is similar for contemporary gradates. Taken together with the findings about the onset of unemployment following the first employment spell, male graduates are no less likely to become unemployed in very early working life.

For the exit from unemployment immediately after leaving full-time education, Table 7 shows the results based on the Cox model. For men, those who grew up in poverty at age 16 are less likely to exit unemployment, controlling for qualification attainment and other individual and family characteristics (Column (3)). For women, on the other hand, poverty at age 10 negatively affects the exit from unemployment, controlling for the other variables (Column (7)).

Qualifications also significantly affect the exit from unemployment. For instance, the hazard rate for graduates is nearly double the hazard rate for those with no or only low qualifications for both genders. Although Table 6 has shown that male graduates are no less likely to become unemployed than those with no or only low qualifications upon leaving full-time education, they tend to move out of unemployment more rapidly than others. There is some evidence that higher vocational qualifications seem to be rather more useful than A-levels (intermediate academic qualifications) for both genders. The effect of time-varying covariate of training participation on the exit from unemployment is negative and significant, which is consistent with unemployment experienced after employment spells.

5. Validity and limitation

5.1 The sensitivity of the childhood poverty variables to the estimates
Variables for childhood poverty may be created in several ways, which raises a question of the sensitivity of using the variables created in the way I described in Subsection 3.2. Table 8 additionally reports the results estimated by using alternative variables for childhood poverty. The alternative method I have chosen to create childhood poverty variables is to impute household income of those whose values are missing by using other observed variables collected in the study,[27] and define them as poor if their

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[27] To impute the variable for household income, I employ a data imputation method suggested in Greene (2008, p. 63), which is made computationally feasible by Stata's mi command. Firstly, I estimate a regression model for household income by using only observed data. Given that the explanatory variables to predict household income are also available for those whose income variable is missing, I fit the estimated regression model onto these values to predict missing values on the income variable. The variables used to predict household income at each age of 10 and 16 include father's social class, mother's education, household structure, household employment status, receiving free school meal,

household income (adjusted for household size) falls below a relative poverty threshold (60% of the median income).

Table 8 presents the coefficients for poverty at age 10 and age 16 estimated from the model controlling for qualification attainment and the other individual and family characteristics. In each panel of the table, the first two rows report the coefficients reported in Table 2 to Table 7, and the bottom two rows indicated by (i) report the coefficients estimated from the models using the imputed variables. The comparison between the two sets of coefficients suggests that the effects of poverty at both age 10 and age 16 are robust at the onset of unemployment for men. The effect of poverty at age 16 is robust at the onset of un/non-employment for women, except for the time of leaving full-time education. However, the estimated effects of childhood poverty on the exit from unemployment are generally weak and can vary depending on the variables used. The evidence is even weaker if I use the imputed variables, presumably because they define a smaller number of the sample members as poor.

5.2 Attrition and sample selection

A limitation of this study in estimating the effect of childhood poverty on unemployment dynamics is that there is an imbalance between those who grew up in poverty and those who did not in the availability of work history data. Table 9 shows that more of those who grew up in poverty have dropped out of the study and not provided their work histories than those who did not. If there are unobserved factors affecting the response to the survey which influences both childhood poverty and unemployment, failing to deal with the sample selection may overestimate the effect of childhood poverty on unemployment. However, it would be more reasonable to assume that childhood poverty may have affected unobserved personal characteristics which influence both the response to the survey and the experience of unemployment. In this case, the effect of childhood poverty on unemployment would not be overestimated or could well be underestimated by the sample selection.

5.3 Correlations or causal effects

I discussed the approaches I take when choosing the estimation methods and variables in Section 3.3 , but need to clarify further how I could interpret derived estimation results; whether they are causal effects or not. In principle, it is impossible to interpret any estimate from survey data (non-experimental data) as causal, even when carefully

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parents' receiving income support or unemployment benefit, housing tenure, cognitive ability, and region of residence. Secondly, I assign random errors to the predicted values. This overcomes the less rewarding way of replacing missing values by perfectly predicted values, which underestimates the variances in the income variables. Because the income variables collected in the BCS can be treated as ordinal, I estimate the ordered logit coefficients and thus the random errors in this context are those for latent values. The probability of each case having a particular value for the income variable is predicted based on these coefficients and errors. By comparing the predicted probability and estimated cut-offs that define the probability ranges represented by each value of the income variable, the missing values are imputed. Running the imputation 20 times, I define someone as poor if more than 10 of the 20 imputed income values indicate that they are in poverty.

selected methods and variables are used, because we cannot perfectly condition out the unobserved heterogeneity of individuals. However, it would also be important to distinguish the results from which we can relatively more safely infer causal effects from those which should be interpreted as correlations.

I interpret the coefficients for the childhood poverty variables as correlations, but attempt to argue that those for the qualification variables may imply causal effects. For the poverty variables, I cannot control for local labour market conditions and it is impossible to isolate the effect of growing up in a poor household from that of living in a poor neighbourhood with a weak local labour market. Arulampalam et al. (2000) found that unemployment among young people aged under 25 was barely affected by the local labour market conditions, which may give some justification for not controlling for them, but it would be safer to be cautious. For the qualification variables, the variables for cognitive ability available in the BCS seem to play an effective role in controlling for the heterogeneity between people with different levels of education.

5.4 Summary
Taken as a whole, the effect of poverty at age 16 on the onset of unemployment is robust, while the effect of childhood poverty on unemployment duration may possibly be underestimated. Therefore, the findings highlight the importance of a mechanism behind intergenerational persistence of poverty that is overlooked in the welfare-dependency model, rather than reject it. However, none of the evidence confirms a causal effect of parental income. A hypothesis that has not been tested but plausible is that both parents and their grown-up children struggle to find (good) jobs due to the weak local labour market.

6.   Conclusions and policy implications
The analysis of work history data from men and women born in 1970 found that childhood poverty increases the later risk of unemployment not only during young people's transitions from education to work, but also after they have started their working lives. This continuing and repeated effect of childhood poverty put those affected at a greater risk of experiencing poverty again in adulthood, even after controlling for their educational attainment and other individual and family characteristics. The evidence suggests that breaking the link between childhood poverty and youth unemployment is indeed crucial.

However, it is inappropriate to allow policy changes to be delivered only in line with the welfare-dependency model. More evidence suggests the relationship between childhood poverty and the later risk of remaining trapped in precarious employment than the intergenerational transmission of welfare dependency. In particular, the effect of poverty experienced in late childhood persists, after taking account of other possible explanations. This is a main contribution of this study to the literature.

The results suggest that there are mechanisms of intergenerational persistence of poverty that could be alleviated by youth employment policy as well as education policy. Youth employment policy should be targeted at those in precarious employment as well

as the unemployed. Long term unemployment in early working life seems to have a negative effect on later employment prospects whose scale is almost as great as that of a lack of economically meaning qualification. Training participation may have reduced this undesirable effect of unemployment, while it did not seem to speed up a job search. Paying attention to the fact that those who grew up in poverty are more likely to become unemployed rapidly even if they have started work, it would be important for policy to address job retention rather than simply to provide them with any job under a work first approach. Public services which help to make a smooth transition from education or training to employment would also be beneficial. This is particularly important in terms not only of their future economic prospects, but also of giving them incentives to participate and make efforts to engage with education and training. Given their high risks of becoming unemployed upon leaving full-time education, it can be difficult to expect them to become motivated about education and training.

This study does not reveal whether income transfers to those growing up in poverty could be really effective in reducing their future unemployment risk. As discussed above, the effects of childhood poverty on youth unemployment found may not be causal, particularly due to possible local labour market effects, as well as effects of unobserved individual heterogeneity which have not been netted out in the analyses of this paper. However, income redistribution remains a reasonable approach to adopt in order to improve the future economic prospects of children growing up in poverty, unless evidence to explain the residual effect of childhood poverty becomes available that shows a mechanism that can be more cost effectively corrected. The evidence on the correlation between childhood poverty and later unemployment duration suggests that the design of income redistribution may matter, not that income redistribution should be avoided.

The Coalition Government proposes to make work pay. While this is possible either by raising in-work benefits or by cutting out-of-work benefits, the Government that is interested in reducing its size might rather be inclined to choose the latter option. Both working and workless families may then become poorer. The study suggests that it is probably not sufficient simply to make work pay and to get parents to work, without ensuring sufficient levels of family incomes that can help them to escape from relative poverty. It is also noteworthy that poverty in late childhood has an independent negative impact on later outcomes, against the context in which early investment is increasingly stressed and prioritised.

Figure 1 The participation rates in education, employment and training among 16-18- year-olds: England, 1985-2006

Age 16

Age 17

Age 18

——— Full time education

– – – Training (including part-time education)

- - - - Employment but not in education or training

——— Not in education, employment or training
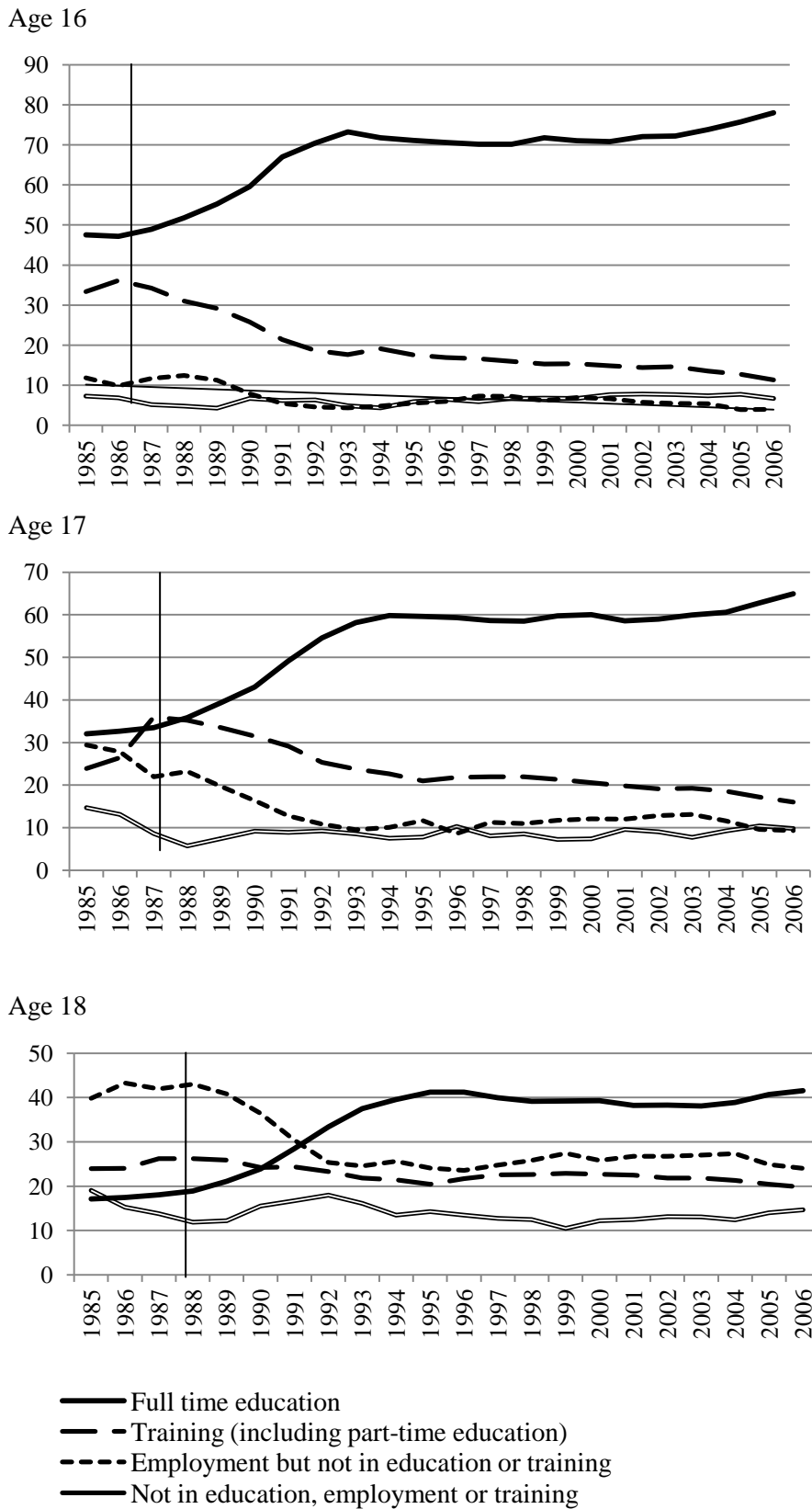
Source: Department for Children, Schools and Families

Figure 2 The unemployment rates by age group (%): Great Britain, 1980-2009

- ——— All aged 16 or over
- - - - All aged between 16 and 17
- ——•— All aged between 18 and 24
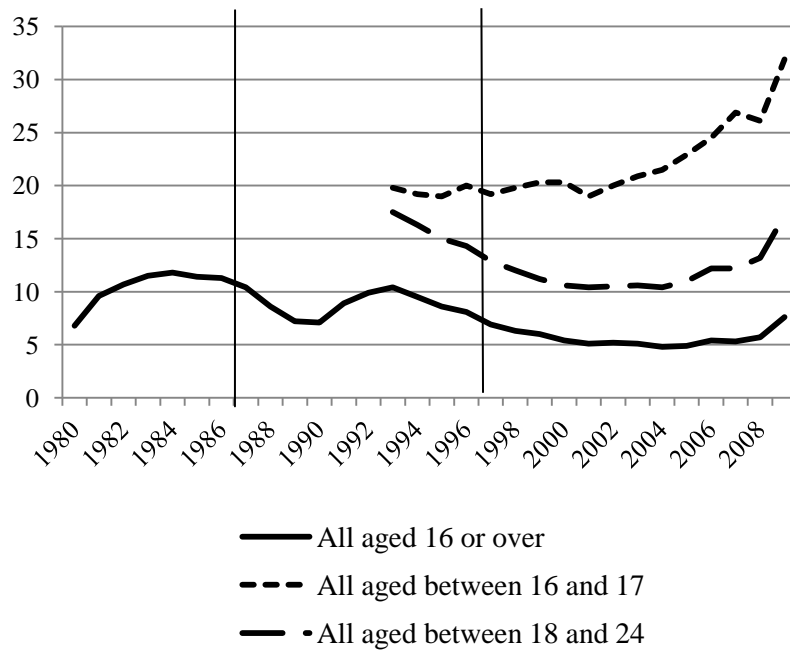
Source: Office for National Statistics using the Labour Force Survey

Figure 3   Possible transition patterns in work history

	Status in calendar time (*m*)			
	Employment	**Unemployment**	**Inactivity**	**Education**
Employment	Survival	Event	Censoring	Censoring
	n/a	*t*=0	n/a	n/a
Unemployment	*t*=0	n/a	n/a	n/a
	Event	Survival	Censoring	Censoring
Inactivity	*t*=0	n/a	n/a	n/a
	n/a	*t*=0	n/a	n/a
Education	*t*=0	Event*	n/a	n/a
	n/a	*t*=0	n/a	n/a

Status in calendar time (*m-1*)

Notes: The unshaded cells in the above matrix indicate possible transitions for the analysis of the onset of unemployment in employment spells. Event* indicates the onset of unemployment upon first leaving full-time education that is not analysed with event history analysis. The shaded cells indicate the possible transitions for the analysis of the exit from unemployment. t_0=0 indicates the beginning of the analysis time. n/a denotes the transitions not under analysis.

Figure 4 Survival estimates for the first employment spell (until the onset of unemployment) by childhood poverty status: BCS males
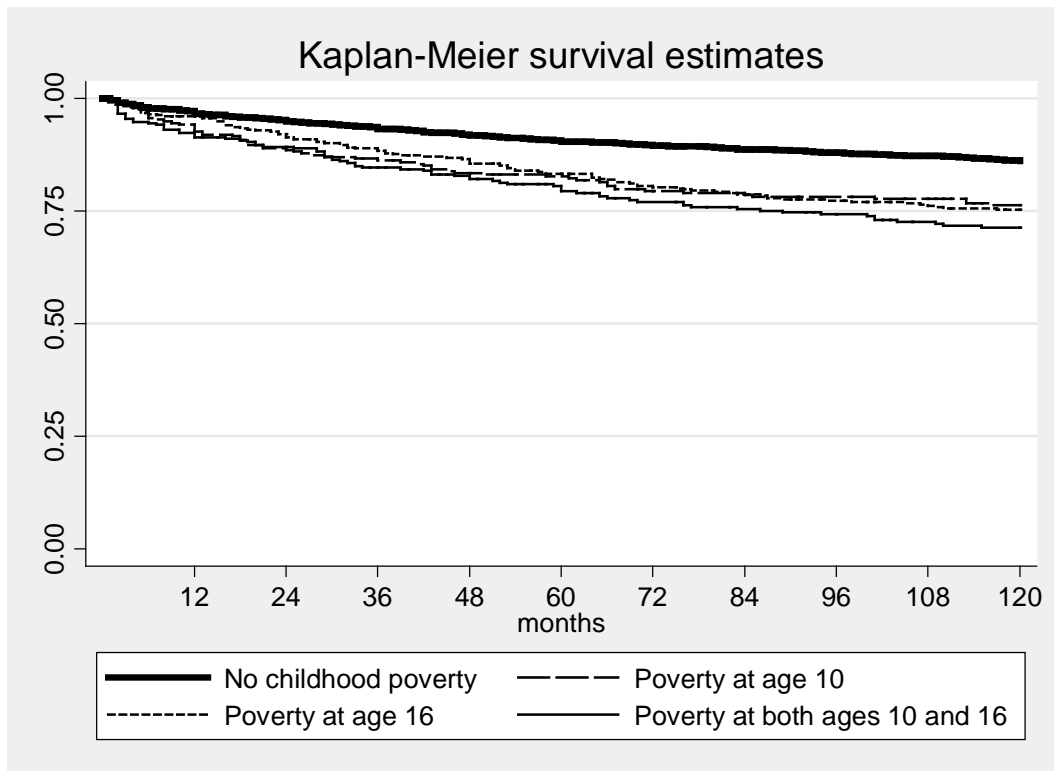
Figure 5 Survival estimates for the first employment spell (until the onset of unemployment) by childhood poverty status: BCS females
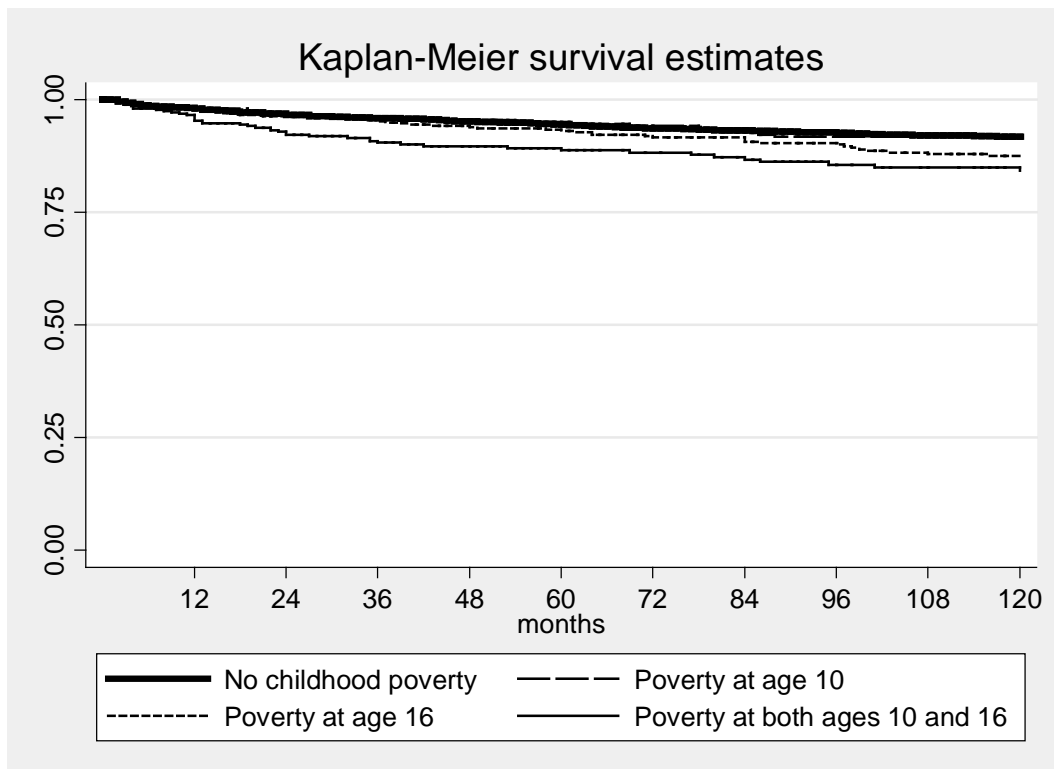
Figure 6 Survival estimates for the first employment spell (until the onset of non-employment) by childhood poverty status: BCS females

Kaplan-Meier survival estimates

Legend:
— No childhood poverty
— — — Poverty at age 10
- - - - - - Poverty at age 16
——— Poverty at both ages 10 and 16
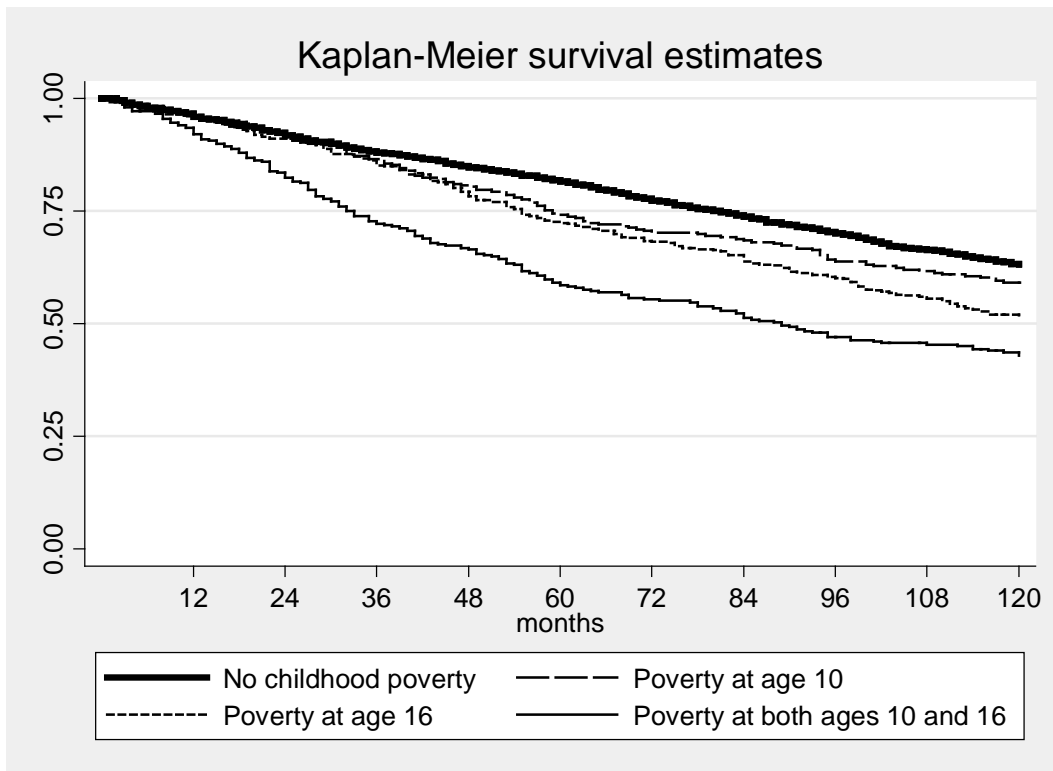
Table 1 Descriptive statistics for the valid sample: BCS

	Males (n=2,022)	Females (n=2,442)
Poverty at age 10 (%)		
No	86.1	85.8
Yes	13.9	14.2
Poverty at age 16 (%)		
No	81.3	80.8
Yes	18.7	19.2

	Poverty at age 10		Poverty at age 16		Poverty at age 10		Poverty at age 16	
	No	Yes	No	Yes	No	Yes	No	Yes
Unemployment experience (%)								
Never	67.6	52.7	69.0	50.4	78.3	74.9	79.3	71.7
Once (when leaving education)	13.2	16.7	12.5	18.7	11.6	13.0	11.0	15.1
Once (after employment)	10.9	12.1	10.9	11.9	7.2	8.1	7.4	6.8
Twice or more (when leaving education & after employment)	2.5	6.4	2.3	6.3	1.4	1.2	1.3	1.9
Twice or more (after employment)	5.9	12.1	5.4	12.7	1.5	2.9	1.1	4.5
Non-employment experience (%)								
Never	58.5	44.8	60.1	41.4	38.9	28.8	39.5	28.9
Once (when leaving education)	14.2	17.1	13.5	19.5	8.2	11.0	8.0	11.1
Once (after employment)	14.3	15.0	14.4	14.3	31.5	33.4	32.4	29.2
Twice or more (when leaving education & after employment)	4.3	8.9	4.0	9.0	7.2	8.4	7.0	8.7
Twice or more (after employment)	8.7	14.2	8.0	15.8	14.3	18.4	13.1	22.1
Highest qualification obtained at age 34 (%)								
1. No or low qualification	11.0	25.9	11.0	25.9	12.1	26.5	11.6	24.7
2. Low GCSEs with higher Voc	10.4	13.7	10.4	13.7	5.0	7.2	4.9	7.0
3. High GCSEs with no or low Voc	13.9	17.2	13.9	17.2	19.5	22.2	19.2	22.6
4. High GCSEs with higher Voc	22.3	20.1	22.3	20.1	18.5	17.9	18.7	17.2
5. A-levels	16.4	10.8	16.4	10.8	21.1	15.6	21.4	15.7
6. Degree	26.1	12.4	26.1	12.4	23.9	10.7	24.2	12.8
Ethnicity (%)								
White	99.1	97.5	99.4	96.8	98.9	96.0	98.8	96.8
Minority	0.9	2.5	0.6	3.2	1.2	4.0	1.2	3.2
Father's social class (%)								
Non-manual	47.1	17.4	48.9	17.2	45.5	17.3	46.3	21.5
Manual	52.9	82.6	51.1	82.9	54.5	82.7	53.8	78.5
Mother's age left education								
Mean	16.0	15.2	16.0	15.3	15.9	15.3	15.9	15.3
Copying test at age 5								
Mean z-score	0.19	-0.24	0.21	-0.20	0.15	-0.16	0.17	-0.17
Vocabulary test at age 5								
Mean z-score	0.35	-0.11	0.36	-0.05	0.05	-0.30	0.07	-0.29

Notes: The variables for unemployment and non-employment experiences classify respondents into five groups according to the frequency and timing of the experience (whether it was experienced upon leaving full-time education or after employment). Unemployment is when people are without a job and searching for a job or on GST. Non-employment is when people are either unemployed or economically inactive and not undertaking full-time education.

Table 2 Cox proportional hazards models for the onset of unemployment for the first employment spell (BCS males)

	(1)	(2)	(3)	(4)	(5)	(6)
Poverty at age 10	0.487**	0.505**	0.420**	0.412**	0.388**	0.391**
	(0.132)	(0.133)	(0.135)	(0.134)	(0.134)	(0.135)
Poverty at age 16	0.409**	0.357**	0.272*	0.270*	0.219+	0.228+
	(0.123)	(0.124)	(0.126)	(0.126)	(0.126)	(0.126)
1. No or low quals		Ref	Ref	Ref	Ref	Ref
2. Low GCSEs with higher Voc		-0.641**	-0.614**	-0.605**	-0.632**	-0.568*
		(0.223)	(0.225)	(0.225)	(0.227)	(0.226)
3. High GCSEs with no or low Voc		-0.218	-0.161	-0.154	-0.147	-0.123
		(0.133)	(0.134)	(0.135)	(0.135)	(0.135)
4. High GCSEs with higher Voc		-0.094	-0.043	-0.041	-0.045	-0.021
		(0.177)	(0.177)	(0.177)	(0.178)	(0.178)
5. A-levels		-0.529**	-0.400*	-0.402*	-0.336+	-0.371+
		(0.188)	(0.193)	(0.193)	(0.194)	(0.192)
6. Degree		-0.135	0.086	0.081	0.125	0.051
		(0.182)	(0.193)	(0.193)	(0.193)	(0.196)
Part-time job				0.824**	0.796**	0.727**
				(0.275)	(0.274)	(0.281)
Unemployed upon leaving education: no					Ref	Ref
1-6 months					0.109	0.281
					(0.227)	(0.255)
7-12 months					0.122	0.244
					(0.244)	(0.359)
13+ months					0.588**	0.996**
					(0.143)	(0.229)
Ethnicity	No	No	Yes	Yes	Yes	Yes
Family background	No	No	Yes	Yes	Yes	Yes
Cognitive ability at age 5	No	No	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes
Number of individuals	2135	2135	2135	2135	2135	2135
Number of events	392	392	392	392	392	392
Log likelihood	-2866.9	-2859.1	-2853.2	-2849.4	-2841.7	-2840.5

Notes: Robust standard errors in parentheses. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$

In Column (6), the unemployment duration excludes the length of time spent on GST.

Table 3 Cox proportional hazards models for the onset of un/non-employment for the first employment spell (BCS females)

	(1) Unemp	(2) Unemp	(3) Unemp	(4) Unemp	(5) Unemp	(6) Unemp	(7) Non-emp	(8) Non-emp	(9) Non-emp	(10) Non-emp
Poverty at age 10	0.148	0.091	0.071	0.072	0.091	0.051	0.246**	0.198*	0.186*	0.179*
	(0.192)	(0.193)	(0.199)	(0.199)	(0.202)	(0.201)	(0.083)	(0.084)	(0.085)	(0.085)
Poverty at age 16	0.406*	0.367*	0.342*	0.339*	0.309+	0.301+	0.309**	0.263**	0.258**	0.261**
	(0.164)	(0.165)	(0.168)	(0.169)	(0.170)	(0.170)	(0.071)	(0.072)	(0.073)	(0.073)
1. No or low quals		Ref	Ref	Ref	Ref	Ref		Ref	Ref	Ref
2. Low GCSEs with higher Voc		0.112	0.106	0.108	0.060	0.134		-0.318*	-0.315*	-0.311*
		(0.326)	(0.323)	(0.324)	(0.332)	(0.326)		(0.152)	(0.152)	(0.151)
3. High GCSEs with no or low Voc		-0.358*	-0.352+	-0.351+	-0.357+	-0.328+		-0.228**	-0.218**	-0.211**
		(0.181)	(0.185)	(0.186)	(0.186)	(0.187)		(0.073)	(0.073)	(0.074)
4. High GCSEs with higher Voc		-0.948**	-0.938*	-0.935*	-0.922*	-0.913*		-0.559**	-0.542**	-0.521**
		(0.368)	(0.374)	(0.373)	(0.376)	(0.376)		(0.117)	(0.118)	(0.118)
5. A-levels		-0.366+	-0.351	-0.349	-0.267	-0.333		-0.430**	-0.409**	-0.392**
		(0.217)	(0.228)	(0.228)	(0.231)	(0.230)		(0.088)	(0.091)	(0.092)
6. Degree		-0.218	-0.172	-0.169	-0.168	-0.246		-0.281*	-0.264*	-0.246*
		(0.252)	(0.283)	(0.283)	(0.286)	(0.283)		(0.110)	(0.117)	(0.117)
Part-time job				0.053						
				(0.221)						
Unemployed upon leaving education: no					Ref	Ref				
1-6 months					0.962**	0.861**				
					(0.251)	(0.303)				
7-12 months					0.502+	0.804				
					(0.293)	(0.523)				
13+ months					0.521*	1.012*				
					(0.249)	(0.428)				
Having a child										0.261**
										(0.081)
Ethnicity	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Family background	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Cognitive ability at age 5	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of individuals	2454	2454	2454	2454	2454	2454	2454	2454	2454	2454
Number of events	198	198	198	198	198	198	1217	1217	1217	1217
Log likelihood	-1464.8	-1459.2	-1458.2	-1458.1	-1449.7	-1452.0	-8849.6	-8831.2	-8829.8	-8824.0

Notes: Robust standard errors in parentheses. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$

In Column (6), the unemployment duration excludes the length of time spent on GST.

Table 4 Cox proportional hazards models for the onset of un/non-employment for all employment spells (BCS)

	(1) Males Unemp	(2) Males Unemp	(3) Males Unemp	(4) Females Unemp	(5) Females Unemp	(6) Females Unemp	(7) Females Non-emp	(8) Females Non-emp	(9) Females Non-emp
Poverty at age 10	0.299**	0.257*	0.277**	0.088	0.112	0.062	0.127+	0.120+	0.118+
	(0.109)	(0.106)	(0.104)	(0.175)	(0.171)	(0.169)	(0.070)	(0.070)	(0.070)
Poverty at age 16	0.294**	0.243*	0.221*	0.381*	0.342*	0.325*	0.244**	0.236**	0.227**
	(0.107)	(0.104)	(0.103)	(0.154)	(0.149)	(0.149)	(0.063)	(0.062)	(0.062)
1. No or low quals	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
2. Low GCSEs with higher Voc	-0.448*	-0.429*	-0.371*	-0.230	-0.267	-0.209	-0.354**	-0.362**	-0.341**
	(0.187)	(0.186)	(0.181)	(0.319)	(0.315)	(0.304)	(0.122)	(0.122)	(0.122)
3. High GCSEs with no or low Voc	-0.166	-0.134	-0.111	-0.380*	-0.364*	-0.338*	-0.120+	-0.113+	-0.113+
	(0.123)	(0.122)	(0.120)	(0.168)	(0.162)	(0.159)	(0.063)	(0.062)	(0.062)
4. High GCSEs with higher Voc	-0.046	-0.011	0.001	-0.505+	-0.449	-0.432	-0.413**	-0.397**	-0.394**
	(0.149)	(0.147)	(0.143)	(0.279)	(0.276)	(0.274)	(0.098)	(0.098)	(0.098)
5. A-levels	-0.386*	-0.257	-0.286+	-0.377+	-0.286	-0.359+	-0.405**	-0.377**	-0.384**
	(0.165)	(0.164)	(0.161)	(0.209)	(0.204)	(0.199)	(0.076)	(0.076)	(0.076)
6. Degree	-0.365*	-0.219	-0.256	-0.077	-0.007	-0.086	-0.270**	-0.210*	-0.212*
	(0.167)	(0.168)	(0.166)	(0.218)	(0.210)	(0.207)	(0.086)	(0.088)	(0.088)
Ever un/non-employed: no		Ref	Ref		Ref	Ref		Ref	Ref
1-6 months		0.259+	0.472**		0.803**	0.800**		0.058	0.172+
		(0.153)	(0.154)		(0.191)	(0.203)		(0.096)	(0.103)
7-12 months		0.563**	0.855**		0.574**	1.015**		0.055	0.274*
		(0.156)	(0.170)		(0.220)	(0.280)		(0.101)	(0.124)
13+ months		0.682**	0.969**		0.758**	1.195**		0.255**	0.386**
		(0.112)	(0.158)		(0.192)	(0.258)		(0.082)	(0.102)
Ethnicity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Family background	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cognitive ability at age 5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of individuals	3063	3063	3063	3926	3926	3926	3926	3926	3926
Number of events	576	576	576	290	290	290	1733	1733	1733
Log likelihood	-3913.5	-3895.2	-3889.6	-2023.1	-2007.6	-2004.6	-11982.5	-11976.7	-11974.0

Notes: Robust standard errors clustered at the individual and sequence levels in parentheses. $+ p < 0.10$, $* p < 0.05$, $** p < 0.01$

In Columns (3), (6) and (9), the un/non-employment duration excludes the length of time spent on GST.

Table 5 Cox proportional hazards models for the exit from un/non-employment for all un/non-employment spells (BCS)

	(1) Males Unemp	(2) Males Unemp	(3) Males Unemp	(4) Males Unemp	(5) Females Unemp	(6) Females Unemp	(7) Females Unemp	(8) Females Unemp	(9) Females Non-emp	(10) Females Non-emp	(11) Females Non-emp
Poverty at age 10	-0.343**	-0.274*	-0.217+		-0.283	-0.161	-0.220		-0.243**	-0.203*	-0.175*
	(0.119)	(0.120)	(0.124)		(0.183)	(0.178)	(0.187)		(0.085)	(0.086)	(0.087)
Poverty at age 16	-0.311**	-0.222*	-0.192+		-0.201	-0.239	-0.213		-0.064	-0.018	0.005
	(0.108)	(0.112)	(0.116)		(0.153)	(0.150)	(0.149)		(0.072)	(0.073)	(0.074)
1. No or low quals		Ref	Ref			Ref	Ref			Ref	Ref
2. Low GCSEs with higher Voc		0.380*	0.390*			-0.409+	-0.478+			0.237	0.224
		(0.169)	(0.171)			(0.245)	(0.263)			(0.156)	(0.154)
3. High GCSEs with no or low Voc		0.033	0.003			0.354*	0.385*			0.186*	0.148+
		(0.132)	(0.133)			(0.169)	(0.166)			(0.075)	(0.076)
4. High GCSEs with higher Voc		0.389*	0.394*			0.758**	0.672**			0.406**	0.384**
		(0.156)	(0.163)			(0.249)	(0.255)			(0.115)	(0.117)
5. A-levels		0.435**	0.412*			0.456*	0.407+			0.379**	0.283**
		(0.158)	(0.164)			(0.178)	(0.209)			(0.098)	(0.105)
6. Degree		0.677**	0.659**			0.745**	0.672**			0.829**	0.697**
		(0.151)	(0.166)			(0.202)	(0.227)			(0.102)	(0.115)
On GST				-0.149				-0.507**			
				(0.155)				(0.182)			
Ethnicity	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Family background	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Cognitive ability at age 5	No	No	Yes	No	No	No	Yes	No	No	No	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of individuals	604	604	604	604	308	308	308	308	1733	1733	1733
Number of events	499	499	499	499	258	258	258	258	1142	1142	1142
Log likelihood	-2365.2	-2351.7	-2347.5	-2347.4	-1111.2	-1100.1	-1097.2	-1095.7	-6671.5	-6636.8	-6629.8

Notes: Robust standard errors clustered at the individual and sequence levels in parentheses. $+ p < 0.10$, $* p < 0.05$, $** p < 0.01$

Table 6 Logit models for the onset of unemployment upon leaving full-time education (BCS)

	(1) Males	(2) Males	(3) Males	(4) Males	(5) Females	(6) Females	(7) Females	(8) Females
Poverty at age 10	0.640**	0.609**	0.484**	0.562**	0.175	0.061	0.006	-0.109
	(0.146)	(0.148)	(0.150)	(0.166)	(0.152)	(0.156)	(0.159)	(0.174)
Poverty at age 16	0.723**	0.616**	0.494**	0.432**	0.507**	0.391**	0.323*	0.349*
	(0.134)	(0.136)	(0.139)	(0.159)	(0.132)	(0.134)	(0.136)	(0.151)
1. No or low quals		Ref	Ref	Ref		Ref	Ref	Ref
2. Low GCSEs with higher Voc		-1.188*	-1.119*	-0.651		-1.404*	-1.367*	-0.255
		(0.515)	(0.514)	(0.738)		(0.608)	(0.608)	(0.830)
3. High GCSEs with no or low Voc		-0.320*	-0.212	-0.169		-0.163	-0.092	-0.022
		(0.128)	(0.130)	(0.138)		(0.123)	(0.124)	(0.130)
4. High GCSEs with higher Voc		-0.603	-0.468	-0.141		-1.201**	-1.119**	-0.734
		(0.375)	(0.377)	(0.713)		(0.365)	(0.365)	(0.493)
5. A-levels		-1.633**	-1.376**	.		-2.129**	-1.924**	.
		(0.260)	(0.265)	.		(0.293)	(0.299)	.
6. Degree		-0.341+	0.061	.		-0.674**	-0.404*	.
		(0.178)	(0.192)	.		(0.193)	(0.206)	.
Ethnicity	No	No	Yes	Yes	No	No	Yes	Yes
Family background	No	No	Yes	Yes	No	No	Yes	Yes
Cognitive ability at age 5	No	No	Yes	Yes	No	No	Yes	Yes
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of individuals	2059	2059	2059	1294	2346	2346	2346	1355
Log likelihood	-1021.8	-992.3	-979.6	-692.6	-1087.2	-1033.9	-1027.0	-755.2

Notes: Robust standard errors in parentheses. $^{+}p < 0.10,\ ^{*}p < 0.05,\ ^{**}p < 0.01$

Table 7 Cox proportional hazards models for the exit from unemployment immediately after leaving full-time education (BCS)

	(1) Males	(2) Males	(3) Males	(4) Males	(5) Females	(6) Females	(7) Females	(8) Females
Poverty at age 10	-0.292**	-0.238*	-0.217+		-0.444**	-0.358*	-0.345*	
	(0.113)	(0.115)	(0.114)		(0.144)	(0.151)	(0.152)	
Poverty at age 16	-0.338**	-0.225*	-0.231*		-0.091	0.053	0.064	
	(0.103)	(0.107)	(0.110)		(0.118)	(0.121)	(0.125)	
1. No or low quals		Ref	Ref			Ref	Ref	
2. Low GCSEs with higher Voc		0.557*	0.554*			0.516*	0.484*	
		(0.228)	(0.217)			(0.244)	(0.245)	
3. High GCSEs with no or low Voc		0.303**	0.278*			0.274*	0.223*	
		(0.114)	(0.116)			(0.109)	(0.114)	
4. High GCSEs with higher Voc		0.391*	0.370*			0.777**	0.712**	
		(0.177)	(0.178)			(0.248)	(0.255)	
5. A-levels		0.297	0.249			0.368	0.276	
		(0.311)	(0.316)			(0.298)	(0.309)	
6. Degree		0.943**	0.900**			1.236**	1.104**	
		(0.167)	(0.188)			(0.230)	(0.253)	
On GST				-0.233*				-0.421**
				(0.112)				(0.126)
Ethnicity	No	No	Yes	No	No	No	Yes	No
Family background	No	No	Yes	No	No	No	Yes	No
Cognitive ability at age 5	No	No	Yes	No	No	No	Yes	No
Unemployment rate	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of individuals	457	457	457	457	447	447	447	447
Number of events	417	417	417	417	374	374	374	374
Log likelihood	-2153.0	-2135.4	-2133.8	-2159.4	-1948.1	-1925.6	-1923.9	-1948.2

Notes: Robust standard errors in parentheses. $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$

Table 8 Comparison of the coefficients for the 'preferred' and imputed variables for poverty at age 10 and age 16 (BCS)

| | Panel1: Unemployment for males | | | | |
| | Immediately after full-time education | | After the first employment | After any employment | |
	Onset	Exit	Onset	Onset	Exit
Poverty at age 10	0.484**	-0.217+	0.420**	0.299**	-0.217+
	(0.150)	(0.114)	(0.135)	(0.109)	(0.124)
Poverty at age 16	0.494**	-0.231*	0.272*	0.294**	-0.192+
	(0.139)	(0.110)	(0.126)	(0.107)	(0.116)
Poverty at age 10 (i)	0.640**	0.223	0.379*	0.329*	-0.169
	(0.196)	(0.154)	(0.178)	(0.149)	(0.147)
Poverty at age 16 (i)	0.703**	-0.200	0.373*	0.430**	-0.215+
	(0.169)	(0.131)	(0.156)	(0.134)	(0.127)

| | Panel2: Unemployment for females | | | | |
| | Immediately after full-time education | | After the first employment | After any employment | |
	Onset	Exit	Onset	Onset	Exit
Poverty at age 10	0.006	-0.345*	0.071	0.088	-0.220
	(0.159)	(0.152)	(0.199)	(0.175)	(0.187)
Poverty at age 16	0.323*	0.064	0.342*	0.381*	-0.213
	(0.136)	(0.125)	(0.168)	(0.154)	(0.149)
Poverty at age 10 (i)	0.241	-0.262	-0.162	0.045	-0.149
	(0.210)	(0.185)	(0.310)	(0.256)	(0.278)
Poverty at age 16 (i)	0.273	-0.041	0.256	0.403*	-0.214
	(0.177)	(0.137)	(0.231)	(0.198)	(0.209)

| | Pnael3: Non-employment for females | | |
| | After the first employment | After any employment | |
	Onset	Onset	Exit
Poverty at age 10	0.186*	0.127+	-0.175*
	(0.085)	(0.070)	(0.087)
Poverty at age 16	0.258**	0.244**	0.005
	(0.073)	(0.063)	(0.074)
Poverty at age 10 (i)	0.138	0.151	-0.218+
	(0.121)	(0.098)	(0.114)
Poverty at age 16 (i)	0.377**	0.294**	0.058
	(0.093)	(0.078)	(0.097)

Notes: For each panel, the first two rows report the coefficients reported in Table 2 to Table 7 (using the 'preferred' variables), and the bottom two rows indicated by (i) report the coefficients estimated from the models using the imputed variables.

Table 9 Attrition and the availability of work history data by childhood poverty status: BCS

Panel1: Attrition	All (n=19,101)		Those surveyed at age 16 (n=11,621)		Those surveyed at age 34 (n=9,665)	
	n	%	n	%	n	%
Poverty at age 10						
No	10,975	0.79	8,327	0.81	7059	0.83
Yes	2,894	**0.21**	2,005	**0.19**	1480	**0.17**
Missing	5,232		1,289		1126	
Poverty at age 16						
No	7,318	0.75	7318	0.75	5,187	0.78
Yes	2,401	**0.25**	2401	**0.25**	1,440	**0.22**
Missing	9,382		1,902		3,038	

Panel 2: Availability of work history data	Unavailable		Available until 2000		Available until 2004	
	n	%	n	%	n	%
Poverty at age 10						
No	2,506	22.8	1,411	12.9	7,058	64.3
Yes	950	32.8	463	16.0	1,481	51.2
Missing	3,721	71.1	385	7.4	1,126	21.5
Poverty at age 16						
No	1,208	16.5	923	12.6	5,187	70.9
Yes	570	23.7	391	16.3	1,440	60.0
Missing	5,399	57.6	945	10.1	3,038	32.4

Notes: The percentages presented in Panel 2 are row percentages. For instance, 32.8% of those who lived in poverty at age 10 did not provide work history data, while 22.8% of those who did not live in poverty did.

Appendix

Figure A1 Aggregate categorisation of the combinations of the highest academic and vocational qualifications used in this study

Academic \ Vocational	No	Level 1	Level 2	Level 3	Level 4	Level 5
No / **Level 1 Low GCSEs**	1	1	1	2	2	2
Level 2 High GCSEs	3	3	3	4	4	4
Level 3 A-levels	5	5	5	5	5	5
Level 4 Degree / **Level 5 Higher Degree**	6	6	6	6	6	6

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