ISER Working Paper Series

The labour market impacts of leaving education when unemployment is high: evidence from Britain.

Mark Taylor
Institute for Social and Economic Research
University of Essex

No. 2013-12
July 2013

INSTITUTE FOR SOCIAL
& ECONOMIC RESEARCH

E·S·R·C
ECONOMIC
& SOCIAL
RESEARCH
COUNCIL

www.iser.essex.ac.uk

Non-technical summary

The UK economy has struggled to recover from the global financial crisis of 2007-08, and the subsequent recession. As a consequence unemployment (and youth unemployment in particular) has remained relatively high for a prolonged period of time, and an increasing number of cohorts of young people are entering the labour market and competing for jobs at a time when labour demand is low. Our aim in this paper is to assess the likely short and longer-term implications for these cohorts of young people, drawing on the experiences of those leaving full-time education over the period 1991-2008. Specifically we use data from the BHPS and *Understanding Society* to identify when young people first left education and the extent to which the prevailing unemployment rate at the time affected subsequent labour market outcomes.

Descriptive statistics indicate that leaving full-time education during periods of relatively high unemployment is associated with a lower propensity to enter employment, and full-time and permanent employment in particular. It is also associated with a higher propensity to enter the labour market via unemployment. These associations are more apparent among men than women, and persist across the years following the exit from full-time education. These findings largely remain in multivariate analysis which controls for a range of time-invariant individuals specific unobserved factors as well as socio-economic status indicators, year and region effects. We find, for example, that a one percentage point higher unemployment rate when leaving full-time education reduces the probability of a man being employed in subsequent years by one percentage point at the sample means, and of being in a full-time job by almost two percentage points. It is also associated with lower wages and occupational attainment, and increases the probability of unemployment and of being NEET by almost one percentage point. Although the sizes of these effects diminish with potential experience, statistically significant effects remain more than 10 years after leaving full-time education. These findings are largely robust to the potential endogeneity of the macroeconomic climate at the time of labour market entry. From this we conclude that for men leaving full-time education when unemployment is high incurs a permanent scar.

These estimates have clear policy implications. For men, our findings are consistent with models that suggest that initial job or task assignment may be important in the long run, with employers assigning otherwise similar workers to lower quality jobs or tasks during periods of low labour demand which offer different (lower) opportunities for accumulating human capital or on-the-job training, and which may have higher rates of destruction. Thus these workers either develop less, or the wrong kind, of human capital, and/or are exposed to unemployment which incurs a lasting scar, and which contribute to a less stable future employment trajectory. The implications from these findings are that the policy focus during periods of low labour demand should not only be on those labour market entrants who on leaving education do not find employment – a group which have been the focus of many policy initiatives including the current Work Programme. There is also a need to ensure that those who enter employment on leaving education do so through high quality, lasting jobs that contribute to the continued development of appropriate skills and human capital. Furthermore, policies that aim to reduce unemployment in the short-term, through for example promoting education, training and skills development, (and hence which prevent the prevailing unemployment rate from rising too far) will have longer lasting effects on young labour market entrants by reducing their propensity to experience unemployment in the future.

The labour market impacts of leaving education when unemployment is high: Evidence from Britain

Mark Taylor*
Institute for Social and Economic Research
University of Essex

Keywords: Initial labour market conditions, wage determination, job quality, business cycle, panel data, BHPS, UKHLS.

JEL Classification: C23; J22; J23; J31; J64

Abstract: We estimate the effects of initial labour market entry conditions on a range of subsequent job outcomes for men and women who entered the British labour market between 1991 and 2009, using data from the British Household Panel Survey and its successor Understanding Society. We find that the unemployment rate on leaving full-time education has large impacts on initial labour market outcomes including status, wages and employment stability, which persist over the subsequent ten years. These effects are more pronounced for men than women and indicate that young people entering the labour market during the current period of economic stagnation will suffer a lasting scar as a consequence.

Acknowledgements: This research was supported by funding from the UK Economic and Social Research Council (ESRC) under the grant 'Understanding the impact of recession on labour market behaviour in Britain' (grant number RES-062-23-3284) and also forms part of the research programme of the Research Centre on Micro-Social Change, also funded by the ESRC (award no. RES-518-28-001).

* Professor Mark Taylor, Institute for Social and Economic Research, University of Essex, Colchester, Essex, UK, CO4 3SQ. Email: taylm@essex.ac.uk. Tel: +44(0)1206 873553; Fax: +44(0)1206 873151.

Introduction

Economies in Europe and across the world have been struggling to recover from recession in the aftermath of the global economic crisis of 2007-08. This 'Great Recession' has had considerable effects on the British labour market. For example, according to figures from the Labour Force Survey (LFS), between the first quarters of 2008 and 2010, unemployment among men increased from 5.6% to 9.0% while among women it increased from 5% to 6.6%. In 2013, the headline unemployment rate remains at 8%. Young people have been particularly affected, and unemployment rates among 16–24 year olds increased by almost 10 percentage points between 2008 and 2010 (to approaching 20%), while almost 22% of young people are currently unemployed. Among 25–49 year olds unemployment rates have increased by less than 3 percentage points and remain below 7%. While unemployment among young people is concentrated among those with no or few qualifications, there is evidence that the job prospects of the more highly educated have also been affected (Gregg and Wadsworth 2010a). The immediate costs of entering the labour market during periods of relatively high unemployment are clear. For example, when labour demand is low and few jobs are available, the chances of labour market entrants finding work, and finding a job that matches their skills and preferences, are lower, while those of being unemployed or in a poor worker-firm match are higher than if entering during periods of high labour demand. What is less clear, however, is the extent to which the costs associated with these experiences are temporary, or whether they persist as the individuals age and the labour market recovers. If workers are able to adjust and find suitable matches when labour demand rises then the costs may only be temporary, but if early labour market experiences determine later outcomes and hence carry a lasting scar, then these costs may be permanent. In this case even relatively small initial losses can accumulate over time. In this paper, we use data from the British Household Panel Survey and its successor, *Understanding Society*, to identify young people who reach the end of compulsory education and subsequently enter the labour market for the first time and then identify the impact of the prevailing unemployment rate on entry on labour market outcomes over the medium and longer-term.

The importance of early years in the labour market is well documented. For example Topel and Ward (1992) report that two thirds of job mobility (and wage growth) occurs within ten years of labour market entry, while Murphy and Welch (1990) estimate that 80% of lifetime wage increases occur within the same period. Hence any disruption faced by young people in their early careers could have long-lasting consequences. There are also sound theoretical

reasons for expecting that labour market conditions on entry will have longer-term consequences. For example, if workers entering the labour market during periods of low labour demand struggle to find a good match or are placed in lower level jobs then they may acquire the wrong sort of job- or firm-specific human capital which affects their productivity when more suitable matches are entered when the labour market recovers (Jovanovic 1979; Neal 1999; Gibbons and Waldman 2004). Employers may assign otherwise identical workers to lower quality jobs in recession, which offer different (lower) opportunities for human capital accumulation and which may have higher rates of job destruction (Arulampalam et al 2000; Gibbons and Waldman 2006). Hence employers give labour market entrants access to different jobs depending on the prevailing labour market conditions (Brunner and Kuhn 2010). This will lead to a scar relative to those who enter during periods of high labour demand and who find good matches immediately, while the experience of unemployment is known to increase the likelihood of being unemployed in the future (Arulampalam et al. 2000; Gregg 2001). Search and job shopping theories suggest that experiencing different jobs accelerates wage growth, and so conditional on the accumulation of similar levels of human capital, any wage losses experienced due to entering the labour market in a recession could be overcome through searching for a better job and job and employer mobility.

Previous empirical research using US data suggests that the unemployment rate faced on entry to the labour market has large and persistent negative wage effects. For example, Kahn (2010) finds an initial wage loss of up to 7% associated with a one percentage point higher unemployment rate, which falls gradually over time but which remains at 2.5% fifteen years later. Negative effects on occupational attainment also emerged, indicating that workers entering the labour market in periods of low labour demand find it difficult to progress into better jobs. Similar results have been found among highly qualified graduates in the US and Japan, and college graduates in Canada (Genda et al. 2010; Kendo 2008; Oreopolous et al 2006, 2008; Oyer 2006a,b; 2008). Estimates from studies exploiting European data are similar, with entering the labour market during periods of economic growth yielding higher wages and faster rates of promotion in Sweden (Kwon et al 2010), while for Germany there is evidence of negative effects of initial labour market conditions on wages which increase over time (Stevens 2008). The latter is consistent with persistent scarring caused by high unemployment on labour market entry. Austrian data reveals that a one percentage point higher unemployment rate on labour market entry is associated with a lower quality first job and a loss in lifetime earnings of 6.5% (Brunner and Kuhn 2010).

Research using UK data has sought to identify the impacts of economic downturns on, for example, specific population subgroups, schooling choices of young people and labour market behaviour of adults, as well as retirement and labour market participation decisions of older workers. In the US, evidence suggests that as in previous recessions, men, youth, and those with lower education levels experienced the largest falls in employment and largest increases in unemployment compared with women, prime-aged workers and those with high education levels (Hoynes et al 2012). The picture in the UK is similar, with the young, the least educated, those living in deprived areas and men being particularly affected (Bell and Blanchflower 2010; EHRC 2009; Jenkins and Taylor 2011). Econometric evidence suggests that a weak youth labour market increases educational aspirations and has a positive impact on attitudes, although more so among children with more highly educated parents (Taylor and Rampino 2013). Consistent with this, high prevailing unemployment rates increase participation in post-compulsory education (Clark 2011; McVicar and Rice 2001; Whitfield and Wilson 1991) although this varies by assets and wealth, gender and educational attainment (Meschi et al. 2011; Rice 1999; Tumino and Taylor 2013). The impact on the labour market behaviour of older people has been less marked (Crawford 2011; Jenkins and Taylor 2011), perhaps because the average wealth losses arising from the financial crisis among older workers are on average small (Banks et al 2010; 2012).

Our focus in this paper is on identifying (i) the nature of the initial disadvantage incurred by young people entering the labour market for the first time when unemployment is high; and (ii) the extent to which this initial disadvantage persists as their labour market careers develop. In tackling these questions we contribute to the literature in a number of ways. First we identify how the prevailing macroeconomic climate when first leaving full-time education affects a number of different outcomes, including initial labour market destination and labour market experiences over the short and medium term, as well wages. Secondly we present evidence using micro-data from Britain, which has not previously been explored. Thirdly, we use nationally representative panel data covering school-leavers from 1991 to 2010, a period that covers the recession of the early 1990s, the subsequent period of economic growth, and the initial impacts of the global economic crisis of 2007-08. Fourthly, we estimate models that allow for time invariant unobserved differences between young people, for example relating to commitment, motivation and personality traits which are likely to be important

factors contributing to the their labour market success and which otherwise bias the coefficients of interest.

Descriptive statistics indicate that leaving full-time education during periods of relatively high unemployment is associated with a lower propensity to enter employment, and full-time and permanent employment in particular. It is also associated with a higher propensity to enter the labour market via unemployment. These associations are more apparent among men than women, and persist across the years following the exit from full-time education. These findings largely remain in multivariate analysis which controls for a range of time-invariant individuals specific unobserved factors as well as socio-economic status indicators, year and region effects. We find, for example, that a one percentage point higher unemployment rate when leaving full-time education reduces the probability of a man being employed in subsequent years by one percentage point at the sample means, and of being in a full-time job by almost two percentage points. It increases the probability of unemployment and of being NEET by almost one percentage point. Although the sizes of these effects diminish with potential experience, statistically significant effects remain more than 10 years after leaving full-time education. We also find evidence of wage scarring effects associated with leaving education when unemployment is high and of lasting negative impacts on occupational attainment, particularly among men. These findings are largely robust to the potential endogeneity of the macroeconomic climate at the time of labour market entry. From this we conclude that for men leaving full-time education when unemployment is high incurs a permanent employment scar.

The rest of the paper is set out as follows. We first introduce the data sets used in our analysis, and provide some initial descriptive statistics. We then detail our estimation procedures and empirical approach before presenting and discussing our findings. The final section summarises and concludes and provides some pointers for policy.

Data and descriptive statistics

Data

We use data from the British Household Panel Survey (BHPS) and its successor, *Understanding Society*. Since 1991 BHPS respondents have been (re)interviewed annually, with the first wave of the survey designed as a nationally representative random sample of the British population living in private households. These original respondents and any adult co-

residents have been interviewed at annual intervals about their incomes, labour market status and job characteristics, parental background, housing tenure and conditions, household composition, education, and health. Interviews with BHPS respondents were conducted until 2008, after which the sample was absorbed in to the larger *Understanding Society* survey. BHPS respondents were first interviewed as part of this survey in 2010.[1]

We draw an estimating subsample from these data and in particular focus on those that left full-time education across the sample period. We identify young people as they turn 16 and reach the end of compulsory schooling, and then follow them across subsequent interviews as they are observed to leave full-time education and enter the labour market for the first time. Therefore over the survey period the oldest cohort we follow (who were aged 16 in 1991) were aged 35 in 2010. This selection ensures that we can for each individual clearly identify the year in which they are first observed to be out of full-time education and therefore identify the prevailing local unemployment rate in this year. This yields a sample of almost 1900 individuals who are observed to leave full-time education for the first time over the period and who are classified as original sample members.[2] These individuals contribute in excess of 13,000 person year observations. To each of these individuals we match the unemployment rate in their government office region of residence when first observed to leave full-time education.[3] Leaving full-time education is identified by the main labour market status as reported by the respondent, and a leaver is defined as an individual who in year *t* reports their main status as being full-time education while in year *t+1* reports their main status as something else (either employment, unemployment, self-employment, or a form of economic inactivity not related to education).[4] The unemployment rates are calculated from the UK Labour Force Survey, and matched to BHPS respondents by year when leaving full-time education and region of residence. Thus we are able to identify the

[1] As a consequence of this design, no interviews with BHPS sample members were conducted in 2009.
[2] We restrict analysis to original sample members to exclude any biases that may arise from including the over-sampling of households in Wales and Scotland.
[3] We have used the adult unemployment rate as an indicator of labour demand and the general macroeconomic climate in favour of the youth unemployment rate for two reasons. Firstly sample sizes in the LFS in some government office regions become quite small when focusing on youth unemployment, which may introduce measurement error in the unemployment rate and bias downwards our subsequent estimates. Secondly, we expect the youth and adult unemployment rates to be highly correlated within regions over time. This is indeed the case, with correlations exceeding 0.8 in all regions. We have re-estimated all models using the youth unemployment rate (defined as the unemployment rate among 16-24 year olds), and estimates are consistent with those presented here.
[4] We also define as leavers those who, when first interviewed in the adult survey at age 16, report their status as anything other than full-time education.

effects of interest using variation in unemployment rates both across regions and over time within regions.

Our objective in this paper is to identify whether or not the prevailing economic climate on leaving full-time education has lasting impacts on people's subsequent labour market outcomes. We address this in a number of different dimensions. We first focus on the impact of the prevailing economic climate when first leaving full-time education on a young person's initial labour market status, distinguishing between employment, full-time employment, permanent employment, unemployment and not in employment, education and training (NEET). This provides information on the immediate cost of entering the labour market for the first time when unemployment is high and labour demand in the economy is low. Of course, our expectation is that leaving full-time education when unemployment is high reduces the likelihood of being initially observed in employment and increases that of being unemployed. We next identify the impact of the unemployment rate on leaving education on the most recent observed status of the respondent, to provide an insight of the longer-term, persistent effects of entering a weak labour market.[5] This can refer to between one and nineteen years after leaving full-time education.

We then take advantage of the fact that we have repeated observations on the same individuals over time, by examining the extent to which the prevailing economic climate when first leaving full-time education affects an individual's labour market status at each of the dates of interview following the exit, again distinguishing between being in any form of work, being employed full-time, being in a permanent job, being unemployed and searching for a job and not being in employment, education or training of any sort (NEET). Here we also broaden our outcomes to look at the weeks per year spent in employment and unemployment and the number of unemployment spells experienced, which provide an indication of the impact of the macroeconomic climate on labour market entry on subsequent job stability and the accumulation of labour market experience. This provides a comprehensive picture of whether, and if so how, the economic climate when entering the labour market affects subsequent behaviour.

[5] The most recent status is captured by their labour market status at the most recent year in which the respondent provided a full interview.

We also consider the impact of the prevailing economic climate when first leaving full-time education on the probability of being promoted within the same employer (and hence experience within firm job mobility), and on experiencing a job-to-job transition (between firm mobility). Such mobility is known to be an important determinant of lifetime wage growth. Our final outcome relates directly to the real hourly wage received, conditional on employment, deflated to January 2008 prices. We next describe the relationships between these outcomes of interest and the prevailing local unemployment rate when first leaving full-time education.

Descriptive statistics

Table 1 summarises the relationships between the local unemployment rate faced by young people when first observed outside of full-time education and (i) the date of interview immediately following their exit from full-time education[6]; and (ii) the date of interview at which the respondent was last observed in the data.[7] As expected this reveals strong relationships between being employed and unemployed when first leaving full-time education and the prevailing rate of unemployment, especially for men. In particular, men first observed in unemployment or NEET on average faced significantly higher unemployment rates than those first observed in employment (6.9% and 6.7% compared with 6.3%). Men first observed in full-time and permanent jobs in particular faced the lowest unemployment rates on leaving full-time education (6.3%), although these do not differ significantly from those faced by men in part-time or non-permanent jobs.

Among women, patterns are much less clear. There is little evidence that the unemployment rate on leaving full-time education is related to first observed labour market status, although women first observed in permanent employment on average faced the lowest unemployment rates (6.2%). Thus consistent with expectations, we find that men who entered employment (and full-time permanent jobs in particular) on leaving full-time education tended to face lower unemployment rates than those who entered unemployment or became NEET on leaving education.

[6] This may not equate to their entry status, as respondents may have changed status between leaving full-time education and their subsequent interview.

[7] For 52% of the sample this relates to the interview in 2010, between two and eighteen years after first leaving full-time education, while for a further 17% it relates to the interview in 2008.

The second panel of Table 1 instead looks at the relationship between the last employment status in which respondents are observed (between one and nineteen years after leaving full-time education) and the prevailing unemployment rate when first leaving full-time education. This reveals that the patterns apparent when looking at first labour market status persist when looking at last observed labour market status. In particular, men and women who were last observed in employment (and full-time and permanent employment in particular) faced lower unemployment rates when leaving full-time education than last observed in unemployment and NEET, and this is especially true among men. For example, men who were last observed to be in work faced an unemployment rate of 6.4% on labour market entry compared with 7% among those who were last observed to be unemployed and 6.8% among those last observed to be NEET. Among women those who were last observed to be in full-time and permanent jobs faced the lowest unemployment rates on leaving full-time education (6.1% and 6.2%). Thus we find that the initial labour market disadvantage faced by those who leave education when unemployment is high persists across the medium term, particularly for men.

Table 2 focuses on outcomes across all years since the respondent left full-time education for the first time. Here we pool multiple observations for the same individual and so the unit of analysis is person-years rather than individuals. The table indicates that men who are observed to be unemployed or NEET on average faced a higher unemployment rate on leaving full-time education than those who are in work, and these differences are statistically significant at the 1% level. Men who are currently unemployed or NEET faced an unemployment rate of about 7.4% when first leaving full-time education compared with 7.8% for those who are employed. Among women, we find that those currently employed in full-time jobs faced the lowest unemployment rates on leaving full-time education (6.85%) while those currently NEET faced the highest unemployment rate on leaving full-time education (7.3%). This is further evidence suggesting that leaving full-time education when unemployment is relatively high significantly affects labour market outcomes in subsequent years.

The next row of Table 2 focuses on whether or not the respondent was promoted in the last year.[8] This captures the extent to which labour market conditions on entry affect job mobility. Evidence suggests that men and women who experience promotion on average left full-time

[8] Here promotions are reported by the respondent in response to a question asking the reasons for leaving any job held in the past year.

education when unemployment was relatively high (7.5% among men and 7.2% among women). This may reflect rapid career progression from (potentially) being initially misallocated within a firm's hierarchy. However these unemployment rates are not statistically significantly different from those faced by men and women who do not experience promotion. The next panel of Table 2 presents correlations between the unemployment rate when first leaving full-time education and the recent employment history of the respondent, captured by the number of weeks the respondent was employed and unemployed in the past 12 months. These are used to measure employment stability and attachment to the labour market and significant relationships emerge. For example among women we find a negative correlation between the unemployment rate on labour market entry and the number of weeks employed in the last year, which is indicative of a less stable employment trajectory and lower labour market attachment. This interpretation is supported by the fact that for women the unemployment rate on labour market entry is not significantly correlated with recent exposure to unemployment. Among men, we find no statistically significant correlation between unemployment rates at labour market entry and the number of weeks in employment in the past year, but a positive and statistically significant correlation with the number of weeks spent in unemployment in the past year. These correlations suggest that entering the labour market when unemployment is high has long-term effects on lifetime wages and wage growth through interrupting the accumulation of experience, human capital and on-the-job training. This is also reflected in the final two rows which indicate an inverse correlation between current usual hourly wages and the unemployment rate on labour market entry (at least for women), and between occupational attainment and the unemployment rate on labour market entry.[9]

These descriptive statistics provide initial evidence that local labour market conditions play an important role not only in terms of initial worker allocation across labour market states, but also on their medium to long-term experiences. Leaving full-time education when unemployment is relatively high is associated with lower employment probabilities, and employment in full-time and permanent jobs in particular, of receiving lower wages and less occupational attainment if employed, higher chances of unemployment, of not being in

[9] Occupational attainment is measured using the Hope-Goldthorpe Scale, which is a classification system for measuring social and occupational prestige. It takes a value ranging from 82.05, relating to self-employed doctors, lawyers and accountants, to 17.52 which relates to street vendors and jobbing gardeners. Analysis using a binary indicator of being in a professional or managerial occupation yields similar results to those presented here.

employment, education or training, and of being in less stable employment. In the remainder of the paper we examine the extent to which these patterns persist in multivariate analysis that control for a range of potentially confounding factors, individual-specific unobserved effects, and the endogeneity of the timing of exiting education.

Estimation and specification

Our research questions focus on the impacts of the prevailing economic climate when first exiting full-time education on subsequent labour market outcomes. To answer these questions we estimate a series of relatively parsimonious models augmented with the unemployment rate in the region and year when first leaving full-time education, our measure of the prevailing economic climate. The dependent variables in these models are a mix of binary indicators (whether or not an individual is observed to be in work, a full time employee, a permanent employee, unemployed or NEET etc.), and continuous variables (their current log real hourly wage, occupational attainment, the number of weeks spent in employment and unemployment etc.). Therefore the methods of estimation differ according to the outcome of interest. Furthermore our outcomes of interest include indicators identified just once per individual (e.g. respondents labour market status at the date of interview when first observed outside of full-time education), and others observed repeatedly over time (e.g. current labour market status). Thus we estimate both cross-sectional and panel data models as appropriate. We describe each of these approaches in more detail below. In all cases, because of the well-documented gender differences in labour market behaviour and outcomes, we estimate gender-specific models.

Our initial analysis focuses on identifying the impact of the unemployment rate faced by young people when they first exit full-time schooling on a respondent's initial labour market status. Here we estimate a series of binary dependent variable models to distinguish between employment, full-time employment, permanent employment, unemployment and NEET.[10] These models take the following general form:

$$y_{i1} = \beta_0 + \beta_1 x_i + \beta_2 z_i + \beta_3 U_i^L + \beta_4 h_{i1} + \varepsilon_i \qquad [1]$$

[10] We have also used a multinomial approach that recognises the unordered categorical nature of the variable measuring initial and last observed labour market status. Estimates from such models are consistent with those presented here.

Where y_{i1} is the observed labour market status at the date of interview at which an individual is first observed out of full-time education, x_i is a vector of individual-specific characteristics likely to determine y_{i1}, z_i is the region of residence on leaving full-time education and U_i^L is the prevailing unemployment rate in the region and year when the young person left full-time education. Within these analyses, the vector x_i includes a range of (exogenous) variables likely to determine employment opportunities, ability and propensity for leisure, and which may also be correlated with unemployment rate in the region of residence when leaving full-time education. These include the type of school the respondent attended (selective or not selective), parental level of education and occupation, parental housing tenure and household income when the respondent was aged 16, household structure and the number of individuals employed in the household when the respondent was aged 16. These variables capture a range of factors related to financial resources, family and social background, and respondent and parental preferences that are likely to be important in determining employment prospects and labour market attachment. Controls in [1] also include h_{i1} which measures time varying characteristics of the respondent (such as marital status, age, highest educational qualification, the number of children and whether the respondent has a pre-school aged child, and whether or not the respondent has changed residential address in the last year). These variables capture both attachment to the labour market and the opportunity cost of working. All models also include year and month of interview fixed effects, and the error term ε_i is clustered by region of residence at age 16. These are estimated using a probit models.

We estimate a set of analogous models using the individual's labour market status at the most recent date of interview as the dependent variables (y_{ir}), adding additional controls that identify the potential experience of the individual when last observed (exp_{ir}) and the current unemployment rate when the individual is last observed (U_i^C). The former is captured by the elapsed time since the respondent left full-time education while the latter is included to ensure that any effects caused by the current macroeconomic climate are not attributed to the unemployment rate when first leaving full-time education. The model estimated can therefore be written as:

$$y_{ir} = \gamma_0 + \gamma_1 x_i + \gamma_2 z_i + \gamma_3 U_i^L + \gamma_4 h_{ir} + \gamma_5 exp_{ir} + \delta_6 U_i^C + \varepsilon_i \qquad [2]$$

The key parameters of interest in these models, β_3 and γ_3, provide the impact of the regional unemployment rate when first leaving full-time education on initial and last observed labour market status, respectively. However, there is a potential issue of endogeneity. For example respondents may relocate on leaving full-time education for the first time to low unemployment areas where they have the greatest chances of securing employment, or they may time their exit from full-time education to coincide with a period of economic growth when labour demand is high (i.e. delay the exit from full-time education until economic conditions are more favourable). If so the values on β_3 and γ_3 will be underestimated and biased downwards. Alternatively, individuals may leave education sooner when unemployment is high because the expected future returns from investing in education are low (see for example Micklewright et al. 1990; Pentrongolo and San Segundo 2002; Taylor and Tumino 2013). Here the values on β_3 and γ_3 will be overestimated and biased upwards. Previous research based on UK data suggests that educational investment decisions are sensitive to the economic climate (see, for example, Clark 2011; McVicar and Rice 2001; Meschi et al. 2011; Micklewright et al. 1990; Tumino and Taylor 2013). To allow for this, we also estimate [1] and [2] instrumenting U_i^L with the unemployment rate when the respondent was aged 15 in the region of residence when leaving full-time education for the first time (see also Kahn 2010; Kondo 2008; Oreopolous 2006, 2008) and a variable measuring whether or not the respondent changed address between the age of 16 and first leaving full-timed education. We choose these as instruments on the basis that the respondent may have some choice over where to live when first entering the labour market but is unlikely to have much choice when aged 15 and still a dependent child and that if the respondent selects into a particular region when entering the labour market, they will have to relocate to do so. Standard tests (which we present later) indicate that these are appropriate and valid instruments, and report estimates from these models as robustness checks.

We next exploit the longitudinal nature of the available data and identify how the unemployment rate when first leaving full-time education affects labour market outcomes at each subsequent date of interview. The first cohort in our data left full-time education in 1991, and consequently we have information on the first nineteen years of labour market experiences. This approach has the advantage of both identifying the average effects of labour market conditions on exiting full-time education on outcomes over the medium term, and of incorporating time-invariant individual specific unobserved heterogeneity into the

estimation. The latter may be important if, for example, individuals with particular unobserved traits or characteristics are both more likely to leave full-time education in regions or years when unemployment is particularly high and to be less likely to be in employment in subsequent years. The estimated models can be written as follows:

$$y_{it} = \delta_0 + \delta_1 x_i + \delta_2 z_i + \delta_3 U_i^L + \delta_4 h_{it} + \delta_5 exp_{it} + \delta_6 U_{it}^C + u_i + \varepsilon_{it} \quad [3]$$

Here x_i, z_i, U_i^L, U_{it}^C and h_{it} are as previously defined, exp_{it} captures the worker's years of labour market experience (i.e. years since leaving full-time education), u_i is the time-invariant individual-specific unobserved effect, and ε_{it} is random error. The relevant parameter of interest in these models is δ_3, which provides the effect of the unemployment rate when first leaving full-time education on the subsequent labour market outcome. As the key explanatory variable of interest, U_i^L, is time-invariant, it cannot be identified by estimating within-group fixed-effects models. Instead we estimate the models using random effects, under the typical assumptions of independence and normality.[11]

Equation [3] estimates the effect of the unemployment rate on leaving full-time education on subsequent outcomes averaged across all time periods. We might expect that any effect diminishes over time and with experience – the effects of leaving full-time education when unemployment rates are high on initial labour market outcomes might be large, but these may fall over time as the individual assimilates into work, gains labour market experience, moves between jobs and employers and the macroeconomic climate improves. To investigate this, and identify the persistence of any effects, we estimate models that interact the unemployment rate on leaving full-time education with potential experience (i.e. time since leaving education). These models can be written as follows:

$$y_{it} = \lambda_0 + \lambda_1 x_i + \lambda_2 z_i + \lambda_{31}(U_i^L t_1) + \lambda_{32}(U_i^L t_2) + \cdots + \lambda_{38}(U_i^L t_8) + \lambda_4 h_{it} + \lambda_5 exp_{it} + \lambda_6 U_{it}^C + u_i + \varepsilon_{it} \quad [4]$$

[11] We have also estimated models that allow for correlation between the means of the time-varying covariates and the individual-specific unobserved effect, following Mundlak (1978) and Chamberlain (1984). However given the small number of time-varying covariates in these specifications, it is not surprising that the estimates on the key coefficients of interest generated from these models are consistent with those presented here.

where t is a series of binary variables indicating the number of years since the respondent first left full-time education. The estimated coefficients $\lambda_{31}$to λ_{38} identify how the impacts of labour market conditions on leaving full-time education for the first time on labour market outcomes vary with the elapsed time since leaving education – are any effects temporary or do they persist into the medium term? Again, these specifications are estimated using random effects models.

In the next section we present, describe and discuss the estimates from these models, specifically focussing on the impact of the unemployment rate when first leaving full-time education on subsequent labour market outcomes of interest.

Estimates

We present estimates on the key explanatory variable of interest from our estimation procedures in Tables 3-10. In each case, models are estimated separately for men and women because labour market outcomes, behaviour and labour supply are known to exhibit gender-specific patterns. We present both estimated coefficients on the key variable of interest – the unemployment rate on first leaving full-time education – as well as marginal effects (where applicable) to provide an indication of the size of the effect. We begin by discussing the estimates presented in Table 3, identifying the impact of the unemployment rate at when leaving full-time education on an individual's labour market status (i) when first observed out of full-time education and (ii) at their most recent date of interview.

First and last labour market status

Table 3 summarises the estimates from a series of models where the dependent variables indicate labour market status at the first date of interview at which an individual is no longer in full-time education (first status), and at the most recently observed date of interview (last observed status). These are from gender-specific probit models which take the value one if the individual is in that specific state (employment, full-time job, permanent job, unemployed, NEET) and zero otherwise, and we present coefficient estimates and marginal effects calculated at the sample means.[12] These models include a range of controls including type of school attended, highest qualification attained, marital status, the number of children, the number of others employed in the household, and whether the respondent moved house in

[12] Estimates from multinomial models are consistent with those presented here.

the last year plus characteristics measured when the respondent was aged 16 such as parental migrant status, whether in a single parent household, in a workless household, housing tenure, whether in a low income household, parental education, and whether or not the individual had a parent in a professional or managerial occupation. In addition, models of the most recent status include potential experience (time since leaving full-time education) and the current rate of unemployment, to ensure that any effects caused by the current macroeconomic climate are not attributed to the unemployment rate when first leaving full-time education.

Focusing initially on men and on their status at the date of interview at which they are first observed to have left full-time education, we find that the unemployment rate on leaving full-time education is an important predictor of labour market status. For example, the unemployment rate when leaving full-time education is negatively related to the probability that a man is first observed to be employed – the estimated coefficient is negative (–0.059) and statistically significant. A one percentage point higher unemployment rate when leaving full-time education reduces the probability of employment at the subsequent date of interview by two percentage points. Furthermore, this effect persists over time – the unemployment rate when leaving full-time education is also inversely related to the probability of being employed when last observed in the data. This could be up to 18 years after leaving full-time education while on average it is 7.5 years after leaving (with a median of seven years later). The size of the estimated coefficient is almost identical to that for the first date of interview (–0.058) and remains negative and statistically significant such that a one percentage point higher unemployment rate on leaving full-time education reduces the probability of being employed when last observed in the data by 1.9 percentage points.

The effects on the probability of being in a full-time job are even larger. Here we find that a one percentage point higher unemployment rate when leaving full-time education reduces the probability of being in full-time employment at the subsequent date of interview by 2.8 percentage points at the sample means. Again, this effect persists with labour market experience, such that a one percentage point higher unemployment rate when leaving full-time education reduces the probability of being employed at the most recent date of interview by two percentage points. Estimates in the subsequent row relate to the probability of being employed in a permanent job as opposed to casual, temporary or fixed term contractual arrangements. Again the estimated coefficients are negative, indicating that leaving education

when unemployment is relatively high reduces the probability of entering a permanent job and of being in permanent employment when last observed in the data. These effects are on the margins of statistical significance in the last observed status, reducing the probability by 1.6 percentage points.

The final two rows present estimates from models where the dependent variables indicate unemployment (i.e. out of work and searching for a job) and NEET (i.e. not in employment, education or training). Consistent with the previous estimates, we find that the probabilities of men being unemployed or NEET when first interviewed after leaving full-time education and when last observed in the data increase with the prevailing unemployment rate – the coefficients are positive. In particular, a one percentage point higher unemployment rate on leaving full-time education raises the probability of initially being unemployed or NEET by 2.3 percentage points, and that of being unemployed or NEET when last observed by about 1.5 percentage points.

Hence these estimates provide initial evidence of a scarring effect of entering the labour market when unemployment is high that persists over time. Young men's immediate employment prospects suffer if leaving full-time education when unemployment is high and this disadvantage persists with potential experience. A higher initial unemployment rate reduces the probability of employment when first observed and of full-time employment in particular, and increases the probability of unemployment. These effects remain, for example, when focusing on the man's most recent observed status which on average is identified seven years after leaving full-time education. These findings are consistent with scarring effects of unemployment (e.g. Arulampalam et al 2000; Gregg 2001), and with models of human capital which suggest that entering a weak labour market is likely to result in a poor worker-firm match preventing the accumulation of suitable knowledge and skills (e.g. Jovanovic 1979; Neal 1999; Gibbons and Waldman 2004). They may also be caused by young people leaving education when unemployment is high accepting low quality jobs characterised by high rates of job destruction (Arulampalam et al 2000; Böheim and Taylor 2002). This leads to unstable employment trajectories and repeated periods of unemployment. They are also consistent with the discouraged worker hypothesis – entering the labour market when unemployment is higher reduces labour market attachment as the chances of securing suitable employment are relatively low.

For women, however, the pattern is different. The estimated coefficients on the key variable of interest are generally small and statistically insignificant both when looking at the status when first observed to have left full-time education and at the most recently observed status. The exception is for being in full-time work when last observed in the data, where a one point higher unemployment on leaving full-time education reduces the probability of being in a full-time job by 1.8 percentage points.[13] Thus for women we find that the prevailing unemployment rate when first leaving full-time education has little impact on either initial or later labour market status outcomes. This suggests that factors other than local labour demand determine such outcomes for women, and that the labour market behaviour of women appears to be unaffected by prevailing economic conditions on leaving full-time education.

However as discussed previously, a potential endogeneity problem arises here. Specifically, respondents may relocate on leaving full-time education for the first time to low unemployment areas where they have the greatest chances of securing employment, or they may time or delay their exit from full-time education to coincide with a period of economic growth when labour demand is high, in which case the estimated coefficients of interest will be biased downwards. Alternatively, individuals may leave education sooner when unemployment is high because the expected future returns from investing in education are low. Here the estimates of interest will be biased upwards. To allow for this, we have instrumented the regional unemployment rate on leaving full-time education using the unemployment rate when the respondent was aged 15 in the region of residence when leaving full-time education for the first time (see also Kahn 2010; Kondo 2008; Oreopolous 2006, 2008) and a variable measuring whether or not the respondent changed address between the age of 16 and first leaving full-timed education. We choose these as instruments on the basis that the respondent may have some choice over where to live when first entering the labour market but is unlikely to have much choice when aged 15 and still a dependent child, and that any selection into a particular region will involve relocation. We report estimates from these models, estimated using maximum likelihood, in Table 4. Estimates from the first stage regressions are presented in the Appendix, Table A1.

[13] Further analysis reveals that the prevailing unemployment rate when leaving full-time education has a positive impact on the probability of being in a part-time job when last observed in the data. Thus women respond to low levels of labour demand on leaving education by turning to part-time employment.

Rather than discuss these in detail, we highlight three main conclusions that can be drawn from these models. Firstly, the IV estimates for men are clearly less well-determined than in the base models, but this primarily because of larger standard errors (at least in the first observed status models). In fact, for the first observed status the estimated coefficients in the IV models are larger than the coefficients presented in Table 3 in the models of employment, full-time employment, unemployment and NEET. This suggests that any endogeneity in the unemployment rate when leaving full-time education biases the estimates downwards. Secondly, the IV estimates relating to last observed labour market status are generally smaller than in Table 3, and are not statistically significant from zero. However, and thirdly, the Wald tests of exogeneity of the instrumented variable are not statistically significant, indicating that we cannot reject the null hypothesis of no endogeneity and that regular probits are appropriate.[14] As a consequence, the estimates from the regular probits are preferred, and the inferences we have drawn from them are valid.

Thus far we have focussed only on outcomes at specific points in time – the date of interview in which the individual is first observed to have left full-time education and the date of interview at which the individual is last observed in the data. While this approach has yielded important findings, it has not taken full advantage of the panel nature of the data available. We next present estimates from panel data models which exploit the fact that we have repeated observations of individuals' labour market status over time.

Outcomes across subsequent years

Table 5 presents estimates from random effects models which exploit the panel nature of the available data and which incorporate unobserved time invariant individual-specific heterogeneity, estimated under the common assumptions of independence and normality. The introduction of individual-specific unobservables may be important in this context, if for example individuals with particular unobserved traits or characteristics (e.g. low motivation, low ability etc) are both more likely to leave full-time education in regions or years when unemployment is particularly high and to be less likely to be in employment or more likely to be unemployed in subsequent years. These models include a range of controls including age

[14] These IV models are estimated using probit and maximum likelihood estimation. We have also estimated linear IV models and tested for instrument validity and over-identification. The F statistic for the joint significance of the instruments in the first-stage regression exceeds 150 in all cases, which indicates we have valid instruments. The tests of over-identification are always statistically insignificant at even the 10% level, suggesting that the instruments are uncorrelated with the structural error term and that the structural equation is not incorrectly specified.

and current unemployment rate, time since leaving full-time education, parental migrant status, type of school attended, region of residence, highest qualification attained, whether in a single parent household at 16, whether in a workless household at 16, whether either parent was employed in a managerial or professional occupation at 16, whether in home-owning household at age 16, the current number of employed people in the household, marital status, the number and ages of children, and whether moved house in the last year. All models also include region, year and month of interview fixed effects. The table presents both coefficients and marginal effects (where applicable), where the latter are estimated at the sample means and represent the change in the predicted probability that the dependent variable equals one resulting from a one percentage point higher unemployment rate when first leaving full-time education, estimated at the sample means.[15]

Focusing initially on the estimates for men, we find that the unemployment rate on leaving full-time education has a negative and statistically significant impact on the probability of being employed in subsequent years. The marginal effect indicates that a one point higher unemployment rate when exiting full-time education reduces the probability of being in employment at subsequent dates of interview by one percentage point. Estimates in the next four sections of the table are also statistically significant and consistent with those discussed previously: those in the models of full-time and permanent employment are negative, while those in the models of unemployment and NEET are positive. In particular a one percentage point higher unemployment rate when leaving full-time education reduces the probability of being in a full-time job in subsequent years by almost two percentage points and that of being in a permanent job by 1.5 percentage points. It increases the probability of being unemployed and of being NEET in subsequent years by 0.8 of a percentage point. Hence these estimates again indicate that exiting full-time education during a weak economy reduces the probability of men being employed in full-time and permanent jobs, and increases the probability of unemployment and NEET, and that these effects persist beyond the year of leaving full-time education.

The subsequent rows focus on the impact of the economic climate when leaving full-time education on other labour market experiences – the probability of being promoted within the

[15] We have also estimated IV models analogous to those discussed above. Again we find the instruments to be appropriate, the estimates to be largely consistent with those presented here, and that the models indicate we cannot reject the hypothesis that the unemployment rate on leaving full-time education is exogenous.

last 12 months and the number of weeks in employment and unemployment in the last 12 months.[16] These outcomes provide information on upward job mobility, job and employment stability, and exposure to negative labour market events. In these models we do not include those who left education less than 12 months previously to ensure that the at-risk period of experiencing a promotion, employment and unemployment is equivalent (i.e. 12 months) in all periods. Estimates from these models indicate that for men labour market conditions on leaving full-time education have no persistent impacts on the probability of subsequent promotion or on the number of weeks spent employed. The estimated coefficients are negative, but are not statistically significant. However we find that labour market conditions on leaving full-time education do have significant impacts on subsequent unemployment experiences. Specifically a higher unemployment rate when first leaving full-time education increases the number of weeks a man spends in unemployment in subsequent years such that a one point higher unemployment rate on leaving full-time education increases the time spent per year a man spends unemployed by 0.35 of a week per year on average. These are considerable effects if we consider that unemployment rates in the recent recession increased by about four percentage points on average, and that previous research suggests that unemployment experiences tend to be focussed on a relatively small proportion of workers and not equally distributed across the labour force (e.g. Arulampalam et al 2000; Gregg 2001). These findings are consistent with models of human capital which suggest that entering a weak labour market is likely to result in a poor worker-firm match preventing the accumulation of suitable knowledge and skills (e.g. Jovanovic 1979; Neal 1999; Gibbons and Waldman 2004), and with young people leaving education when unemployment is high being allocated to relatively low quality jobs characterised by high rates of job destruction (Arulampalam et al 2000; Böheim and Taylor 2002).

Thus for men we find evidence that labour demand when leaving full-time education for the first time has persistent, relatively large and statistically significant effects on the propensity to be employed in full-time and permanent work, to be unemployed (and NEET), and on unemployment experiences in the years following labour market entry. This indicates that young men who leave full-time education when unemployment rates are relatively high suffer longer-term consequences in terms of subsequent labour market trajectories in subsequent years.

[16] These take the value zero for those who have not experienced any employment/unemployment in the past year.

The estimates for women are less conclusive. Estimates in the first row indicate that a higher unemployment rate when leaving full-time education increases the probability for a woman to be employed – the estimated coefficient is positive but not well determined. Estimates in the remainder of the models are also not statistically significant, indicating that for women unemployment rates when leaving full-time education have little impact on subsequent labour market outcomes. While this may appear counter-intuitive it is consistent with previous research that employment among women is typically little affected by an economic downturn (Gregg and Wadsworth 2010b; Jacobsen 2007), and might reflect the fact that women who enter the labour market when unemployment is high are more likely to do so through part-time employment. Indeed, further analysis (not shown) indicates that this is the case. The unemployment rate on leaving full-time education has a positive and statistically significant impact on the probability of a woman currently being in a part-time job. This, together with estimates from the other models, suggests that women respond to local labour market conditions when leaving full-time education on the intensive margin while men are affected on the extensive margin. Previous evidence has shown that part-time employment is associated with lower wages, fewer promotion opportunities and less on-the-job training (e.g. Connolly and Gregory 2008; 2009). This implies that women who enter the labour market when unemployment is high may suffer longer-term consequences in terms of career and wage progression, even if these do not directly emerge in our models.

In Table 6 we present the estimated effects of the unemployment rate on first leaving full-time education on observed wages and occupational attainment in the subsequent years. These are estimated using random effects, and are conditional on employment.[17] These estimates suggest that the prevailing economic climate on leaving full-time education, as captured by the unemployment rate, has a negative impact on wages received in subsequent years among men but not women. A one point higher unemployment rate on leaving education is associated with earning 1.2% lower wages, which is statistically significant at the 10% level. Thus leaving education during an economic downturn not only affects the chances of being in a job, but also wages conditional on employment. It also has a negative and statistically significant impact on occupational attainment, particularly for men. Leaving education when unemployment is high reduces occupational attainment in subsequent years

[17] We have also estimated selection-corrected wage equations among women, using marital status and number of children as exclusion restrictions. Estimates from these models are consistent with those presented here.

which might reflect the more interrupted employment profiles, the greater exposure to unemployment, or the misallocation of workers across firms or jobs.

Persistence in effects

Thus far, estimates of the impact of economic conditions when first leaving full-time education on subsequent labour market outcomes have been estimated at specific points in time and averaged across subsequent interview years. These average effects may hide important trends related to the length of time for which any impacts persist. For example prevailing labour market conditions on leaving full-time education may have large and important immediate effects on outcomes (as suggested in Table 3), but these may diminish over time. We investigate this in detail in Tables 7, 8, 9 and 10. Here variation in the effects of interest over time have been identified through estimating models including interactions between the unemployment rate when leaving full-time education and the time since leaving full-time education (potential experience), again using random effects models.

We first discuss the estimates in Table 7 which relate to labour market status at subsequent waves for men. These provide evidence that the effects persist across the medium term. The estimates in the first columns indicate that the unemployment rate on first leaving full-time education has a large, negative and statistically significant impact on the probability of being employed within the first year since leaving, with a one point higher unemployment rate reducing the probability by almost two percentage points (consistent with the estimates presented in Table 3). This increases to 2.7 percentage points in the second year since leaving. The size of this effect then falls in subsequent years, to about two percentage points two to four years after leaving. This is evidence of relatively large scarring effects associated with leaving full-time education during periods of high unemployment, which persist across the first four years of potential experience. Furthermore, we find that smaller long-term persistent effects emerge – as our estimates suggest that a one point higher unemployment rate when leaving full-time education reduces the probability of being employed more than eight years later by about 0.5 percentage points.

The next two sets of columns present estimates and marginal effects for the impact of the unemployment rate when leaving full-time education on the probability of being unemployed and NEET. These reveal a consistent pattern, suggesting that a higher unemployment rate on exiting education has a large, positive and statistically significant impact on the probability of

being unemployed and NEET within the first year, with a one point higher unemployment rate increasing the probabilities by about 2.5 percentage points. The size of this scarring effect falls in subsequent years, but remains positive and either statistically significant or on the margins of statistical significance, such that a one point higher unemployment rate increases the probability of unemployment and NEET by between 0.5 and one percentage point up to six years after leaving education. Longer-term effects also emerge, increasing the probability of unemployment and NEET by up to 0.5 points more than ten years after leaving education.

The final columns focus on the probability of being in a full-time job. These estimates are consistent with those for being in employment discussed previously, although even larger and more persistent. In particular we find that a one point higher unemployment rate on leaving full-time education reduces the probability of being in a full-time job in the first year by 4.1 percentage points, and by 3.1 percentage points in the second year. The size of this effect continues to fall in later years, to 2.1percentage points in the third year since leaving and 1.6 percentage points in the fourth year. These effects persist into the medium to long-term, such that a one point higher unemployment rate on leaving reduces the probability of being in a full-time job more than 10 years later by almost one percentage point. These findings are consistent with workers entering the labour market during periods of low labour demand entering poor worker-firm matches and being placed in lower level jobs with a higher rate of destruction. As a consequence they incur a lasting scar which affects their propensity to be employed in the future, and may acquire inappropriate human capital which affects their productivity and employability when the labour market recovers (Jovanovic 1979; Neal 1999; Gibbons and Waldman 2004; 2006).

Table 8 presents the estimates for women. As found previously, these suggest a much weaker relationship between labour market conditions when leaving full-time education and labour market status in later years than for men. There is little evidence that entering the labour market when unemployment rates are high has any scarring effects either in the short, medium or longer-term – the estimated coefficients on the interaction terms are generally not statistically significant. There are two exceptions. Firstly, we find that the probability of being in a full-time job in the first year since leaving education is inversely related with the prevailing unemployment rate. A one point higher unemployment rate when leaving education reduces the probability of being in a full-time job in the subsequent year by 2.5

percentage points. However, the estimates on the other interaction terms are not statistically significant, suggesting that this is only a short-term effect. Secondly, there is some weak evidence that the probability of being employed more than 10 years after leaving full-time education increases with local labour demand when leaving education. The estimated coefficient is positive and on the margins of statistical significance. However, as the estimated coefficients in the full-time employment equation are not well determined, we can infer that the positive effect on the employment probability is driven by part-time work. This is confirmed by estimates from a model of the probability of being in part-time work (not shown), which indicate that a higher unemployment rate when leaving full-time education increases the probability of being in a part-time job eight or more years later. Again, it is worth noting that exposure to part-time work has implications for the career progression of women (Connolly and Gregory 2008; 2009).

Table 9 presents estimates from models where the dependent variables indicate being in a permanent job (as opposed to temporary or fixed term contract employment or being without a job) and experiencing a promotion in the past twelve months. In the latter models, we again exclude those who left education less than 12 months previously to ensure that the at-risk period of experiencing a promotion is equivalent (i.e. 12 months) in all periods. For men, we again find evidence of a persistent scarring effect of leaving full-time education when unemployment is high. In particular, a one point higher unemployment rate on leaving full-time education reduces the probability of being in a permanent job in the next year by 4.2 percentage points, which falls to three percentage points in the second year after leaving education. The size of the effect continues to fall in subsequent years, to two percentage points in the third year, 1.6 percentage points in the fourth and 1.4 percentage points in the fifth year. This levels out in subsequent years such that eight years after leaving full-time education, it results in a 0.8 percentage point lower probability of being in a permanent job. For women, we find little evidence of a scarring effect on the probability of being in a permanent job – the estimates on the interaction terms are generally small and poorly determined. There is evidence however that leaving full-time education when unemployment is high reduces the probability of being promoted in the short-term. In particular, a one point higher unemployment rate when leaving full-time education reduces the probability of being promoted in the first complete year since leaving full-time education by 0.3 percentage points. However this dissipates in later years. No such effect emerges for men.

Table 10 presents estimates from models where the dependent variables are continuous, including the log real hourly wage (deflated to January 2008 prices), occupational attainment, and the number of weeks in employment and unemployment in the past year. As for promotions, we do not include an interaction term with having left education within the last 12 months in the employment history models to ensure that the at-risk period of experiencing an event is equivalent (i.e. twelve months) across the categories. For men, we find an immediate impact on wages of leaving full-time education when unemployment is relatively high. In particular, at the sample means an additional point on the unemployment rate is associated with earning 4.3% lower wages. This persists into the second year, where an additional point on the unemployment rate is associated with 2.1% lower wages. The wage scarring effect then disappears in subsequent years, but returns more than ten years later. Here we find a one point higher unemployment rate on leaving education reduces wages more than ten years later by 1.7%. Hence we find evidence that, for men, leaving full-time education when unemployment is high has large short-term and smaller longer-term impacts on wages (conditional on employment).

The subsequent columns reveal a consistent pattern regarding the impact of the labour market conditions on leaving full-time education on recent employment history and stability for men. In particular, we find that an additional point on the unemployment rate when leaving full-time education reduces the number of weeks in employment in the second and third years since leaving full-time education by about half a week. Although the estimates on the interaction terms for later years are also negative they are not well determined. Hence we find evidence of a short-term scarring effect in terms of time spent in employment. In contrast, a one point higher unemployment rate when leaving full-time education increases the number of weeks spent in unemployment in the subsequent year by 0.4, and there is some evidence that this persists in subsequent years.[18]

The estimates in the occupational attainment model indicate no immediate or short-term penalty associated with leaving full-time education when unemployment is high (conditional on being employed). Within five years of leaving education, the unemployment rate on leaving education has a negative but statistically insignificant impact on occupational

[18] This is reinforced by estimates looking at the impact of the unemployment rate on leaving full-time education on the number of unemployment spells in the last year. Here we find a positive and statistically significant on each interaction term, indicating a persistent long-term impact of leaving education when unemployment is high on employment stability.

attainment. However from the sixth year onwards, the estimates are negative and statistically significant, indicating that leaving education when unemployment is high has a longer-term impact on occupational attainment. This might reflect the greater exposure to unemployment that our findings show is a consequence of leaving education when unemployment is high, or of being placed in worse jobs or employers. Either of these is likely to result in the slower accumulation of the appropriate human capital. Considering these estimates together with those from the wage equation suggests that individuals who leave education when unemployment is high enter similar occupations initially as those who enter during periods of low unemployment, but initially receive lower wages conditional on occupation. This suggests that they either enter worse worker-firm matches or worse jobs. As they gain experience, their occupational attainment falls behind, which is also consistent with them receiving fewer opportunities to accumulate the appropriate human capital or in worse jobs. Again, we find evidence that entering the labour market when unemployment is high has persistent scarring effects for men.

For women, there is less evidence of any persistent scarring effects. Estimates from the wage equation indicate that a one point higher unemployment rate when leaving education reduces the wages received in the subsequent year by 3.4% and in the year after by 1.5%. However this is only a temporary effect, as from the third year onwards the effect is no longer statistically significant. The estimates subsequent columns, focusing on recent employment and unemployment experiences and thus reflecting job stability, are generally poorly determined. This suggests that for women the unemployment rate on leaving full-time education has little impact on employment and unemployment experiences in subsequent years. An exception relates to the number of weeks per year spent in employment more than ten years after leaving full-time education, which has a positive and statistically significant coefficient, indicating that a one point higher unemployment rate when leaving full-time education for the first time increases the time per year spent employed more than 10 years later by 0.6 of a week. As discussed previously, this is likely to reflect the higher propensity for women who leave education when unemployment is high to be in part-time jobs. The other exception relates to occupational attainment in the year following the exit from education. Here we find that a higher unemployment rate on exiting education reduces the occupational prestige in the first year (statistically significant at the 10% level), but this is only a temporary effect as the estimated coefficients on the interactions for later years are statistically insignificant.

This final set of models reveals a consistent pattern. Among men the unemployment rate on exiting full-time education has a long-term, persistent impact, reducing the probability of being in a full-time job, wages received and occupational attainment, and increasing the probability of unemployment and NEET even ten years later. It also increases the likelihood of unstable employment and the length of time spent in unemployment. Thus exiting full-time education when labour demand is low affects men's labour supply at the extensive margin. In contrast, estimates for women suggest that exiting full-time education when labour demand is low affects their labour supply only on the intensive margin, and has only a temporary a temporary negative impact on wages and occupational attainment. Our findings for women are consistent with previous research suggesting that women may actually improve their labour market position relative to men during a recession (Gregg and Wadsworth 2010b; Jacobsen 2007).

Conclusions

The UK economy has struggled to recover from the global financial crisis of 2007-08, and the subsequent recession. As a consequence unemployment (and youth unemployment in particular) has remained relatively high across a prolonged period of time, and an increasing number of cohorts of young people are entering the labour market and competing for jobs at a time when labour demand is low. Our aim in this paper is to assess the likely short and longer-term implications for these cohorts of young people, drawing on the experiences of those leaving full-time education over the period 1991-2008. Specifically we use data from the BHPS and *Understanding Society* to identify when young people first left education and the extent to which the prevailing unemployment rate at the time affected subsequent labour market outcomes. Our findings are clearly relevant to policy makers with interests in boosting economic growth, smoothing the transition from school to work, maintaining high employment rates and reducing unemployment.

We have adopted a range of different approaches to answer this question, and the patterns that emerge from this analysis are consistent and revealing. In particular we find that for men a higher unemployment rate on leaving full-time education reduces their propensity to be employed, and especially in full-time and permanent jobs, reduces their wages and occupational attainment, and increases their propensity to be unemployed and NEET both in the short-term and in the medium to long-term. The sizes of these effects are large, such that

at sample means a one point higher unemployment rate on leaving full-time education reduces the probability of being in a full-time job in the short-term by four percentage points while it reduces the probability of being in a full-time ten years later by almost one percentage point. Similarly a one point higher unemployment rate in exiting full-time education increases the probability of unemployment in the short-term by 2.4 percentage points, and that ten years later by almost 0.5 percentage points. It also increases the number of weeks spent in unemployment and the number of unemployment spells experienced in the short and longer-term. If we extrapolate from this, the average four point increase in unemployment rates resulting from the recent recession imply a reduction in long-term full-time employment among the affected cohort of young people by 4 percentage points and an increase in unemployment by approaching two percentage points. There is evidence that a four point increase in the prevailing unemployment rate on leaving full-time education reduces wages received in the short-term by up to 17%, and in the long-term by 7%.

For women the economic climate on leaving education has only a short-term impact on the probability of being in a full-time job, such that a four point higher unemployment rate on exiting education reduces the probability of being in a full-time job one year later by ten percentage points. In contrast to men, we instead find evidence that among women leaving education when labour demand is low affects the intensive margin of female labour supply, and increases the probability of being in part-time work. As for men, a short-term impact on wages also emerges.

These estimates have clear policy implications. For men, our findings are consistent with models that suggest that initial job or task assignment may be important in the long run, with employers assigning otherwise similar workers to lower quality jobs or tasks during periods of low labour demand which offer different (lower) opportunities for accumulating human capital or on-the-job training, and which may have higher rates of destruction (Böheim and Taylor 2002; Brunner and Kuhn 2010; Gibbons and Waldman 2006). Thus these workers either develop less, or the wrong kind, of human capital, and/or are exposed to unemployment which incurs a lasting scar (e.g. Arulampalam et al 2000; Gregg 2001), and which contribute to a less stable future employment trajectory. The implications from these findings are that the policy focus during periods of low labour demand should not only be on those labour market entrants who on leaving education do not find employment – a group which have been the focus of many policy initiatives including the current Work Programme

and Youth Contract. There is also a need to ensure that those who enter employment on leaving education do so through high quality, lasting jobs that contribute to the continued development of appropriate skills and human capital. Furthermore, policies that aim to reduce unemployment in the short-term, through for example promoting education, training and skills development, (and hence which prevent the prevailing unemployment rate from rising too far) will have longer lasting effects on young labour market entrants by reducing their propensity to experience unemployment in the future.

References

Arulampalam, W., Booth, A.L. and Taylor, M.P. (2000), "Unemployment persistence", *Oxford Economic Papers*, 52 , 24–50.

Banks, J., Crawford, R. and Tetlow, G. (2010), "What does the distribution of wealth tell us about future retirement resources?" Department for Work and Pensions Research Report No 665.

Banks, J., Crawford, R., Crossley, T. and Emmerson, C. (2012), "The effect of the financial crisis on older households in England", IFS Working Paper W12/9.

Bell, D.N.F and Blanchflower, D.G. (2010), "UK unemployment in the Great Recession", *National Institute Economic Review* 214: R3

Böheim, R. and Taylor, M.P. (2002), "The search for success: Do the unemployed find stable employment?" *Labour Economics*, 9 (6), 717–735.

Brunner, B. and Kuhn, A. (2010), "The impact of labor market entry conditions on initial job assignment, human capital accumulation and wages", IZA Discussion Paper 5360.

Clark, D. (2011), "Do recessions keep children in school? The impact of youth unemployment on enrolment in post-compulsory education in England", *Economica*, 78, 523–545.

Connolly, S. and Gregory, M. (2008) "Moving down: women's part-time work and occupational change in Britain 1991-2001" *Economic Journal*, 118 (526), F52-F76.

Connolly, S. and Gregory, M. (2009) "The part-time pay penalty: earnings trajectories of British women", *Oxford Economic Papers*, 61, i76-i97.

Crawford, R., (2011), "The effect of the financial crisis on the retirement plans of older workers" Institute for Fiscal Studies.

Equality and Human Rights Commission (2009), *Monitoring the impact of the recession on various demographic groups*, EHRC and Department for Work and Pensions.

Genda, Y., Kondo, A., and Ohta, S. (2010). Long-Term Eects of a Recession at Labor Market Entry in Japan and the United States. *Journal of Human Resources*, 45(1), 157-196.

Gibbons, R. and Waldman, M. (2006). Enriching a theory of wage and promotion dynamics inside firms. *Journal of Labor Economics*, 24(1), 59-107.

Gregg, P. (2001), "The impact of youth unemployment on adult unemployment in the NCDS", *Economic Journal*, 111 (475), pp. F626-F653.

Gregg, P. & Wadsworth, J. (2010a), "Unemployment and inactivity in the 2008–2009 recession", *Economic and Labour Market Review*, 4(8), 44–50.

Gregg, P. & Wadsworth, J. (2010b), "Employment in the 2008–2009 recession", *Economic and Labour Market Review*, 4(8), 37–43.

Hoynes, H.W., Miller, D.L., Schaller, J. (2012) "Who suffers during recessions?" NBER Working Paper 17951.

Jacobsen, J.P. (2007), *The economics of gender*, Oxford: Blackwell.

Jenkins, S.P. and Taylor, M.P. (2012), "Non-employment, age, and the business cycle", *Longitudinal and Life Course Studies*, 3(1), 18–40.

Jovanovic, B (1979), "Firm specific capital and turnover", *Journal of Political Economy*, 87, 1246-1260.

Khan, L. (2010), "The long-term labor market consequences of graduating from college in a bad economy", *Labour Economics*, 17(2), 303–316.

Kondo, A. (2008). Differential Effects of Graduating During a Recession Across Race and Gender. ISERP working paper no. 0809-08.

Kwon, I., Meyersson Milgrom, E., and Hwang, S. (2010). Cohort Effects in Promotions and Wages. Evidence from Sweden and the United States. *Journal of Human Resources*, 45(3), 772-808.

Manning, A. (2000), "Pretty vacant: recruitment in low wage labour markets", *Oxford Bulleting of Economics and Statistics*, 62, 747-770.
McVicar, D. and Rice, P.G. (2001), "Participation in further education in England and Wales: an analysis of post-war trends", *Oxford Economic Papers*, 53 (1), 47–56.
Meschi, E., Swaffield, J. and Vignoles, A. (2011), "The relative importance of local labour market conditions and pupil attainment on post-compulsory schooling decisions", IZA Discussion Paper 6143.
Micklewright, J., Pearson, M., and Smith, S. (1990), "Unemployment and early school leaving", *Economic Journal*, 100 (400), 163-169.
Murphy, K. and Welch, F. (1990). Empirical Age-Earnings Profiles. *Journal of Labor Economics*, 8(2), 202.
Neal, D. (1999). The complexity of job mobility among young men. *Journal of labor Economics*, 17(2), 237-261.
Oreopoulos, P., von Wachter, T., and Heisz, A. (2006). The Short-and Long-Term Career Effects of Graduating in a Recession: Hysteresis and Heterogeneity in the Market for College Graduates. NBER Working Paper No. 12159.
Oreopolous, P., von Wachter, T. and Heisz, A. (2008), "The short- and long-term career effects of graduating in a recession: hysteresis and heterogeneity in the market for college graduates", IZA Discussion Paper 3578.
Oyer, P. (2006). Initial Labor Market Conditions and Long-Term Outcomes for Economists. *The Journal of Economic Perspectives*, 20(3), 143-160.
Oyer, P. (2008). The Making of an Investment Banker: Stock Market Shocks, Career Choice, and Lifetime Income. *The Journal of Finance*, 63(6), 2601-2628.
Petrongolo, B. and San Segundo, M.J. (2002), "Staying-on at school at 16: the impact of labor market conditions in Spain", *Economics of Education Review*, 21, 353-365.
Rice, P.G. (1999), "The impact of local labour markets in investment in further education: Evidence from the England and Wales Youth Cohort Studies", *Journal of Population Economics*, 12 (2), 287–312.
Stevens, K. (2008), "Adverse economic conditions at labour market entry: permanent scars or rapid catch up?", University of Sydney.
Taylor, M.P. and Rampino, T. (2013), "Educational aspirations and attitudes over the business cycle", *Economica*, forthcoming.
Topel, R. H. and Ward, M. P. (1992), "Job Mobility and the Careers of Young Men", *Quarterly Journal of Economics*, 107, 439-479.
Tumino, A. and Taylor, M.P. (2013), "The impact of local labour market conditions on school leaving decisions", Institute for Social and Economic Research.
Whitfield, K. and Wilson, R. (1991), "Staying on in full-time education: the educational participation rate of 16 year olds", *Economica*, 58, 391–404.

Table 1: Average unemployment rate when leaving full-time education by first and last observed labour market status: BHPS 1991-2010

	First labour market status				Last observed labour market status			
	Men	N	Women	N	Men	N	Women	N
Employed	6.33	652	6.23	641	6.37	594	6.25	596
Unemployed	6.91***	203	6.37	180	6.99***	177	6.40	168
NEET	6.71**	240	6.39	237	6.80**	210	6.40	222
Full-time job	6.32†††	469	6.32	399	6.41††	452	6.10††	339
Permanent job	6.27†††	461	6.19††	493	6.49††	483	6.20††	454

Notes: Regional unemployment rates calculated from LFS 1992-2010. ***, **, * significantly different from employed at 1%, 5% and 10% level. †††, †† indicates significantly different from non-employed at 1% and 5% level. N refers to number of individuals.

.

Table 2: Average prevailing youth unemployment rate when first left full-time education by current employment status, BHPS 1991-2010

Current job status	Men Unemployment rate	N	Women Unemployment rate	N
Employed	7.18	5071	6.94	4687
Unemployed	7.49***	719	6.90	531
NEET	7.42**	870	7.26***	1578
Full-time employee	7.20	4384	6.85†††	3452
Permanent job	7.20	4535	6.95	4229
Promoted in last year	7.51	326	7.24	305
Correlation with:				
N weeks employed	–0.005		–0.071***	
N weeks unemployed	0.052***		0.016	
Hourly wage	0.016		–0.071***	
Occupational attainment	–0.053***		–0.068***	

Notes: Gender-specific regional unemployment rates calculated from LFS 1992-2010. . ***, **, * indicates stastistical significance at 1%, 5% and 10% level. ††† indicates significantly different from part-time employed at 1% level. N refers to number of person-year observations.

Table 3: Impact of unemployment rate when leaving full-time education for first time on initial and last observed labour market status, BHPS 1991-2010

	Men				Women			
	First status		Last observed status		First status		Last observed status	
Dependent variable:	Coeff	ME	Coeff	ME	Coeff	ME	Coeff	ME
Employed	–0.059	–0.020	–0.058	–0.019	–0.026	–0.009	–0.011	–0.004
	[2.26]		[2.40]		[1.47]		[0.42]	
Log likelihood	–506		–401		–486		–423	
N individuals	905		816		899		829	
Full-time job	–0.071	–0.028	–0.052	–0.020	–0.013	–0.005	–0.047	–0.018
	[2.36]		[2.42]		[0.51]		[1.96]	
Log likelihood	–543		–392		–544		–385	
N individuals	861		707		871		698	
Permanent job	–0.024	–0.009	–0.044	–0.016	0.009	0.004	–0.011	–0.004
	[1.34]		[1.80]		[0.46]		[0.45]	
Log likelihood	–574		–428		–562		–417	
N individuals	888		750		890		732	
Unemployed	0.085	0.023	0.074	0.017	–0.029	–0.007	–0.018	–0.004
	[2.99]		[2.90]		[1.50]		[0.62]	
Log likelihood	–417		–333		–386		–341	
N individuals	905		816		899		829	
NEET	0.076	0.023	0.054	0.015	0.018	0.006	0.004	0.001
	[2.63]		[1.80]		[1.28]		[0.15]	
Log likelihood	–460		–367		–441		–399	
N individuals	905		816		899		829	

Notes: Probit estimates. Standard errors clustered on region in brackets. Controls: parental migrant status, school type, qualification level attained, in single parent household at 16, in workless household at 16, has parent in a professional or managerial occupation when respondent 16, housing tenure when 16, household income when 16, parental education, number employed in household, year, month and region of residence. Additional controls in last status models include current unemployment rate, marital status, number of children, whether moved in last year, time since leaving full-time education. Marginal Effect defined as change in probability that dependent variable equals one resulting from 1 percentage point higher unemployment rate when leaving full-time education.

Table 4: IV estimates of the impact of unemployment rate when leaving full-time education for first time on initial and last observed labour market status, BHPS 1991-2010

	Men		Women	
Dependent variable:	First status	Last observed status	First status	Last observed status
Employed	–0.084	–0.036	–0.032	–0.037
	[2.13]	[0.76]	[0.78]	[0.74]
Wald test p-value	0.331	0.572	0.834	0.519
Loglikelihood	–1761	–1777	–1703	–1793
N individuals	905	816	899	829
Full-time job	–0.074	–0.048	–0.026	–0.016
	[1.91]	[0.96]	[0.67]	[0.28]
Wald test p-value	0.890	0.935	0.615	0.498
Loglikelihood	–1743	–1573	–1726	–1523
N individuals	861	707	871	698
Permanent job	–0.022	–0.032	0.016	–0.020
	[0.57]	[0.69]	[0.42]	[0.40]
Wald test p-value	0.936	0.762	0.774	0.822
Loglikelihood	–1810	–1704	–1769	–1623
N individuals	888	750	890	732
Unemployed	0.104	0.080	–0.049	–0.016
	[2.46]	[1.56]	[1.02]	[0.27]
Wald test p-value	0.498	0.875	0.520	0.949
Loglikelihood	–1673	–1709	–1605	–1711
N individuals	905	816	899	829
NEET	0.089	0.047	0.011	0.036
	[2.16]	[0.94]	[0.26]	[0.71]
Wald test p-value	0.643	0.855	0.780	0.434
Loglikelihood	–1715	–1743	–1660	–1769
N individuals	905	816	899	829

Notes: IV probit estimates. Standard errors clustered on region in brackets. Controls: parental migrant status, school type, qualification level attained, in single parent household at 16, in workless household at 16, has parent in a professional or managerial occupation when respondent 16, housing tenure when 16, household income when 16, parental education, number employed in household, year, month and region of residence. Additional controls in last status models include current unemployment rate, marital status, number of children, whether moved in last year, time since leaving full-time education. Unemployment rate when left full-time education instrumented using the unemployment rate at age 15 in the region of residence when leaving full-time education and whether or not the respondent moved house between the age of 16 and leaving full-time education for the first time.

Table 5: Impact of unemployment rate when leaving full-time education for the first time on subsequent employment status, BHPS 1991-2010

	Men		Women	
Dependent variable:	Coefficient	Marginal effect	Coefficient	Marginal effect
Employed	–0.051	–0.010	0.027	0.006
	[1.95]		[1.12]	
Log likelihood	–2355		–2814	
N observations	6091		6401	
N individuals	909		909	
Full-time job	–0.080	–0.019	–0.027	–0.007
	[3.02]		[1.05]	
Log likelihood	–2474		–2831	
N observations	5713		6172	
N individuals	899		906	
Permanent job	–0.060	–0.015	0.025	0.034
	[2.37]		[1.03]	
Log likelihood	–2764		–3157	
N observations	6045		6380	
N individuals	907		909	
Unemployed	0.067	0.008	0.004	0.001
	[2.53]		[0.17]	
Log likelihood	–1628		–1481	
N observations	6091		6401	
N individuals	909		909	
NEET	0.065	0.008	–0.021	–0.004
	[2.45]		[0.84]	
Log likelihood	–1812		–2329	
N observations	6091		6401	
N individuals	909		909	
Promoted last year	–0.011	–0.001	–0.025	–0.002
	[0.44]		[0.89]	
Log likelihood	–1065		–992	
N observations	4787		5035	
N individuals	777		802	
N weeks employed	–0.364		0.165	
	[1.29]		[0.54]	
R-squared	0.157		0.206	
N observations	4737		4974	
N individuals	775		800	
N weeks unemployed	0.348		–0.064	
	[1.97]		[0.46]	
R-squared	0.234		0.143	
N observations	4743		4984	
N individuals	776		801	

Notes: Estimates from random effects probit models. Marginal effects defined as change in predicted probability that dependent variable equals one resulting from 1 percentage point higher unemployment rate when leaving full-time education estimated at sample means. Models include current unemployment rate, household employment, number of children, has child below 5, moved house in last year, age, parental migrant status, type of school attended, highest qualification, single parent household at 16, workless household at 16, whether parent professional or manager when respondent 16, housing tenure when 16, household income when 16, parental education, year, month of interview and current region of residence.

.**Table 6: Impact of unemployment rate when leaving full-time education for the first time on subsequent wages and productivity, BHPS 1991-2010**

	Men		Women	
	Wages	Occupation	Wages	Occupation
Unemp rate	–0.012	–0.519	–0.001	–0.247
	[1.87]	[2.41]	[0.14]	[1.19]
R^2	0.484	0.261	0.501	0.328
N observations	4173	4479	3994	4178
N individuals	794	813	811	820

Notes: Estimates from random effects GLS regression models where dependent variable is (i) log real hourly wage and (ii) Hope-Goldthorpe occupation prestige score. All models control for current rate of unemployment, number employed in household, number of children, whether child aged below 5, whether moved house in last 12 months, age, parental migrant status, type of school attended, highest educational qualification attained, whether in single parent household at age 16, whether in a workless household at age 16, whether at least one parent was in a professional or managerial occupation when respondent aged 16, housing tenure when aged 16, household income when aged 16, parental education, year, month of interview and current region of residence. Wage equations also include hours of work and occupation.

Table 7: Persistence in the impact of the unemployment rate when leaving full-time education for the first time on subsequent employment outcomes: Men, BHPS 1991-2010

	Working	ME*	Unemp	ME*	NEET	ME*	FT job	ME*
Unemp rate when left FTE *								
Left FTE<1 year ago	–0.065	–0.019	0.110	0.024	0.106	0.026	–0.117	–0.041
	[1.92]		[2.91]		[2.90]		[3.37]	
Left FTE 1-2 years ago	–0.091	–0.027	0.061	0.009	0.044	0.006	–0.093	–0.031
	[2.81]		[1.70]		[1.26]		[2.82]	
Left FTE 2-3 years ago	–0.066	–0.017	0.070	0.010	0.059	0.009	–0.073	–0.021
	[2.15]		[2.07]		[1.79]		[2.33]	
Left FTE 3-4 years ago	–0.066	–0.015	0.087	0.013	0.071	0.011	–0.064	–0.016
	[2.24]		[2.76]		[2.27]		[2.12]	
Left FTE 4-5 years ago	–0.029	–0.005	0.065	0.007	0.048	0.005	–0.031	–0.006
	[1.00]		[2.09]		[1.53]		[1.01]	
Left FTE 5-6 years ago	–0.032	–0.004	0.062	0.006	0.053	0.006	–0.041	–0.007
	[1.08]		[2.01]		[1.76]		[1.36]	
Left FTE 6-8 years ago	–0.035	–0.004	0.050	0.003	0.048	0.004	–0.065	–0.010
	[1.25]		[1.71]		[1.68]		[2.28]	
Left FTE 8-10 years ago	–0.052	–0.005	0.078	0.005	0.068	0.005	–0.093	–0.013
	[1.79]		[2.63]		[2.32]		[3.19]	
Left FTE >10 years ago	–0.052	–0.003	0.055	0.002	0.065	0.003	–0.093	–0.007
	[1.69]		[1.73]		[2.10]		[3.01]	
Log-likelihood	–2347		–1618		–1797		–2457	
N observations	6091		6091		6091		5716	
N individuals	909		909		909		899	

Notes: Estimates from random effects probit models. Marginal effects defined as change in predicted probability that dependent variable equals one resulting from 5 percentage point higher unemployment rate when leaving full-time education. Models include current unemployment rate, household employment, number of children, has child below 5, moved house in last year, age, parental migrant status, type of school attended, highest qualification, single parent household at 16, workless household at 16, whether parent professional or manager when respondent 16, housing tenure when 16, household income when 16, parental education, year, month of interview and current region of residence.

Table 8: Persistence in the impact of the unemployment rate when leaving full-time education for the first time on subsequent employment outcomes: Women, BHPS 1991-2010

	Working	ME*	Unemp	ME*	NEET	ME*	FT job	ME*
Unemp rate when left FTE *								
Left FTE<1 year ago	–0.007	–0.002	0.047	0.009	0.041	0.010	–0.088	–0.025
	[0.21]		[1.25]		[1.22]		[2.67]	
Left FTE 1-2 years ago	–0.010	–0.003	–0.027	–0.002	–0.038	–0.006	–0.037	–0.010
	[0.34]		[0.75]		[1.18]		[1.17]	
Left FTE 2-3 years ago	–0.002	–0.000	–0.016	–0.001	–0.023	–0.004	–0.027	–0.007
	[0.06]		[0.47]		[0.76]		[0.90]	
Left FTE 3-4 years ago	0.011	0.003	–0.022	–0.002	–0.035	–0.006	–0.017	–0.004
	[0.40]		[0.70]		[1.18]		[0.60]	
Left FTE 4-5 years ago	0.003	0.001	–0.007	–0.001	–0.009	–0.002	–0.026	–0.007
	[0.12]		[0.23]		[0.32]		[0.94]	
Left FTE 5-6 years ago	0.038	0.007	0.008	0.001	–0.030	–0.005	0.010	0.002
	[1.39]		[0.29]		[1.06]		[0.35]	
Left FTE 6-8 years ago	0.043	0.008	0.002	0.000	–0.022	–0.003	0.006	0.001
	[1.63]		[0.08]		[0.85]		[0.21]	
Left FTE 8-10 years ago	0.042	0.007	–0.001	–0.000	–0.029	–0.004	–0.010	–0.002
	[1.58]		[0.02]		[1.08]		[0.35]	
Left FTE >10 years ago	0.051	0.008	0.017	0.001	–0.032	–0.004	–0.042	–0.007
	[1.78]		[0.51]		[1.10]		[1.37]	
Log-likelihood	–2831		–1462		–2310		–2827	
N observations	6401		6401		6401		6184	
N individuals	909		909		909		906	

Notes: Estimates from random effects probit models. Marginal effects defined as change in predicted probability that dependent variable equals one resulting from 5 percentage point higher unemployment rate when leaving full-time education. Models include current unemployment rate, household employment, number of children, has child below 5, moved house in last year, age, parental migrant status, type of school attended, highest qualification, single parent household at 16, workless household at 16, whether parent professional or manager when respondent 16, housing tenure when 16, household income when 16, parental education, year, month of interview and current region of residence.

Table 9: Persistence in the impact of the unemployment rate when leaving full-time education for the first time on subsequent employment outcomes: BHPS 1991-2010

	Men				Women			
	Permanent	ME*	Promoted	ME*	Permanent	ME*	Promoted	ME*
Unemp rate when left FTE *								
Left FTE<1 year ago	–0.115	–0.042			–0.020	–0.006		
	[3.49]				[0.64]			
Left FTE 1-2 years ago	–0.086	–0.030	–0.064	–0.003	–0.003	–0.001	–0.104	–0.003
	[2.75]		[1.59]		[0.10]		[2.34]	
Left FTE 2-3 years ago	–0.064	–0.020	–0.034	–0.003	0.016	0.005	–0.045	–0.003
	[2.12]		[0.92]		[0.57]		[1.17]	
Left FTE 3-4 years ago	–0.058	–0.016	–0.025	–0.002	0.033	0.009	–0.027	–0.002
	[2.01]		[0.76]		[1.22]		[0.75]	
Left FTE 4-5 years ago	–0.054	–0.014	–0.036	–0.003	0.007	0.002	–0.004	–0.001
	[1.91]		[1.11]		[0.25]		[0.13]	
Left FTE 5-6 years ago	–0.028	–0.005	–0.013	–0.001	0.045	0.011	–0.018	–0.002
	[0.99]		[0.44]		[1.70]		[0.57]	
Left FTE 6-8 years ago	–0.042	–0.007	–0.012	–0.001	0.038	0.009	–0.021	–0.002
	[1.56]		[0.42]		[1.51]		[0.67]	
Left FTE 8-10 years ago	–0.052	–0.008	–0.019	–0.002	0.028	0.006	–0.018	–0.002
	[1.85]		[0.67]		[1.08]		[0.57]	
Left FTE >10 years ago	–0.065	–0.007	–0.002	–0.000	0.040	0.007	–0.024	–0.002
	[2.21]		[0.07]		[1.41]		[0.65]	
Log-likelihood	–2746		–1073		–3157		–981	
N observations	6045		4787		6380		5035	
N individuals	907		777		909		802	

Notes: Estimates from random effects probit models. Marginal effects defined as change in predicted probability that dependent variable equals one resulting from 5 percentage point higher unemployment rate when leaving full-time education. Models include current unemployment rate, household employment, number of children, has child below 5, moved house in last year, age, parental migrant status, type of school attended, highest qualification, single parent household at 16, workless household at 16, whether parent professional or manager when respondent 16, housing tenure when 16, household income when 16, parental education, year, month of interview and current region of residence.

Table 10: Persistence in the impact of the unemployment rate when leaving full-time education for the first time on subsequent employment outcomes: BHPS 1991-2010

	Men				Women			
	Wages	Weeks employed	Weeks unemp	Occup.	Wages	Weeks employed	Weeks unemp	Occup.
Unemp rate when left FTE *								
Left FTE<1 year ago	–0.043			–0.253	–0.034			–0.495
	[5.10]			[0.93]	[4.09]			[1.82]
Left FTE 1-2 years ago	–0.021	–0.529	0.404	–0.053	–0.015	–0.324	0.192	–0.243
	[2.64]	[1.63]	[1.94]	[0.21]	[1.87]	[0.98]	[1.11]	[0.94]
Left FTE 2-3 years ago	–0.011	–0.509	0.322	0.002	–0.005	–0.245	–0.022	–0.162
	[1.40]	[1.62]	[1.60]	[0.01]	[0.62]	[0.78]	[0.13]	[0.66]
Left FTE 3-4 years ago	–0.005	–0.333	0.372	–0.155	0.001	–0.071	0.032	–0.150
	[0.70]	[1.09]	[1.91]	[0.65]	[0.18]	[0.24]	[0.21]	[0.64]
Left FTE 4-5 years ago	0.002	–0.197	0.263	–0.356	0.005	–0.009	–0.102	0.022
	[0.26]	[0.65]	[1.38]	[1.52]	[0.73]	[0.03]	[0.67]	[0.10]
Left FTE 5-6 years ago	–0.002	–0.147	0.342	–0.404	0.004	0.046	–0.087	–0.094
	[0.28]	[0.49]	[1.81]	[1.75]	[0.57]	[0.16]	[0.58]	[0.42]
Left FTE 6-8 years ago	–0.004	–0.234	0.308	–0.455	0.009	0.320	–0.084	–0.223
	[0.59]	[0.81]	[1.69]	[2.05]	[1.25]	[1.14]	[0.58]	[1.04]
Left FTE 8-10 years ago	–0.009	–0.376	0.412	–0.613	0.005	0.370	–0.103	–0.198
	[1.24]	[1.29]	[2.25]	[2.75]	[0.69]	[1.30]	[0.70]	[0.90]
Left FTE >10 years ago	–0.017	–0.386	0.310	–0.734	0.003	0.642	–0.147	–0.315
	[2.41]	[1.29]	[1.64]	[3.19]	[0.44]	[2.13]	[0.94]	[1.37]
R-squared	0.415	0.147	0.232	0.265	0.453	0.348	0.135	0.329
N observations	4173	4737	4743	4479	3994	4974	4984	4178
N individuals	794	775	776	813	811	800	801	820

Notes: Estimates from random effects probit models. Marginal effects defined as change in predicted probability that dependent variable equals one resulting from 5 percentage point higher unemployment rate when leaving full-time education. Models include current unemployment rate, household employment, number of children, has child below 5, moved house in last year, age, parental migrant status, type of school attended, highest qualification, single parent household at 16, workless household at 16, whether parent professional or manager when respondent 16, housing tenure when 16, household income when 16, parental education, year, month of interview and current region of residence. Wage equations also include occupation and hours of work.

Appendix Table A1: Estimates from first stage IV

	Men		Women	
	First status	Last status	First status	Last status
Employed/unemployed/NEET				
Unemp rate at age 15	0.593	0.543	0.572	0.497
	[35.56]	[22.80]	[36.08]	[22.71]
Moved before leaving education	–0.085	–0.599	–0.074	–0.015
	[0.70]	[3.58]	[0.65]	[0.10]
R^2	0.846	0.731	0.832	0.706
Partial R^2	0.583	0.407	0.604	0.396
N individuals	905	816	899	829
Full-time job				
Unemp rate at age 15	0.598	0.534	0.570	0.475
	[34.09]	[20.91]	[35.38]	[19.69]
Moved before leaving education	–0.059	–0.644	–0.116	–0.084
	[0.47]	[3.64]	[1.00]	[0.53]
R^2	0.846	0.738	0.832	0.694
Partial R^2	0.587	0.401	0.603	0.372
N individuals	861	707	871	698
Permanent job				
Unemp rate at age 15	0.593	0.542	0.572	0.493
	[34.31]	[21.49]	[35.97]	[21.21]
Moved before leaving education	–0.074	–0.659	–0.087	–0.069
	[0.60]	[3.73]	[0.76]	[0.44]
R^2	0.846	0.724	0.830	0.702
Partial R^2	0.583	0.400	0.605	0.395
N individuals	888	750	890	732

Notes: Relates to estimates presented in Table 4. OLS estimates of first stage IV regression, dependent variable is unemployment rate when leaving full-time education.