The Wage Scar from Youth Unemployment

Paul Gregg[1]
and
Emma Tominey[2]

[1]CEP, LSE; CMPO and Department of Economics, The University of Bristol
[2]CMPO, The University of Bristol

February 2004

Abstract

In this paper we utilise the National Child Development Survey to analyse the impact of unemployment during youth upon the wage of individuals up to twenty years later. We find a large and significant wage penalty, even after controlling for educational achievement, region of residence and a wealth of family and individual specific characteristics. We employ an instrumental variables technique to ensure that our results are not driven unobserved individual heterogeneity. Our estimates are robust to the test, indicating that the relationship estimated between youth unemployment and the wage in later life is a causal relationship. Our results suggest a scar from early unemployment in the magnitude of 12% to 15% at age 42. However, this penalty is lower, at 8% to 10%, if individuals avoid repeat incidence of unemployment.

Address for Correspondence
Department of Economics
University of Bristol
12 Priory Road
Bristol
BS8 1TN
P.Gregg@bristol.ac.uk

1. Introduction

Whilst a spell of unemployment will generate a direct loss of income, studies examining the full cost of job loss show that a period of unemployment imposes disadvantages individuals above and beyond this direct cost. For example, Jacobson et al (1993) provide evidence of a wage loss associated with displacement from employment which commences up to three years prior to the date of displacement and is still evident five years following. Furthermore, according to Huff Stevens (1997), in the post-displacement period a person is made much more vulnerable to repeated incidence of unemployment. Stewart (2000), suggests that low pay and higher incidence of job loss are correlated to create a low-pay-no-pay cycle; whereby individuals located low down on the income distribution face a relatively high risk of becoming unemployed. This combined with the widening gap between pre- and post- displacement wages in the UK (Nickell et al. 2002) results in long lasting negative effects from a spell of unemployment. The deterioration of labour market prospects stemming directly from an initial spell of unemployment is sometimes termed a 'scar'; and can come in the form of either higher unemployment or a lower subsequent wage or a combination of both.

There are potential policy implications related to evidence of scarring. Whilst the lowest exit rates from unemployment fall upon older, less educated individuals, intervention may be better directed towards the youth, if the evidence suggests that unemployment imposes a substantial scar upon individuals, which they carry for much of their future labour market experience. As with the old adage, 'prevention is better than cure', the prevention of extended periods of unemployment as individuals gain their first footholds in the labour market may reduce these long-lasting disadvantages. However, an econometric problem exists whereby the fixed individual characteristics which make someone prone to unemployment as a youth, will also drive later unemployment and poor wages. Further, these characteristics may well be poorly observed in conventional databases or difficult to observe at all, such as motivation, self-confidence and expectations. Consequently, the relationship between early unemployment and later outcomes may not be causal but reflect heterogeneity. If this is the case, policy aimed at reducing the incidence or duration of unemployment will be misdirected and the vast

inequalities in life chances will remain.

We use the National Child Development Survey (NCDS) database to explore evidence of scarring in the form of persistently lower wages from a person's youth unemployment experience. We look at how these scars evolve in terms of the initial impact on wages and subsequent recovery and the countervailing impact of repeat incidence of job loss from entry into the labour market up to age 42. Hence, the relationship between youth unemployment and the cumulative history from age 23 to 42 is explored. The NCDS has an expanse of information on factors often unobservable in other data, such as the cohort members ability (literacy, numeracy and intelligence tests) and detailed family background, as well as information upon their educational, occupational and economic achievements during their lifetime. However there exists an evaluation problem. Any relationship we observe between youth unemployment and the subsequent wage may not be causal. If unobservable characteristics of cohort members drive early unemployment experiences and the later wages, our results will be biased upwards. Therefore to ensure the estimated relationship is truly causal we employ the Instrumental Variables technique. The unemployment rate prevalent locally for individuals aged 16 is employed to instrument youth unemployment in the wage equation for individuals aged 33. The intuition is that at such a young age, the individuals have little autonomy over their area of residence, thus the personal characteristics of the individuals are removed from the equation. Further, the local rate of unemployment certainly plays a role in determining experiences of unemployment. We conclude that unobserved heterogeneity does not create a bias. Thus our evaluation of the scarring effect of youth unemployment does estimate the true relationship.

The research in this paper concludes that youth unemployment does indeed impose a wage scar upon individuals, in the magnitude of 12% to 15% at age 42. However, this penalty is lower, at 8% to 10%, if individuals avoid repeat incidence of unemployment. The structure of the analysis of the wage scar from youth unemployment is as follows. The literature surrounding this topic is evaluated in section 2. Section 3 details the data set employed to tackle the issue at hand. The methodology adopted is described in section

4. The results are analysed in section 5 with relevant tables. Following from this, section 6 concludes and discusses the current labour market policies and the scope for future policies, based upon these results.

2. Existing literature

It is obvious that a period of job loss reduces a persons current income. However the detriment may be much longer lasting if unemployment carries a scar. Scarring is a causal link between unemployment history and a negative future experience in the labour market. The literature on the effects from scarring are highlights a twofold impact; damaging the individual's future employment prospects and/or lowering their subsequent earnings; effects which potentially may last for the individual's entire remaining working lifetime.

A number of economic theories can predict scarring. Following the intuition of Becker (1975), although general skills raise a worker's marginal productivity in all different firms and sectors, firm specific skills are non-transferable and thus increase the worker's marginal productivity only in the firm providing the investment. A consequence of unemployment is the depreciation of general skills and the loss of firm specific skills. The worker will therefore receive a wage lower on return to the labour market than that received prior to the spell of unemployment. However, re-entry into the labour market will initiate further accumulation of human capital and hence, as long as there are diminishing returns to extra tenure, the scarring effects will only be temporary.

In standard unemployment Search Theory, unemployment that is a consequence of an inappropriate match between the employer and employee will have a positive effect on subsequent wages. Durations of unemployment are used for job search and thus improve the likelihood of a good employer-employee match in subsequent jobs. However Pissarides (1994) extends these models to include on-the-job search and here, with dispersion in firm productivity, low quality firms recruit the unemployed but lose them to better paying higher productivity firms. Displacement from a good job means a high probability of return to a lower quality one and hence a cost-of-job loss. Part of these

3

costs will be permanent if the worker remains in the low wage sector to retain firm specific human capital which would be lost on a switch to a better paying firm. Theories of dynamic monopsony would create similar predictions (see Manning 2003 for a discussion).

In a similar vein, if the employer ex-ante has imperfect information on the workers quality, they will rationally seek more information ex-post to observe worker potential. This leads to an initially lower wage on entry into a job. By observing the worker over time to improve their knowledge of the worker's productivity, information is revealed to the firm but diffuses to other firms through actions from the employer, such as promoting or firing the employee. Unemployment is then an example of a negative signal, which carries a stigma effect as employers pick up on actions of other employers and view unemployed job seekers as having lower average quality to employed job seekers. Accordingly, unemployment will scar a worker throughout their entire future labour market experience unless they can successfully signal their true quality.

Over the past decade, empirical economic studies have sought identification of the scarring effect from unemployment by observing wages in the periods immediately preceding and following the spell for workers where the displacement can be reasonably thought to be exogenous to their quality. Rhum (1991) finds significant and negative long-term effects on wages from periods spent in unemployment. Workers displaced at the time of observation were more than twice as likely to have 25% lower wages and experience on average 6 times more weeks out of work. Rhum also compares a control group of non-displaced workers to a group of displaced workers in the three years prior to displacement and four years following and finds that, whilst in the long run the employment disadvantage diminishes, the wage penalty was large and persistent.

Jacobson et al (1993) contribute to the identification of the cost of job loss by detecting an earnings loss three years prior to displacement using administrative records from Pennsylvania. At the date of displacement there will be a dramatic drop, followed by a quick recovery and 5 years after displacement, individuals had 25% lower earnings,

compared to non-displaced workers. Stevens (1997) also suggests that much of the cost of job loss is permanent. Thus in order to prevent underestimating the scar it is necessary to consider the full cost of job loss from unemployment. Stevens identifies multiple job loss as a key driving force behind the permanent scarring effects of unemployment, stating that if individuals can avoid falling into unemployment more than once, they will face a good chance of recovery.

The UK literature explores the effects of unemployment more generally rather than focusing on workers displaced in a major layoff, but show similar findings. Nickel et al. (2002) report for the UK that the cost of job loss rose through the 1980s as wage inequality grew. They also explore the impact of repeated job loss and suggest that repeat job loss results in smaller wage penalties approximately half of that of the first incidence. Arulampalam (2001) uses longitudinal data from the British Household Panel Survey (BHPS) and support the findings that the cost of job loss are long-term and that second or subsequent interruptions are less harmful than the first. Gregory and Jukes (2001) utilise the combined information from two longitudinal datasets: New Earnings Survey Panel Dataset (NESPD) and Joint Unemployment and Vacancies Operating System (JUVOS). Their results suggest that the impact effect of job loss is short lived but the effect of duration in the unemployment spell persist and are also strong in a second spell. Borland et al. (2002) show that when a worker displaced from their job finds a new job during the notice period of redundancy, therefore experiencing no unemployment, do not suffer these wage falls.

Looking in particular at the scar imposed upon an individual from youth unemployment, Gregory and Jukes explore variation across age groups and suggest that the impact effect is more marked with older workers but the duration effects are more substantial for the young. Gregg (2001) uses NCDS to analyse scarring in terms of future employment prospects. Specifically Gregg asks whether the cumulated unemployment experience up to the age of 23 drives unemployment in subsequent years. NCDS provides a wealth of information on individuals and despite controlling for many observable characteristics of individuals, Gregg identified persistent effects from youth unemployment. In addition,

an Instrumental Variables technique identifies whether this relationship is causal or resulting from unobserved heterogeneity. The results, suggesting that no bias was detected, lead to the conclusion that unemployment does causally scar individuals in terms of their future employment.

A general consensus between these authors is that an unemployment spell consistently imposes a wage scar upon individuals that persist. However, these studies rarely follow individuals for more than 5 years or so. Although multiple spells of unemployment harm individuals, results indicate that the first spell carries the most significant scar but the impact of longer durations apply to all spells. Stevens (1997) suggests that a substantial part of the reason for persistent effects is that repeat incidence inhibits wage recovery and Gregg (2001) suggest that a spell of unemployment causally increases the likelihood of repeat job loss or multiple spells. This present paper is closest in spirit to Stevens in that we use the NCDS to track the impact of youth unemployment on earnings up to age 42, thus we look for adverse effects from unemployment after 19 to 26 years and we explore how such penalties diminish over that period and the role for further unemployment in preventing recovery.

3. Data set

To show the impact that youth unemployment has upon an individual's future experience in the labour market, we utilise the National Child Development Survey (NCDS), a longitudinal birth cohort panel dataset. The NCDS children were those born in the week 3-9 March, 1958 living in Great Britain. Information was collected on the cohorts on characteristics including gender, race, region of birth and whether the parents are married. Subsequently, information has been collected on these cohorts at ages 7 (1965), 11 (1969), 16 (1974), 23 (1981), 33 (1991) and 42 (1999/2000); creating what approximates to a half-life time history of the individuals.

During the survey, information was gathered not only from the individuals themselves. The parents were interviewed on topics such as their expectations and aspirations for their child's educational and employment prospects, their smoking, working and personal

relationship habits and the child's health. Levels of financial difficulty were assessed and anxiety traits of the children recorded, for instance whether the child experienced depression or wet the bed. Further, the child's ability is observed through a substantial number of tests administered to the children, including drawing and copying, reading, comprehension, mathematics and non-verbal reasoning (akin to IQ). Finally, details of the cohort members as adults was collected at ages 23, 33 and 42 adding insight into the individual's record of crime, their family statistics (number of children, divorce) and their educational and employment histories.

4. Methodology

Our interest lies in the extent to which youth unemployment scars an individual in terms of their subsequent wage. Youth unemployment is defined as a period of unemployment covering the ages 16-23, i.e. as the cohort members are first able to enter the labour market. Individuals pursuing further education into their twenties will not provide a representative picture of youth experience in the labour market, thus the sample is limited to individuals with an employment history lasting more than 24 months between age 16 and 23. We attempt to identify the non-linear relationship between youth unemployment and the subsequent wage, grouping the youth unemployment experience into six categories: zero months, 1 – 2 months, 3 – 4 months, 5 – 6 months, 7 – 12 months and 13+ months. We analyse the wage scar for those with youth unemployment relative to the counterfactual group experiencing no youth unemployment. The dependent variable of the tests is the natural log of the wage reported by the cohort members: we analyse this at three periods in their life, age 23, 33 and 42. The analysis of the wage scar at each stage requires a sample constraint that we examine only those reporting a wage at the relevant age [1].

The data from NCDS is combined with information on region of residence and ward level unemployment rates from Census data in 1971 and 1991, for the purpose of employing the Instrumental Variables technique to test for potential heterogeneity manifested in the

---

[1] A summary of characteristics for individuals reporting a wage at different periods of observation is given in Appendix A.1

data.

Heterogeneity

We aim to examine the scar from unemployment experience before the age of 23 upon the subsequent wage received up to the age of 42. Any unobserved heterogeneity remaining in the results which is correlated with both unemployment and wages will create an upward bias to the estimates of the impact of preceding unemployment.

Formally, individual i's wage experience at time t (W_{it}) is a function of their unemployment experience up to the age of 23 (U_{it-1}), heterogeneity (Z_{it}) and an error term (E_{it}).

$$W_{it} = U_{it-1} + Z_{it} + E_{it} \tag{1}$$

Heterogeneity is a set of non-time varying observable characteristics of the individual i (A_i) including gender, family background and child ability and unobservable characteristics (B_i), which may capture expectations, aspirations or self-confidence, and an error term (ξ_{it}).

$$Z_{it} = A_i + B_i + \xi_{it} \tag{2}$$

The consequence of failure to take account of heterogeneity is the belief of a strong relationship between unemployment and subsequent wages when, in truth it is not the experience of unemployment *per se* that results in lower wages, but the unobserved heterogeneity. This will result in either an omitted variable bias, or a violation of the OLS assumption that the coefficient U_{it-1} is correlated with the error term[2]. Subsequently OLS estimation of U_{it-1} will be biased. Therefore the assessment of the wage scar created from youth unemployment is a two stage task: First, identify the relationship between months of unemployment experienced before the age of 23 and the individual's subsequent wage. Second, examine whether this relationship is causal; a prerequisite for scarring.

---

[2] i.e. that correlation(U_{it-1}, E_{it}) = 0

Controlling for heterogeneity

Utilising NCDS

The plethora of information contained in NCDS is certainly an advantage in the task of isolating a causal relationship between youth unemployment and the subsequent wage. Firstly, it is possible to include variables into the model to account for educational achievement and region of residence between 16-33 (reported at 16, 22 and 33). These additions are a necessity in any reliable wage equation; an individual's wage is at least in part driven by educational attainment and, with variations in levels of employment across regions and therefore variations in wages, it is vital to control for region. Although we can condition on gender we choose to estimate the scar separately as the experience of males and females within the labour market is often very different. Tracing a cohort through various stages of their lives means that it is not possible to include age as an explanatory variable of the model.

Obtaining information on the variables noted so far – months spent unemployed, educational attainment and region – is relatively straight forward. However, the crucial advantage of NCDS is the information on variables that are often unobservable, such as school attendance, ability and childhood deprivation. These variables, although usually unmeasured, certainly have the potential to influence the individual's experience within the labour market later in life. We limit the analysis to those variables thought influential to the economic experience of the cohort. Thus, following Gregg (2001), we define a group of variables specific to the individual's family background and a group of variables pertinent to the individual.

The family background characteristics include whether the parents stayed on at school past age 16 (which could proxy ambitions or expectations of the parent and child), if the cohort member is non-white, whether the child was exposed to financial deprivation or put into care of the local authority and the income received by the household at age 16. The individual specific variables incorporate negative anxiety traits at age 7 (for example depression), low school attendance (truancy), sickness, scores on various school tests, for example vocabulary IQ and mathematics (which proxy for ability) and whether the child

9

ever had educational special needs. If the individual and family specific characteristics are creating an omitted variable bias in the relationship between youth unemployment and subsequent wages, the coefficient of unemployment will fall with the introduction of these background variables.

<u>Econometric techniques</u>

However detailed the set of child and family information available, one or more important background characteristic may have been excluded from the dataset or badly measured. Therefore it is necessary to further control for the unobserved heterogeneity, through econometric techniques. Three main methods are generally adopted in the scarring or cost-of-job-loss literature.

Difference-in-difference

A target group is exposed to a policy change aimed eliminating any potential scar from unemployment by preventing its occurrence. The results of the group are recorded and compared to a benchmark group not affected by job loss, conditional on observed characteristics. The pre-displacement (or unemployment spell) wage should capture any unobserved characteristics that influence wages so that the change in the wage compared across affected and unaffected groups is net of such unobserved differences. Nickell et al. (2002) and Gregory and Jukes (2001) opted for the difference-in-difference to separate heterogeneity from true scarring. However, if the reason for job loss was due to the pre-unemployment wage being too high as a result of a poor match, then even this estimate will be biased. Hence the cost-of-job loss literature tends to include in the sample cases where the displacement can reasonably be thought to be exogenous, for instance where a plant has closed or had mass layoffs. Here the event is plausibly exogenous to the worker quality. Unfortunately such data is not available for the UK.

Assume functional form

A number of studies estimating structural dependence in unemployment (reviewed by Machin and Manning, 1999) attempt to separate dependence from heterogeneity by making assumptions about the likely distribution of such heterogeneity. Lancaster (1990)

states that this method requires certain heroic assumptions regarding the parametric specification of heterogeneity. However, such assumptions about the functional form of the model may lead to misspecification, if they are incorrect. Indeed, Heckman and Borjas (1980) argue that, although the *a priori* assumptions are necessary for empirical investigations into scarring, "In most cases, such assumptions usually cannot be justified by an appeal to economic theory."

Instrumental variables

For the Instrumental Variables technique it is necessary to identify as an instrument some variable which drives the unemployment experience - the endogenous factor - but which is exogenous to the individual themselves. If it is true that the characteristics which drive youth unemployment also drive low wages, rather than (or as well as) the experience of unemployment *per se* acting as the driving force, then the instrument must capture the effect of these characteristics. This will ensure that any results we observe, in terms of the relationship between unemployment and wages, is causal. Heckman and Borjas (1980) cite the Instrumental Variables method as advantageous and accordingly it is the technique adopted in this study. A criticism of the instrumental variables technique is the difficulty in identifying a valid instrument. However, with the nature and expanse of the longitudinal data available, identifying an instrument is simplified. With impetus from Gregg (2001), the unemployment rate prevalent locally for individuals aged 16 is employed to instrument youth unemployment in the wage equation for individuals aged 33. The intuition is that at such a young age, the individuals have little autonomy over their area of residence, thus the personal characteristics of the individuals are removed from the equation. Further, the local rate of unemployment certainly plays a role in determining experiences of unemployment.

The local rate of unemployment when the individuals are aged 33 is included as an endogenous variable. Individuals are sorted into areas, which crudely can be classified into high and low income areas according to their earnings. Furthermore, the impact of recessions of 1980's and 1990's upon regions of the UK was not evenly distributed geographically. Thus to remove any correlation between unemployment after youth and

the instrument (as individuals may not have moved far away), local unemployment rates in 1991 are controlled for. Consequently, local labour market conditions when the individuals were aged 16 will not directly impact upon later unemployment conditional upon local unemployment rates in 1991, except through scarring. A criticism of using the local rate of unemployment or area of residence at age 16 is that rather than removing the influence of heterogeneity from the equation, heterogeneity is just pushed back a generation, as parents have an impact upon where the child lives as they enter the labour market. Consequently it must be noted that there is a risk of the parents' heterogeneity creating a residual bias in the results but, as there is less than complete intergenerational immobility in life chances, then the bias should be reduced.

5. Results

Summary of NCDS data

Table 1 describes the characteristics of the NCDS dataset, distinguishing between males and females. The cohort members have been grouped into six categories, depending upon the number of months spent unemployed between the age of 16-23: zero months, 1-2 months, 3-4 months, 5-6 months, 7-12 months and 13+ months. The vast majority of individuals – approximately 60% - experience no unemployment during their youth, whilst of the remaining 40%, 11-12% reported being unemployed for only approximately 1½ months. However, one fifth of the sample individuals are subjected to 5+ months of unemployment during their youth, with the hardest hit 8% clocking up some 26 months unemployment as youths on average. There is an easily identifiable correlation between unemployment during youth and in the subsequent decade (column V), although between ages 33-42 (column VII) even the individuals with extensive youth unemployment are rarely unemployed. This may, in part, reflect the fact that the period of 1991 to 2000 was characterised by a sustained upswing.

Immediately obvious from columns IV, VI and VIII is the trend for the mean wage of the cohort to decline as youth unemployment accrues. Men carrying the worst history from their youth labour market experience will be paid £4.00 per hour less twenty years later, a 30% penalty, compared to men with no youth unemployment. The wage gap is large for

men whether the wage is measured at age 23, 33 and 42. For women the penalty is approximately £2.00 per hour at age 42 and is consistently slightly lower compared to women with no youth unemployment than for men.

Wage scar at 23

Tables 2a and b report the log wage scar at 23 for men and women respectively. Cohort members are included in the analysis only if they report a wage at 23; details of the restricted sample are given beneath the regression results. Almost 1,000 men and 1,500 women have been dropped from the sample, changing the composition so that individuals with no history of youth unemployment have a somewhat greater representation and those with 13+ months have almost half as much prevalence than in the whole sample.

Looking at column I, a large raw wage gap at 23 is evident between those experiencing 5+ months of unemployment compared to those with no or very little youth unemployment. In the worst case scenario, compared to an individual with no youth unemployment, a history of 13+ months of unemployment between the age of 16-23 is associated with an average reduction in earnings of a 23 year old male by almost 30% and the earnings of a 23 year old female by 35%.

Accounting for observable heterogeneity

Introducing controls for background characteristics in turn will identify the contribution of each towards the wage gap at 23, revealing the upward bias omission these background characteristics creates.

Education and region of residence at 23

Educational attainment is associated with different earning capacities, regardless of an employment history. Relatively poorly qualified individuals achieve lower paid jobs and tend to experience more unemployment. In addition, regions with higher unemployment tend to have lower wages. Inclusion of controls for region and education are thus vital initial conditions when calculating the impact of unemployment upon wages. It should, however, be noted that at age 23, the returns to educational qualifications are not yet fully

apparent and the regional wage gaps are not strongly related to unemployment differences. Column II of Tables 2a and b shows youth unemployment on the whole to be less severe than the previous results suggested once education and region is taken into account. Inclusion of region of residence does not change the scar a great deal. The implied effect of 7-12 months unemployment on wages is reduced by just 3% for men and 1% for women. The damaging consequence of 13+ months unemployment during youth is reduced by just 5% for males and by over 10% for women once the educational heterogeneity of the individuals is taken into account. These relatively small adjustments probably reflect a muted educational premia among such a young cohort. Workers with higher vocational qualifications or above are earning only between 13-18% if they are men, although the wage premia of women at 23 is larger.

Family and individual specific characteristics

Whilst educational returns are low at age 23, it may be that other factors, correlated with youth unemployment, are driving the observed variation in wages. The most obvious candidates are ability unmeasured by qualifications and dimensions of parental background. The NCDS unusually allows a serious attempt to control for many of these characteristics. The ability of each individual, the aspirations of parents as to the individual's achievements, the parental involvement in raising the individual and the physical and mental health of the individual, all of which are potential driving forces of an individual's earnings capacity can be controlled for. Column III of Table 2a and b report that inclusion of a wealth of detail capturing the family and individual heterogeneity does little to alter the wage scar reported above. Youth unemployment experience appears to be one of biggest drivers of wage rates at age 23.

The wage scar at 33

The next stage of analysis steps ten years further into the individual's lives, looking for evidence of the wage scar evident at age 33. Tables 3a-3c detail the results which evaluate the wage scar at age 33 and analyse how the scar changes between the age of 23 and 33. To analyse the scar present at age 33 it is necessary to restrict the sample of evaluation to those reporting a wage at 33. The restriction excludes approximately 2,400

cohort members from the full sample, however the proportion of individuals within the different classifications of youth unemployment is fairly similar to the original sample.

By age 33, the raw log wage penalty for males at every category of youth unemployment, reported in column 1 has intensified relative to a full employment experience, compared to ten years previously. It is broadly similar for women. Focusing upon the worst case scenario, for a male reporting a history of 13+ months of youth unemployment, over the years 23-33 the wage penalty has increased by over 10% to 42%.

Conditioning upon educational achievement and region of residence becomes much more important as returns to education rise with age. The results in column II shows that obtaining a degree will increase the wage at 33 by 60% for males and by nearly 80% for females. In column II, we compare two individuals with an identical educational background, inhabiting the same area but with a different labour market experience during their youth. At age 33 we will still observe wage rates which have diverged for these individuals. The wage of males tends to be lower by up to 25% at 33 and the women's by 18% among those with over a year worth of youth unemployment compared to the individual with no youth unemployment. For men with 5 to 12 months unemployment wages are 11-16% lower and 6-9% for women. Column III displays results when controlling for family and individual specific characteristics. Again the log wage penalty for experiencing some youth unemployment declines once these characteristics were controlled for, but only marginally. Thus two males or females identical in terms of their level of education, their region of residence, their parent's education and their IQ, literacy and numeracy test scores etc., will on average have an earnings gap of 23% and 16% respectively resulting from a year of youth unemployment for one individual. The conditional estimates of the wage penalty associated with youth unemployment are now very similar at ages 23 and 33. This suggests little or no progress in mitigating the impact of youth unemployment over the decade.

Column IV of Tables 3a and b introduce controls for unemployment experience between the ages of 23 and 33. This conditions out the extent to which youth unemployment

experience is correlated with unemployment experience as young adults. It also incorporates the repeat incidence of job loss - found to be important in the work of Gregg (2001) and Stevens (1997) - into the true cost of job loss. Hence the counterfactual now is the wage penalty associated with no youth unemployment given similar subsequent unemployment experience. The wage penalties here associated with youth unemployment are substantially lower for men but changes little for women as the persistence in patterns of unemployment are much less prolific for women. The males within our sample experiencing 3 to 6 months unemployment as youths but no extra unemployment after age 23 have wage penalties of the order of 7%. For 7+ months the penalty increases to 11 to 13%. The penalties conditional on unemployment experience are now similar for men and women. There is evidence of earnings recovery among those experiencing substantial youth unemployment, if they avoid further exposure to unemployment. However, those unemployed for more than 6 months as youths and again between age 23-33 suffer very large wage penalties. This finding raises a question about when the wage difference is first evident. If lower ability or motivation is observed by employers but not picked up in the data, then the wage at 23 may be lower for individuals who go on to experience extensive later unemployment. Evidence to the contrary would suggest that lower paid jobs are less stable and have scarring effects of their own, as suggested by Stewart (2000).

We separate individuals experiencing at least 6 months of youth unemployment into two groups: those in full employment in the decade following youth and those with some unemployment (at least 3 months). There was no significant difference in the wage at 23 for the two groups of individuals[3]. Yet a person experiencing 7+ months of unemployment between 23 and 33 has wages at 33 that are 16-30% lower for men and 10-19% lower for women. So those workers who go on to experience adult unemployment had an insignificantly different wage at age 23 relative to other workers with similar pre-23 characteristics but no later unemployment. This suggests that it is the unemployment experience that induces scarring, rather than ability, unobserved by the

---

[3] Coefficient for men with youth unemployment and some later unemployment was 0.0426 (0.0476). For women the coefficient was –0.0844 (0.0614).

researcher but apparent to employers, that drives down the wage received later in life.

Playing catch up

Table 3c explores the dynamics of the wage penalty between ages 23 and 33. This requires both wages at 23 and 33 to be observed. This further restricts the sample, especially among those with a substantial history of youth unemployment, as their wage is less likely to be observed at 23. The wage growth equation differs from comparing the wage gap level at 23 and 33 to the extent that those missing a wage at 23 can appear in the wage equation at 33 and vice versa. So to explore the impact of this selection we included a dummy variable which equals one if individuals report a wage at 23 and 0 otherwise into the equation for wages at 33 and a similar dummy for reporting a wage at 33 in the age 23 wage equation. This tests whether the sample population being dropped by moving to a wage growth equation differs from the residual populations. Perhaps unsurprisingly both sets of terms are positive. Men and women with an observed wage at 23 and at 33 have wages that are nearly 7-8% higher for given other characteristics at age 23, hence low wage jobs are generally less stable. Women reporting a wage at age 23 will tend to receive a wage at 33 which is 15% higher for given characteristics. For men the effect is smaller, at around 4%, however once we condition upon unemployment experience between ages 23 and 33 the effect disappears.

The individuals not reporting a wage at either 23 or 33 are those spending relatively more time unemployed as youths. The consequence in terms of selection in the wage growth equation is that the picture of earnings progression for the high youth unemployment groups will be altered by the selection criteria. For men, the bias of focusing analysis on those reporting wages at both 23 and 33 results in the wage growth of those with substantial youth unemployment being somewhat exaggerated. This is because the bias is stronger at 23 than 33. For women, the picture is reversed.

Columns I and IV of Table 3c show the correlations between wage growth and youth unemployment conditioning for education, region of residence and the family and individual characteristics of the cohort members, for men and women respectively. The

results match implications of the above results that there is no significant catch-up for individuals with a substantial amount of youth unemployment. Columns II and V control for repeat unemployment between the age of 23 and 33 and suggest that there is wage recovery among men experiencing over a year of youth unemployment. Pooling those with 5+ months unemployment improves the precision of the estimated wage growth and suggests modest recovery of around 5% for those who go on to experience little or no further unemployment. These results again show how the common pattern of exposure to further substantial unemployment continues to damage individuals with substantial youth unemployment and on average prevents recovery among men. For women repeat exposure is less of an issue.

Also utilising the NCDS, Gregg and Machin (2000) found that there are significant wage returns from late achievement of educational qualifications. 18% of males and 12% of females from our sample improve their educational achievement between 23-33 and columns III and VI of Table 3c shows that a wage improvement of 11% for men and 15% for women can be attributed to late educational development. The educational upgrade variable was interacted with long-term youth unemployment (defined as a spell greater than 4 months) and included into the previous equation to isolate any difference in the ability to "catch up" for the more disadvantaged individuals. The size of the effect for both genders is small and insignificant, indicating that regardless of an individual's employment experience in their early years of labour market activity, late educational developers can improve their earnings potential. Thus there is a chance of weakening the scar from youth unemployment through returning to education. However, such upgrading is neither more common among those experiencing a lot of youth unemployment – the target group – nor does it fully compensate for the loss of earnings resulting from the youth unemployment.

The wage scar at 42

More than twenty years after an event of unemployment has occurred, does the negative impact remain? Tables 4a and 4b report the results for wages at age 42. The sample is restricted to include those who report a wage at 42. Compared to the scar prevailing at

age 33, the raw wage penalty from youth unemployment observed when individuals are aged 42 has weakened slightly. 13+ months of youth unemployment is associated with a raw wage gap of approximately 30% at age 23 for men, which increases to 42% by age 33 and falls back to 32% by age 42. The overall picture seems slightly different for women, whereby the wage penalty at age 23 is 34%, increasing marginally to 35% at 33, but by age 42 falls to 25%. Education accounts for a large amount of the wage gap at 42, as column II of Table 4a and b show: qualification to degree standard pushes wages up by around 65-70%, relative to no qualifications. Column III adds family and individual specific characteristics into the equation, with the intent of isolating the detriment from youth unemployment upon the wage at 42, regardless of the individual themselves. The fall in the log wage penalty is approximately 2% for males with an experience of youth unemployment over 7 months, but is very small for females. These conditional estimates of the wage penalty at age 42 are now much lower than at age 23 or 33. For males the conditional wage gap, for over a year of unemployment before the age of 23, is 23% at age 23 and 33 but just 15% at age 42. The pattern for shorter youth unemployment (3-12 months) shows similar shrinkage in the wage penalty. For women, the reduction in these penalties is even more marked. For both men and women, only youth unemployment over 6 months statistically is significantly negatively related to wages at age 42.

Again, it is informative to differentiate between the persistence of the wage penalty derived through repeat exposure to unemployment and that which persists even with continuous employment. In Tables 4a and b, columns IV and V display the scar at 42 controlling for unemployment exposure between ages 23 and 33 and then 33 to 42 additively. For men and women, long term youth unemployment of over 6 months damages the wage at 42 even if they remain out of unemployment after the age of 23. The magnitude of the permanent wage scar is modest at just 6-10% and the results remain statistically significant. Intervening spells of unemployment are more important for men than women and although repeat exposure after age 33 is important for wages, conditioning on later unemployment exposure does not affect the magnitude of the wage penalty associated with youth unemployment. That is, for men, once unemployment experience between the ages of 23 and 33 is conditioned upon, further unemployment

19

experience is uncorrelated with youth unemployment patterns. As shown in Table 1 there is a far more muted relationship between youth unemployment and that experienced after age 33. Thus the persistence effect of unemployment dies out if a worker can avoid a further spell for 10 years or so. However, they are still left with a wage scar. The direct impact of recent unemployment on earnings is strong throughout such that over a year worth of cumulated unemployment experiencing in the preceding 8 to 10 years (depending upon the period) reduces wages by around 30% for men and 15-20% for women.

Table 4c analyses the wage growth prevalent between the age of 33 and 42. The sample includes individuals reporting a wage at 33 and 42. Again this involves a change in sample selection and we explore if this makes any difference by including a dummy variable for not reporting a wage at 33 in the age 42 equation. The samples reporting both wages have on average higher wages than those missing one or the other. Those reporting a wage at 33 have wages at 42, which are 10% higher than for those that did not after conditioning on other characteristics. Likewise, those reporting a wage at 42 had wages at 33 that were 7-8% higher than those that did not. There were no differences across gender in these patterns. Hence the bias in growth appears small.

The coefficients reported in column I and IV show the relationship between wage growth and youth unemployment, once education, region of residence, family and individual characteristics have been controlled for, for men and women. The wage recovery is now far less marked, with men experiencing 5+ months unemployment pre-23 showing recovery of around 7%. The results for women are effectively zero. Columns II and V further control for unemployment between 23-33 and columns III and VI control for unemployment in the following decade. Evident from the table is that there is little relative wage growth in the past two decades. Here it makes little difference whether later unemployment is conditioned on. To summarise, the recovery of wages among those experiencing 5+ months youth unemployment mainly occurs by age 33 unless it is interrupted for some by repeat bursts of unemployment. Even so the recovery is partial some twenty years later, suggesting a near permanent wage scar.

Further accounting for unobservable heterogeneity

<u>Unobserved individual characteristics</u>

In the results presented above the wage penalty associated with youth unemployment is sharply reduced once education and region are conditioned on. However, further conditioning on a wealth of individual ability and family background measures makes only a modest further reduction in the relationship between youth unemployment and wages. On one hand, this result might signify that we are capturing the major cross-correlates between youth unemployment and wages leaving no residual bias from unobserved heterogeneity and thus isolating the pure scarring effect. However, there may be other variables which determine the hourly wage which are correlated with youth unemployment and thus continue to cloud the observed scarring effect. The results presented above show that wages at 23 do not differ significantly between those who go on to experience more than 3 months further unemployment after age 23 and those who have little or no further unemployment, after conditioning on observed characteristics. Hence employers of cohort members at age 23 are not observing and rewarding some ability component unobserved to the researcher, which is correlated with the revealed future unemployment experience. This suggests that the large conditional wage penalties at age 33, or indeed 42, associated with unemployment in the preceding decade were unobservable to employers at 23 (or 33 for wages at 42). However, there may still be concerns that youth unemployment experience reflects some unobserved ability factor and that the persistent wage penalty reflects this unobserved ability rather than unemployment per se.

Therefore we extended the current analysis by adopting an instrumental variables (IV) approach to analyse the impact of youth unemployment upon the wage at 33. The instrument is the local area (ward level) unemployment rate prevalent as the cohort members can first enter the labour market at age 16. The intuition for the decision is that at 16, the individual cohort members are unlikely to have chosen the area within which they live. However the local unemployment rate certainly drives the labour market experience of the individual; thus an exogenous source of variation in youth

21

unemployment experience can be captured by the instrument, allowing accurate calculation of the true scarring effect. A strong instrument must drive wages whilst remaining exogenous to the individual themselves. A likelihood ratio tests confirms the strength of the instrument in driving youth unemployment: statistically the instrument is a strong predictor of the endogenous variable.

To avoid the requirement of non-linear instruments, a linear model is adopted, where the effect of one month of youth unemployment upon the natural log of the hourly wage reported at age 33 is evaluated. In addition, there maybe a concern that some people will not have left their home area by age 33 or have moved nearby. So we also condition on ward level unemployment at age 33, to make sure our instrument is not capturing persistence in residence. This disaggregated data on unemployment is not available at age 42 and hence we only focus on cohort members at age 33 for the IV estimation. Table 5 reports the results from an estimation controlling for education, region of residence, family and individual effects. One month of unemployment will reduce a male individual's wage at 33 by 0.8% and will reduce a female individual's wage at 33 by 0.7%, conditional on education level, measures of family background and ability and ward level unemployment at age 33 from the 1991 Census. The application of the IV technique does change the coefficients; the estimated impact of months of youth unemployment upon the subsequent wage rises slightly, although the results are not largely different from the OLS estimates. If heterogeneity was creating a bias in the results and pushing up the perceived scarring effect from youth unemployment, the IV technique should cause the impact of unemployment upon wages to fall. Even if the instrument is capturing unobserved parental characteristics that have sorted families into more deprived areas, as we condition on a lot of family and parental factors, then the bias should still be reduced through the IV approach and the coefficient fall. Intergenerational transmission produces far less than a complete replication across generations (see Dearden et al 1997).

One simple interpretation for the change could be that the inclusion of an instrument creates 'wobble' in the coefficient on youth unemployment, which is never significantly

different from the un-instrumented coefficient. In other words, there is no economic explanation for the observed movement of the coefficient. Alternatively an error could lie in the assumption necessary for ease of calculation, of a linear relationship between the hourly wage and months of youth unemployment. Although we explored this by capping the months of unemployment at different levels between 25 and 50, the pattern of results was unaffected. A third plausible explanation is that the instrument reflects neighbourhood effects which influence youth's unobserved characteristics and impact upon both earnings and employment opportunities for youths. We cannot test for this here, but given the assumption that the local employment conditions when youths first enter the labour market affect youth's early unemployment experiences in a way that is exogenous to the unobserved characteristics of the individual, then the importance of the results is that the instrumentation does not reduce the magnitude of the results – suggesting that the wage penalty identified is accurate. Therefore we can conclude that there are no substantive biases to our estimates of the scarring effects of youth unemployment from unobserved heterogeneity.

6. Conclusion

There is a plethora of empirical evidence to suggest that a spell of unemployment harms an individual's labour market outcomes, both in terms of future employment prospects and in terms of wages. We contribute to these studies by examining the consequence of youth unemployment upon the cumulative wage experience up to twenty years later. We look at the mechanisms by which youth unemployment translates into labour market outcomes, in order to identify true potential for policy intervention. Our findings are that youth unemployment imposes a sizeable wage scar upon both males and females at age 23 followed by substantial recovery over the next ten years, but only if the individual can avoid further spells of unemployment after age 23. A modest residual wage scar of around 8% persists up to twenty years later even for those who have no further unemployment experience. Those with extensive youth unemployment are at higher risk of further unemployment through to age 33 and this inhibits wage recovery. However there was no further relationship between youth unemployment and unemployment reported after age 33. The results suggest therefore that wages recovery slowly and

incompletely after a substantive bout of youth unemployment. Further, subsequent exposure to unemployment retards this recovery process. So interventions to reduce the exposure of young adults to substantive periods of unemployment could if successful have substantial returns in terms of the individual's lifetime earnings and could represent a good investment.

BIBLIOGRAPHY

Abraham, K. G. and Farber, H. S. (1987). 'Job duration, seniority and earnings', *American Economic Review,* vol. 77(3), pp. 278-97.

Abbring, J., van den Berg, G., Cautier, P. A., Lomwel, A. G. C., van Ours, J. C. and Rhum, C. J. (1998). 'Displaced workers in the United States and the Netherlands', in (P. Khun, eds) *Losing Work, Moving On: International Perspectives on Worker Displacement.* W. E. Upjohn Institute for Employment Research, forthcoming.

Ackum, S. (1991). 'Youth unemployment, labour market programs and subsequent earnings', *Scandinavian Journal of Economics,* vol. 93(4), pp. 531-43.

Albaek, K., van Audenrobe, M. and Browning, M. (1999). 'Employment protection and the consequences for displaced workers: a comparison of Belgium and Denmark', in (P. Khun, eds) *Losing Work, Moving On: International Perspectives on Worker Displacement.* W. E. Upjohn Institute for Employment Research, forthcoming.

Altonji, J. G. and Shaktoko, R. A. (1987). 'Do wages rise with job seniority?', *Review of Economic Studies*, vol. 54(3), pp. 437-59.

Altonji, J. G. and Williams, N. (1997). 'Do wages rise with job seniority? A reassessment', mimeo, paper presented at the Society of Labour Economists meeting held in Washington DC.

Arulampalam, W. (2001). 'Is unemployment really scarring? Effects of unemployment experiences on wages', *Economic Journal,* vol. 111(475), pp. 585-606.

Arulampalam, W., Booth, A. and Taylor, M. (2000). 'Unemployment persistence', *Oxford Economic Papers,* vol. 52, pp. 24-50.

Arulampalam, W., Gregg, P. and Gregory, M. (2001). 'Unemployment scarring', *Economic Journal,* vol. 111(475), pp. 577-84.

Ashenfelter, O. and Zimmerman, D. J. (1997). 'Estimates of the return to schooling from sibling data: fathers, sons and brothers', *The Review of Economics and Statistics,* vol. 79(1), pp. 1-9.

Becker, G. S. (1975). *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education,* 2nd Edition, New York: NBER with Columbia University Press.

Belzil, C. (1995). 'Unemployment duration stigma and re-employment earnings', *Canadian Journal of Economics,* vol. 28(3), pp. 568-85.

Bender, S., Dustmann, C., Margolis, D. and Meghir, C. (1999). 'Worker displacement in France and Germany', *IFS Working Paper,* W99/14.

Borland, J. Gregg, P. Knight, J. And Wadsworth, J. (2002) They Get Knocked Down. Do they Get Up Again? Displaced Workers in Britain and Australia prepared for CILN conference on Displaced Workers, Burlington, Sept 1998. in Kuhn, P. (ed) Losing Work, Moving On: Worker Displacement in an International Context. Michigan, Upjohn Institute

Davidson, R. and MacKinnon, J. G. (1993). *Estimation and Inference in Econometrics*, Oxford University Press.

Dearden, L., Machin, S. and Reed, H. (1997), 'Intergenerational Mobility in Britain', *Economic Journal*, vol. 107(440), pp. 47-66.

Dolton, P. and O'Neill, D. (1996). 'Unemployment duration and the Restart effect: some experimental evidence', *Economic Journal,* vol. 106(435), pp. 387-400.

Farber, H. (1993). 'The incidence and cost of job loss: 1982-91', *Brookings Papers on Economic Activity,* pp. 73-132.

Jacobson, L., LaLonde, R. and Sullivan, D. (1993). 'Earnings losses of displaced workers', *American Economic Review,* vol. 83, pp. 685-709.

Gregg, P. (2001). 'The impact of youth unemployment on adult employment in the NCDS', *Economic Journal,* vol. 111(475), pp. 623-53.

Gregg, P. and Machin, S. (2000). 'Child development and success or failure in the youth labour market' in (D. Blanchflower and R. Freemam, eds) *Youth Unemployment and Joblessness in Advanced Countries,* NBER Comparative Labour Market Series, Chicago: University of Chicago Press.

Gregory, M. and Jukes, R. (2001). 'Unemployment and subsequent earnings: estimating scarring among British men 1984-94', *Economic Journal*, vol. 111(475), pp. 607-25.

Heckman, J. and Borjas, G. (1980). 'Does unemployment cause future unemployment? Definitions, questions and answers from a continuous time model of heterogeneity and state dependence', *Economica,* vol. 47, pp. 247-83.

Lockwood, B. (1991). 'Information externalities in the labour market and the duration of unemployment', *Review of Economic Studies,* vol. 58(4), pp. 733-53.

Manning, A. (2000). 'Pretty vacant: recruitment in low wage labour markets', *Oxford Bulletin of Economics and Statistics,* vol. 62(SI), pp. 747-70.

Manning, A. (2003) Monopsony in Motion, Princeton University Press, Princeton.

Mincer, J. (1974). *Schooling, Experience and Earnings,* New York: NBER with Columbia University Press.

Narendranathan, W. and Elias, P. (1993). 'Influences of past history on the incidence of youth unemployment: empirical findings for the UK', *Oxford Bulletin of Economics and Statistics,* vol. 55(2), pp. 161-85.

Nickell, S., Jones, P. and Quintini, G. (2002). 'A picture of job insecurity facing British men'*, Economic Journal* vol. 112(476), pp. 1-27.

Pissarides, C., (1994). 'Search unemployment with on-the-job search', *Review of Economic Studies,* vol. 61, pp. 457-75.

Rhum, C. J. (1991). 'Are workers permanently scarred by job displacement?', *American Economic Review*, vol. 81(1), pp. 319-24.

Sianesi, B. and van Reenen, J. (2002). 'The returns to education: a review of the empirical macro-economic literature', *IFS Working Papers, W02/05.*

Spence, M. (1973). 'Job market signalling', *Quarterly Journal of Economics,* vol. 87, no. 3, pp. 355-374.

Stevens, A. H. (1997). 'Persistent effects of job displacement: the importance of multiple job losses', *Journal of Labor Economics,* vol. 15(1), pp. 165-88.

Stewart , M. B. (2000). 'The inter-related dynamics of unemployment and low pay', University of Warwick, mimeo.

Swaim, P. and Podgursky, M. (1991). 'The distribution of economic losses among displaced workers: a replication', *Journal of Human Resources,* vol. 26(4), Fall, pp. 742-55.

Topel, R. (1991). 'Specific capital, mobility and wages: wages rise with job seniority', *Journal of Political Economy,* vol. 99(1), pp. 145-76.

Table 1
Summary of NCDS Sample

	I	II	III	IV	V	VI	VII	VIII
Youth Unemployment 16-23	No. Indivds	% of Sample	Average Months Youth Unemployment 16-23	Mean Pay at 23 £ per hour (2000 prices)	Average Months Unemployment 23-33	Mean Pay at 33 £ per hour (2000 prices)	Average Months Unemployment 33-42	Mean Pay at 42 £ per hour (2000 prices)
Men								
0 months	2607	58.6	0	6.400	1.450	10.500	1.160	12.386
1-2 months	539	12.1	1.430	6.190	3.023	9.823	1.581	12.195
3-4 months	364	8.2	3.374	5.938	2.984	9.649	3.280	11.728
5-6 months	231	5.2	5.472	5.660	4.627	9.045	1.814	11.778
7-12 months	342	7.7	9.190	5.553	7.285	8.090	4.368	9.989
13+ months	366	8.2	25.680	4.726	21.745	7.132	10.150	8.461
Total	**4449**	**100**						
Women								
0 months	2769	61.1	0	5.680	1.315	6.841	0.786	8.021
1-2 months	516	11.4	1.483	5.555	2.548	6.844	0.831	7.633
3-4 months	384	8.5	3.401	5.134	1.829	6.658	0.766	7.810
5-6 months	215	4.7	5.484	5.000	3.352	6.469	0.898	8.756
7-12 months	335	7.4	9.167	4.795	2.896	6.299	2.284	7.508
13+ months	314	6.9	23.815	4.100	8.207	4.911	2.025	5.807
Total	**4533**	**100**						

Table 2a
Dependent Variable is Log Wage Penalty aged 23 for Males

	I	II	III
Youth Unemployment	**Log Wage Penalty**		
1-2 Months	-0.033	-0.021	-0.016
	(0.020)	(0.020)	(0.020)
3-4 Months	-0.055	-0.041	-0.042
	(0.025)**	(0.024)*	(0.025)*
5-6 Months	-0.126	-0.112	-0.105
	(0.031)**	(0.031)**	(0.031)**
7-12 Months	-0.131	-0.100	-0.100
	(0.029)**	(0.028)**	(0.029)**
13+ Months	-0.296	-0.242	-0.232
	(0.034)**	(0.034)**	(0.034)**
Education Variables			
Lower vocational		0.100	0.107
Qualifications		(0.063)	(0.063)*
Lower academic		0.035	0.023
		(0.049)	(0.049)
Intermediate Vocational		0.095	0.080
		(0.045)**	(0.045)*
O'Level or equivalent		0.104	0.091
		(0.019)**	(0.021)**
Higher Vocational		0.153	0.139
		(0.021)**	(0.023)**
A'Level or equivalent		0.174	0.154
		(0.031)**	(0.034)**
Level 5 vocational		0.178	0.161
		(0.026)**	(0.028)**
Degree or equivalent		0.126	0.105
		(0.025)**	(0.030)**
Controls			
Regional Variables aged 23[4]	No	Yes	Yes
Family & Individual Variables	No	No	Yes

NCDS Sample: Conditional upon reporting wage at 23

Youth Unemployment	No. Individs	% of Sample	Mean Pay at 23 £ per hour (2000 prices)	Average Months Youth Unemployment
Males				
0 Months	2263		6.400	0
1-2 Months	449		6.190	1.425
3-4 Months	286		5.940	3.392
5-6 Months	169		5.660	5.420
7-12 Months	207		5.553	9.048
13+ Months	146		4.726	23.274
Total	**3520**			

---

[4] Full regression results are available from the authors.

Table 2b
Dependent Variable is Log Wage Penalty aged 23 for Females

	I	II	III
Youth Unemployment	**Log Wage Penalty**		
1-2 Months	-0.029	-0.039	-0.036
	(0.024)	(0.023)*	(0.023)
3-4 Months	-0.103	-0.119	-0.116
	(0.029)**	(0.027)**	(0.027)**
5-6 Months	-0.133	-0.129	-0.127
	(0.038)**	(0.036)**	(0.036)**
7-12 Months	-0.154	-0.146	-0.125
	(0.033)**	(0.031)**	(0.031)**
13+ Months	-0.335	-0.221	-0.192
	(0.042)**	(0.040)**	(0.040)**
Education Variables			
Lower vocational		0.028	-0.012
Qualifications		(0.052)	(0.052)
Lowe r academic		0.024	-0.020
		(0.068)	(0.067)
Intermediate Vocational		-0.018	-0.024
		(0.088)	(0.087)
O'Level or equivalent		0.141	0.063
		(0.021)**	(0.022)**
Higher Vocational		0.231	0.136
		(0.031)**	(0.033)**
A'Level or equivalent		0.310	0.199
		(0.034)**	(0.037)**
Level 5 vocational		0.351	0.261
		(0.027)**	(0.029)**
Degree or equivalent		0.425	0.308
		(0.027)**	(0.032)**
Controls			
Regional Variables aged 23	No	Yes	Yes
Family & Individual Variables	No	No	Yes

NCDS Sample: Conditional upon reporting wage at 23

Youth Unemployment	No. Individs	Mean Pay at 23 £ per hour (2000 prices)	Average Months Youth Unemployment
Females			
0 Months	1942	5.680	0
1-2 Months	351	5.555	1.479
3-4 Months	242	5.134	3.397
5-6 Months	127	5.000	5.496
7-12 Months	174	4.795	9.109
13+ Months	103	4.000	20.990
Total	**2939**		

Table 3a
Dependent Variable is Log Wage Penalty aged 33 for Males

	I	II	III	IV
Youth Unemployment	**Log Wage Penalty**			
1-2 Months	-0.075	-0.030	-0.026	-0.014
	(0.024)**	(0.021)	(0.021)	(0.021)
3-4 Months	-0.098	-0.089	-0.090	-0.070
	(0.029)**	(0.025)**	(0.025)**	(0.025)**
5-6 Months	-0.136	-0.113	-0.106	-0.073
	(0.035)**	(0.031)**	(0.030)**	(0.030)**
7-12 Months	-0.252	-0.160	-0.154	-0.106
	(0.030)**	(0.027)**	(0.026)**	(0.026)**
13+ Months	-0.424	-0.252	-0.231	-0.133
	(0.030)**	(0.027)**	(0.027)**	(0.028)**
Education Variables				
Lower vocational		0.231	0.207	0.193
qualifications		(0.060)**	(0.059)**	(0.058)**
Lower academic		0.117	0.084	0.082
		(0.051)**	(0.051)*	(0.050)*
Intermediate Vocational		0.160	0.115	0.110
		(0.051)**	(0.051)**	(0.050)**
O'Level or equivalent		0.227	0.156	0.151
		(0.020)**	(0.021)**	(0.021)**
Higher Vocational		0.277	0.199	0.190
		(0.023)**	(0.024)**	(0.023)**
A'Level or equivalent		0.489	0.357	0.350
		(0.031)**	(0.034)**	(0.033)**
Level 5 vocational		0.448	0.347	0.333
		(0.027)**	(0.029)**	(0.028)**
Degree or equivalent		0.603	0.457	0.450
		(0.025)**	(0.030)**	(0.029)**
Unemployment 23-33				
1-2 Months				-0.031
				(0.036)
3-4 Months				-0.185
				(0.041)**
5-6 Months				-0.192
				(0.048)**
7-12 Months				-0.158
				(0.036)**
13+ Months				-0.297
				(0.027)**
Controls				
Regional Variables aged 23	No	Yes	Yes	Yes
Family & Individual Variables	No	No	Yes	Yes

NCDS Sample of Males: Conditional upon reporting wage at 33

Youth Unemployment	No. Individs	Average Months Youth Unemployment	Mean Pay at 33 £ per hour (2000 prices)	Average Unemployment 23-33
Males				
0 Months	1924	0	10.500	1.413
1-2 Months	400	1.430	9.823	2.865
3-4 Months	267	3.371	9.649	3.187
5-6 Months	172	5.459	9.045	4.430
7-12 Months	240	9.217	8.100	7.225
13+ Months	245	25.233	7.132	18.775
Total	**3248**			

Table 3b
Dependent Variable is Log Wage Penalty aged 33 for Females

	I	II	III	IV
Youth Unemployment	**Log Wage Penalty**			
1-2 Months	-0.025	-0.034	-0.031	-0.023
	(0.029)	(0.025)	(0.024)	(0.024)
3-4 Months	-0.049	-0.085	-0.083	-0.081
	(0.033)	(0.029)**	(0.028)**	(0.028)**
5-6 Months	-0.099	-0.059	-0.060	-0.050
	(0.044)**	(0.038)	(0.037)	(0.037)
7-12 Months	-0.121	-0.086	-0.077	-0.067
	(0.036)**	(0.031)**	(0.031)**	(0.031)**
13+ Months	-0.350	-0.185	-0.166	-0.141
	(0.038)**	(0.033)**	(0.033)**	(0.033)**
Education Variables				
Lower vocational		0.203	0.160	0.162
qualifications		(0.056)**	(0.056)**	(0.056)**
Lower academic		0.223	0.176	0.180
		(0.075)**	(0.075)*	(0.074)*
Intermediate Vocational		-0.146	-0.128	-0.144
		(0.104)	(0.103)	(0.103)
O'Level or equivalent		0.199	0.131	0.129
		(0.020)**	(0.022)**	(0.022)**
Higher Vocational		0.394	0.311	0.302
		(0.035)**	(0.037)**	(0.037)**
A'Level or equivalent		0.573	0.451	0.443
		(0.038)**	(0.041)**	(0.041)**
Level 5 vocational		0.626	0.544	0.538
		(0.029)**	(0.031)**	(0.031)**
Degree or equivalent		0.785	0.657	0.648
		(0.029)**	(0.034)**	(0.034)**
Unemployment 23-33				
1-2 Months				0.037
				(0.052)
3-4 Months				-0.073
				(0.058)
5-6 Months				0.002
				(0.067)
7-12 Months				-0.098
				(0.045)*
13+ Months				-0.186
				(0.038)**
Controls				
Regional Variables aged 23	No	Yes	Yes	Yes
Family & Individual Variables	No	No	Yes	Yes

NCDS Sample of Females: Conditional upon reporting wage at 33

Youth Unemployment Females	No. Individs	Average Months Youth Unemployment	Mean Pay at 33 £ per hour	Average Unemployment 23-33
0 Months	2016	0	7.186	1.112
1-2 Months	394	1.464	6.844	2.595
3-4 Months	282	3.401	6.658	1.487
5-6 Months	152	5.493	6.469	4.041
7-12 Months	233	9.227	6.299	2.516
13+ Months	209	22.321	4.911	7.047
Total	**3286**			

Table 3c

Dependent Variable is Wage Growth between ages 23-33

	I	II	III	IV	V	VI
	Wage Growth					
	Males			**Females**		
Youth Unemployment						
1-2 Months	0.023	0.035	0.041	-0.038	-0.032	-0.033
	(0.026)	(0.026)	(0.026)	(0.033)	(0.033)	(0.033)
3-4 Months	-0.015	-0.001	-0.003	-0.010	-0.009	-0.019
	(0.032)	(0.032)	(0.032)	(0.039)	(0.039)	(0.039)
5-6 Months	0.044	0.061	0.063	0.088	0.090	0.083
	(0.041)	(0.041)	(0.040)	(0.053)*	(0.053)*	(0.053)
7-12 Months	-0.042	-0.025	-0.029	0.053	0.065	0.063
	(0.039)	(0.038)	(0.038)	(0.045)	(0.045)	(0.045)
13+ Months	0.048	0.082	0.081	0.035	0.056	0.053
	(0.045)	(0.045)*	(0.044)*	(0.059)	(0.060)	(0.059)
Unemployment 23-33						
1-2 Months		0.050	0.046		0.114	0.113
		(0.049)	(0.049)		(0.075)	(0.074)
3-4 Months		-0.174	-0.182		-0.092	-0.093
		(0.059)**	(0.059)**		(0.074)	(0.073)
5-6 Months		0.027	0.024		-0.124	-0.128
		(0.067)	(0.067)		(0.093)	(0.093)
7-12 Months		-0.173	-0.167		-0.032	-0.022
		(0.051)**	(0.051)**		(0.061)	(0.061)
13+ Months		-0.260	-0.260		-0.178	-0.185
		(0.042)**	(0.042)**		(0.058)**	(0.058)**
Educational Upgrade			0.108			0.153
			(0.023)**			(0.033)**
Controls						
Education Variables	Yes	Yes	Yes	Yes	Yes	Yes
Regional Variables aged 23	Yes	Yes	Yes	Yes	Yes	Yes
Family & Individual Variables	Yes	Yes	Yes	Yes	Yes	Yes

Table 4a
Dependent Variable is Log Wage at age 42 for Males

	I	II	III	IV	V
Youth Unemployment	**Log Wage Penalty**				
1-2 Months	-0.076	-0.041	-0.039	-0.031	-0.029
	(0.031)**	(0.028)	(0.028)	(0.028)	(0.028)
3-4 Months	-0.046	-0.055	-0.051	-0.037	-0.026
	(0.037)	(0.034)*	(0.034)	(0.034)	(0.033)
5-6 Months	-0.038	-0.020	-0.006	0.016	0.020
	(0.046)	(0.042)	(0.042)	(0.042)	(0.042)
7-12 Months	-0.184	-0.125	-0.118	-0.078	-0.070
	(0.038)**	(0.035)**	(0.035)**	(0.035)**	(0.035)**
13+ Months	-0.315	-0.182	-0.154	-0.094	-0.078
	(0.041)**	(0.038)**	(0.038)**	(0.039)**	(0.039)**
Education Variables					
Lower vocational		0.171	0.151	0.157	0.143
qualifications		(0.084)**	(0.084)*	(0.083)*	(0.083)*
Lower academic		0.124	0.097	0.099	0.087
		(0.070)*	(0.070)	(0.069)	(0.069)
Intermediate Vocational		0.071	0.040	0.048	0.028
		(0.065)	(0.065)	(0.065)	(0.064)
O'Level or equivalent		0.230	0.163	0.164	0.156
		(0.027)**	(0.029)**	(0.028)**	(0.028)**
Higher Vocational		0.280	0.207	0.207	0.198
		(0.030)**	(0.032)**	(0.032)**	(0.032)**
A'Level or equivalent		0.572	0.453	0.451	0.436
		(0.041)**	(0.045)**	(0.044)**	(0.044)**
Level 5 vocational		0.404	0.308	0.300	0.287
		(0.036)**	(0.038)**	(0.038)**	(0.038)**
Degree or equivalent		0.644	0.504	0.505	0.486
		(0.033)**	(0.039)**	(0.039)**	(0.039)**

Table 4a continued

Unemployment 23-33	Log Wage Penalty				
1-2 Months				0.002	0.028
				(0.048)	(0.049)
3-4 Months				-0.155	-0.136
				(0.056)**	(0.056)**
5-6 Months				-0.148	-0.108
				(0.063)**	(0.064)*
7-12 Months				-0.154	-0.133
				(0.051)**	(0.051)**
13+ Months				-0.195	-0.145
				(0.039)**	(0.040)**
Unemployment 33-42					
1-2 Months					-0.052
					(0.067)
3-4 Months					-0.141
					(0.060)**
5-6 Months					-0.051
					(0.066)
7-12 Months					-0.218
					(0.060)**
13+ Months					-0.270
					(0.053)**
Controls					
Regional Variables aged 23	No	Yes	Yes	Yes	Yes
Family & Individual Variables	No	No	Yes	Yes	Yes

NCDS Sample: Conditional upon reporting wage at 42

Youth Unemployment	No. Individs	Average Months Youth Unemployment	Average Months Unemployment 23-33	Average Months Unemployment 33-42	Mean Pay at 42 £ per hour
Males					
0 Months	1722	0	1.221	0.963	12.386
1-2 Months	340	1.424	2.379	1.182	12.195
3-4 Months	226	3.385	2.802	2.960	11.728
5-6 Months	137	5.460	2.925	1.036	11.778
7-12 Months	215	9.107	7.427	3.214	9.990
13+ Months	182	22.429	16.277	6.148	8.461
Total	**2822**				

Table 4b
Dependent Variable is Log Wage at aged 42 for Females

Youth Unemployment	I	II	III	IV	V
	Log Wage Penalty				
1-2 Months	-0.039	-0.044	-0.040	-0.038	-0.038
	(0.031)	(0.027)	(0.027)	(0.027)	(0.027)
3-4 Months	-0.004	-0.032	-0.027	-0.027	-0.025
	(0.035)	(0.031)	(0.031)	(0.031)	(0.031)
5-6 Months	-0.026	-0.018	-0.018	-0.013	-0.011
	(0.045)	(0.040)	(0.040)	(0.040)	(0.040)
7-12 Months	-0.068	-0.058	-0.063	-0.062	-0.059
	(0.037)*	(0.033)*	(0.033)*	(0.033)*	(0.033)*
13+ Months	-0.252	-0.114	-0.116	-0.107	-0.101
	(0.042)**	(0.038)**	(0.038)**	(0.039)**	(0.039)**
Education Variables					
Lower vocational qualifications		0.077	0.044	0.046	0.039
		(0.061)	(0.062)	(0.062)	(0.062)
Lower academic		-0.002	-0.048	-0.047	-0.050
		(0.087)	(0.087)	(0.087)	(0.087)
Intermediate Vocational		0.016	0.016	0.015	0.014
		(0.107)	(0.106)	(0.106)	(0.106)
O'Level or equivalent		0.177	0.134	0.133	0.133
		(0.022)**	(0.024)**	(0.024)**	(0.024)**
Higher Vocational		0.321	0.267	0.263	0.261
		(0.038)**	(0.040)**	(0.040)**	(0.040)**
A'Level or equivalent		0.494	0.418	0.414	0.415
		(0.040)**	(0.044)**	(0.044)**	(0.043)**
Level 5 vocational		0.571	0.519	0.516	0.515
		(0.031)**	(0.033)**	(0.033)**	(0.033)**
Degree or equivalent		0.729	0.643	0.639	0.638
		(0.032)**	(0.037)**	(0.037)**	(0.037)**

37

Table 4b continued

Unemployment 23-33	Log Wage Penalty				
1-2 Months				0.038	0.032
				(0.059)	(0.059)
3-4 Months				-0.006	-0.005
				(0.065)	(0.066)
5-6 Months				-0.062	-0.045
				(0.077)	(0.077)
7-12 Months				-0.048	-0.048
				(0.050)	(0.051)
13+ Months				-0.080	-0.075
				(0.044)*	(0.045)*
Unemployment 33-42					
1-2 Months					-0.091
					(0.083)
3-4 Months					0.185
					(0.076)**
5-6 Months					-0.007
					(0.073)
7-12 Months					-0.133
					(0.080)*
13+ Months					-0.131
					(0.071)*
Controls					
Regional Variables aged 23	No	Yes	Yes	Yes	Yes
Family & Individual Variables	No	No	Yes	Yes	Yes

NCDS Sample: Conditional upon reporting wage at 42

Youth Unemployment	No. Individs	Average Months Youth Unemployment	Average Months Unemployment 23-33	Average Months Unemployment 33-42	Mean Pay at 42 £ per hour
Females					
0 Months	1861	0	1.252	0.694	8.021
1-2 Months	333	1.486	2.630	0.700	7.633
3-4 Months	249	3.390	1.219	0.936	7.810
5-6 Months	139	5.489	2.867	0.655	8.756
7-12 Months	214	9.061	1.673	1.706	7.508
13+ Months	161	22.100	6.264	1.292	5.807
Total	**2957**				

Table 4c Wage Growth between ages 33-42

	I	II	III	IV	V	VI
	Wage Growth					
	Males			**Females**		
Youth Unemployment						
1-2 Months	-0.011	-0.011	-0.012	0.004	-0.001	-0.002
	(0.028)	(0.028)	(0.028)	(0.031)	(0.031)	(0.031)
3-4 Months	0.007	0.003	0.007	0.030	0.029	0.028
	(0.033)	(0.034)	(0.034)	(0.035)	(0.035)	(0.035)
5-6 Months	0.073	0.069	0.075	-0.038	-0.040	-0.036
	(0.041)	(0.041)	(0.041)	(0.047)	(0.047)	(0.047)
7-12 Months	0.055	0.045	0.047	0.014	0.010	0.009
	(0.035)	(0.036)	(0.036)	(0.040)	(0.040)	(0.040)
13+ Months	0.011	-0.006	-0.005	-0.001	-0.011	-0.010
	(0.038)	(0.040)	(0.040)	(0.046)	(0.046)	(0.046)
Unemployment 23-33						
1-2 Months		0.058	0.062		0.088	0.093
		(0.048)	(0.049)		(0.066)	(0.067)
3-4 Months		-0.024	-0.016		0.016	0.025
		(0.055)	(0.055)		(0.075)	(0.075)
5-6 Months		0.065	0.082		-0.078	-0.058
		(0.065)	(0.065)		(0.094)	(0.095)
7-12 Months		0.009	0.007		0.037	0.042
		(0.053)	(0.053)		(0.059)	(0.060)
13+ Months		0.065	0.087		0.069	0.087
		(0.039)	(0.040)*		(0.051)	(0.053)
Unemployment 33-42						
1-2 Months			0.087			-0.052
			(0.069)			(0.099)
3-4 Months			-0.060			0.068
			(0.060)			(0.089)
5-6 Months			-0.040			-0.120
			(0.067)			(0.086)
7-12 Months			-0.042			-0.151
			(0.062)			(0.088)
13+ Months			-0.212			-0.031
			(0.059)**			(0.085)
Controls						
Education Variables	Yes	Yes	Yes	Yes	Yes	Yes
Regional Variables aged 23	Yes	Yes	Yes	Yes	Yes	Yes
Family & Individual Variables	Yes	Yes	Yes	Yes	Yes	Yes

NCDS Sample: Conditional upon reporting wage at 33 and 42

Youth Unemployment	No. Individs	Average Months Youth Unemploy	Mean Pay at 33 £ per hour	Average Unemploy 23-33	Mean Pay at 42 £ per hour
Males					
0 Months	1496	0	8.327	1.148	12.562
1-2 Months	287	1.422	7.945	2.016	11.760
3-4 Months	184	3.380	7.736	2.627	11.558
5-6 Months	118	5.441	7.328	3.018	12.347
7-12 Months	165	9.285	6.492	7.387	10.282
13+ Months	143	22.133	3.013	12.738	8.597
Total	**2393**				
Females					
0 Months	1471	0	5.657	1.128	8.218
1-2 Months	271	1.480	5.269	2.471	7.817
3-4 Months	200	3.395	5.462	1.121	8.150
5-6 Months	107	5.477	5.353	3.163	8.421
7-12 Months	154	9.104	5.309	1.643	7.968
13+ Months	116	21.888	4.000	6.197	5.861
Total	**2319**				

Table 5

Dependent Variable is Wage at age 33

	I	II	III	IV
	Males		**Females**	
	OLS	**IV**	**OLS**	**IV**
Months of Youth Unemployment	-0.008	-0.019	-0.007	-0.023
	(0.001)**	(0.011)*	(0.001)**	(0.031)
Ward Level Unemployment 33	-0.015	-0.010	-0.003	0.001
	(0.002)**	(0.004)***	(0.002)	(0.005)
Controls				
Education Variables	Yes	Yes	Yes	Yes
Family & Individual Variables	Yes	Yes	Yes	Yes

Appendix A.1. Characteristics for individuals reporting wage at different periods of observation

Men

		Mean	Report wage 23		Report wage 33		Report wage 42		Always report wage	Never report wage
			yes	no	yes	no	yes	no		
Youth Unemployment	Mean	3.552	2.215	8.62	3.327	4.163	2.848	4.774	1.928	8.437
	Observations	4449	3520	929	3248	1201	2822	1627	2020	263
Unemployment 23-33	Mean	4.049	2.149	11.249	3.637	5.166	3.014	5.845	1.609	10.443
	Observations	4449	3520	929	3248	1201	2822	1627	2020	263
Unemployment 33-42	Mean	2.404	1.802	4.687	2.086	3.266	1.649	3.676	1.171	5.532
	Observations	4449	3520	929	3248	1201	2822	1627	2020	263
Wage 23	Mean	2.715	2.715	x	2.755	2.586	2.78	2.584	2.802	x
	Observations	3520	3520		2687	833	2344	1176	2020	x
Wage 33	Mean	7.714	7.83	7.159	7.714	x	7.921	7.137	7.997	x
	Observations	3248	2687	561	3248	x	2393	855	2020	x
Wage 42	Mean	11.845	11.901	11.568	11.983	11.071	11.845	x	12.061	x
	Observations	2822	2344	478	2393	429	2822	x	2020	x

Women

		Mean	Report wage 23		Report wage 33		Report wage 42		Always report wage	Never report wage
			yes	no	yes	no	yes	no		
Youth Unemployment	Mean	3.044	1.969	5.027	2.795	3.699	2.57	3.934	1.777	6.361
	Observations	4533	2939	1594	3286	1247	2957	1576	1621	305
Unemployment 23-33	Mean	2.19	1.569	3.333	1.934	2.862	1.783	2.952	1.318	4.875
	Observations	4533	2939	1594	3286	1247	2957	1576	1621	305
Unemployment 33-42	Mean	0.991	0.783	1.376	0.835	1.404	0.817	1.319	0.687	2.17
	Observations	2939	2939	1594	3286	1247	2957	1576	1621	305
Wage 23	Mean	2.409	2.409	x	2.432	2.334	2.44	2.341	2.448	x
	Observations	3286	2939	x	2249	690	2007	932	1621	x
Wage 33	Mean	5.379	5.835	4.389	5.379	x	5.468	5.164	5.884	x
	Observations	3286	2249	1037	3286	x	2319	967	1621	x
Wage 42	Mean	2957	8.331	6.793	8.041	7.093	7.837	x	8.458	x
	Observations	7.837	2007	950	2319	638	2957	x	1621	x

	Wage at 23 (Table 2a column III)	Wage at 33 (Table 3a column IV)	Wage at 42 (Table 4a column V)
Variable			
Youth Unemployment			
1-2 Months	-0.016	-0.014	-0.029
	(0.020)	(0.021)	(0.028)
3-4 Months	-0.042	-0.070	-0.026
	(0.025)*	(0.025)***	(0.033)
5-6 Months	-0.105	**-0.073**	0.020
	(0.031)**	**(0.030)****	(0.042)
7-12 Months	**-0.100**	-0.106	-0.070
	(0.029)**	(0.026)***	(0.035)**
13+ Months	**-0.232**	**-0.133**	-0.078
	(0.034)**	**(0.028)*****	(0.039)**
Education Dummy Variables			
Lower vocational qualifications	0.107	0.193	0.143
	(0.063)*	(0.058)***	(0.083)*
Lower academic (below O'level or equivalent)	0.023	0.082	0.087
	(0.049)	(0.050)*	(0.069)
Intermediate Vocational (equivalent to O'level)	0.080	0.110	0.028
	(0.045)*	**(0.050)****	(0.064)
O'level or equivalent	**0.091**	**0.151**	**0.156**
	(0.021)**	**(0.021)*****	**(0.028)****
Higher vocational (Akin to A'level)	**0.139**	**0.190**	**0.198**
	(0.023)**	**(0.023)*****	**(0.032)****
A'level or equivalent	**0.154**	**0.350**	**0.436**
	(0.034)**	**(0.033)*****	**(0.044)****
Level 5 vocational (equivalent to degree)	**0.161**	**0.333**	**0.287**
	(0.028)**	**(0.028)*****	**(0.038)****
Degree or equivalent	**0.105**	**0.450**	**0.486**
	(0.030)**	**(0.029)*****	**(0.039)****
Unemployment 23-33			
1-2 Months		-0.031	0.028
		(0.036)	(0.049)
3-4 Months		-0.185	-0.136
		(0.041)***	(0.056)**
5-6 Months		-0.192	-0.108
		(0.048)***	(0.064)*
7-12 Months		**-0.158**	-0.133
		(0.036)***	(0.051)**
13+ Months		**-0.297**	-0.145
		(0.027)***	(0.040)**
Unemployment 33-42			
1-2 Months			-0.052
			(0.067)
3-4 Months			-0.141
			(0.060)**
5-6 Months			-0.051
			(0.066)
7-12 Months			-0.218
			(0.060)**
13+ Months			-0.270
			(0.053)**

	Wage at 23 (Table 2a column III)	Wage at 33 (Table 3a column IV)	Wage at 42 (Table 4a column V)
Regional Dummy Variables			
Region 2	-0.055	0.038	0.049
	(0.032)*	(0.034)	(0.047)
Region 3	-0.115	0.003	-0.025
	(0.033)**	(0.034)	(0.047)
Region 4	-0.087	0.018	-0.006
	(0.033)**	(0.034)	(0.047)
Region 5	-0.044	0.016	**-0.059**
	(0.034)	(0.036)	**(0.048)**
Region 6	-0.153	**0.054**	**0.004**
	(0.044)**	**(0.044)**	**(0.060)**
Region 7	-0.159	**0.052**	**0.018**
	(0.036)**	**(0.036)**	**(0.050)**
Region 8	**-0.016**	0.195	0.146
	(0.028)	(0.030)***	(0.041)***
Region 9	**-0.090**	-0.044	-0.078
	(0.038)**	(0.039)	(0.054)
Region 10	**-0.115**	**-0.003**	**-0.040**
	(0.034)**	**(0.035)**	**(0.047)**
Region 11	**-0.106**	**-0.001**	**0.097**
	(0.162)	**(0.128)**	**(0.153)**
Family Effects			
Father stayed in FT edu > age 16	0.016	-0.032	-0.036
	(0.021)	(0.021)	(0.028)
Mother staying in FT edu > age 16	0.026	-0.013	-0.032
	(0.021)	(0.021)	(0.027)
Ethnic origin Non-white	0.053	**0.048**	**0.031**
	(0.052)	**(0.049)**	**(0.068)**
Ever had Education special needs	-0.208	**-0.134**	**-0.131**
	(0.047)**	**(0.043)***	**(0.063)****
Ever lived in financial deprivation	**-0.014**	0.013	-0.003
	(0.021)	(0.021)	(0.028)
Ever lived in Local Authority Care	-0.000	0.040	0.116
	(0.038)	(0.036)	(0.052)**
Family Total Income aged 16	**-0.000**	0.012	0.090
	(0.022)	(0.021)	**(0.030)****

	Wage at 23 (Table 2a column III)	Wage at 33 (Table 3a column IV)	Wage at 42 (Table 4a column V)
Individual Effects			
Negative anxiety traits aged 7, Score1	-0.015	0.006	0.002
	(0.019)	(0.019)	(0.025)
Negative anxiety traits aged 7, Score2	-0.024	-0.008	-0.011
	(0.019)	(0.018)	(0.025)
Negative anxiety traits aged 7, Score4	-0.015	-0.041	-0.015
	(0.023)	(0.023)*	(0.031)
Low School attendance (<75%)	0.059	-0.031	-0.001
	(0.027)**	(0.027)	(0.038)
Sick1	0.012	0.008	-0.022
	(0.017)	(0.017)	**(0.024)**
Sick2	0.019	-0.026	**-0.046**
	(0.027)	(0.027)	**(0.037)**
Probation by age 16	0.022	**0.030**	**-0.020**
	(0.028)	**(0.029)**	**(0.040)**
Vocabulary, 2nd quintile score aged 11	0.012	**0.056**	**0.077**
	(0.023)	**(0.023)****	**(0.031)****
Vocabulary 3rd quintile score aged 11	0.000	**0.045**	**0.077**
	(0.024)	**(0.024)***	**(0.033)****
Vocabulary 4th quintile score aged 11	**0.006**	**0.068**	**0.094**
	(0.026)	**(0.026)*****	**(0.035)*****
Vocabulary 5th quintile score aged 11	**-0.013**	**0.075**	**0.060**
	(0.028)	**(0.028)*****	**(0.038)**
Arithmetic 2nd quintile score aged 11	0.029	**0.023**	**0.044**
	(0.024)	**(0.024)**	**(0.033)**
Arithmetic 3rd quintile score aged 11	0.036	**0.039**	**0.052**
	(0.024)	**(0.025)**	**(0.033)**
Arithmetic 4th quintile aged 11	0.057	**0.065**	**0.045**
	(0.025)**	**(0.025)****	**(0.034)**
Arithmetic 5th quintile score aged 11	**0.100**	**0.096**	**0.067**
	(0.026)*	**(0.027)*****	**(0.036)***
IQ 2nd quintile score aged 11	**-0.000**	**0.006**	**0.027**
	(0.022)	**(0.023)**	**(0.031)**
IQ 3rd quintile score aged 11	**-0.011**	**0.043**	**0.046**
	(0.024)	**(0.024)***	**(0.032)**
IQ 4th quintile score aged 11	**0.009**	**0.052**	**0.042**
	(0.025)	**(0.025)****	**(0.034)**
IQ 5th quintile score aged 11	**0.009**	**0.074**	**0.097**
	(0.027)	**(0.026)*****	**(0.035)*****

	Wage at 23 (Table 2b column III)	Wage at 33 (Table 3b column IV)	Wage at 42 (Table 4b column V)
Variable			
Youth Unemployment			
1-2 Months	-0.036	-0.023	-0.038
	(0.023)	(0.024)	(0.027)
3-4 Months	-0.116	-0.081	-0.025
	(0.027)**	(0.028)**	(0.031)
5-6 Months	-0.127	-0.050	-0.011
	(0.036)**	(0.037)	(0.040)
7-12 Months	-0.125	-0.067	-0.059
	(0.031)**	(0.031)**	(0.033)*
13+ Months	-0.192	-0.141	-0.101
	(0.040)**	(0.033)**	(0.039)**
Education Dummy Variables			
Lower vocational qualifications	-0.012	0.162	0.039
	(0.052)	(0.056)**	(0.062)
Lower academic (below O'level or equivalent)	-0.020	0.180	-0.050
	(0.067)	(0.074)**	(0.087)
Intermediate Vocational (equivalent to O'level)	-0.024	-0.144	0.014
	(0.087)	(0.103)	(0.106)
O'level or equivalent	0.063	0.129	0.133
	(0.022)**	(0.022)**	(0.024)**
Higher vocational (Akin to A'level)	0.136	0.302	0.261
	(0.033)**	(0.037)**	(0.040)**
A'level or equivalent	0.199	0.443	0.415
	(0.037)**	(0.041)**	(0.043)**
Level 5 vocational (equivalent to degree)	0.261	0.538	0.515
	(0.029)**	(0.031)**	(0.033)**
Degree or equivalent	0.308	0.648	0.638
	(0.032)**	(0.034)**	(0.037)**
Unemployment 23-33			
1-2 Months		0.037	0.032
		(0.052)	(0.059)
3-4 Months		-0.073	-0.005
		(0.058)	(0.066)
5-6 Months		0.002	-0.045
		(0.067)	(0.077)
7-12 Months		-0.098	-0.048
		(0.045)**	(0.051)
13+ Months		-0.186	-0.075
		(0.038)**	(0.045)*
Unemployment 33-42			
1-2 Months			-0.091
			(0.083)
3-4 Months			0.185
			(0.076)**
5-6 Months			-0.007
			(0.073)
7-12 Months			-0.133
			(0.080)*
13+ Months			-0.131
			(0.071)*

	Wage at 23 (Table 2b column III)	Wage at 33 (Table 3b column IV)	Wage at 42 (Table 4b column V)
Regional Dummy Variables			
Region 2	0.025	0.117	-0.018
	(0.037)	(0.040)**	(0.043)
Region 3	0.021	0.007	-0.063
	(0.040)	(0.041)	(0.045)
Region 4	0.029	0.098	-0.032
	(0.039)	(0.041)**	(0.046)
Region 5	0.003	0.036	-0.082
	(0.041)	(0.045)	(0.049)*
Region 6	0.057	0.106	-0.090
	(0.049)	(0.051)**	(0.056)
Region 7	0.003	-0.014	-0.089
	(0.042)	(0.042)	(0.045)**
Region 8	0.131	0.184	0.023
	(0.034)**	(0.036)**	(0.039)
Region 9	0.026	-0.026	-0.055
	(0.045)	(0.048)	(0.052)
Region 10	0.010	0.064	-0.054
	(0.039)	(0.041)	(0.045)
Region 11	-0.069	0.138	0.005
	(0.177)	(0.104)	(0.105)
Family Effects			
Father stayed in FT edu > age 16	0.023	-0.048	-0.066
	(0.022)	(0.024)**	(0.027)**
Mother staying in FT edu > age 16	0.025	-0.002	-0.020
	(0.022)	(0.024)	(0.026)
Ethnic origin Non-white	0.118	0.208	0.303
	(0.066)*	(0.067)**	(0.074)**
Ever had Education special needs	-0.551	-0.192	-0.158
	(0.089)**	(0.081)**	(0.104)
Ever lived in financial deprivation	-0.001	-0.042	-0.029
	(0.023)	(0.023)*	(0.026)
Ever lived in Local Authority Care	-0.014	0.022	0.049
	(0.048)	(0.047)	(0.052)
Family Total Income aged 16	0.011	0.017	-0.013
	(0.023)	(0.024)	(0.026)
Individual Effects			
Negative anxiety traits aged 7, Score1	-0.018	-0.064	0.015
	(0.019)	(0.021)**	(0.022)
Negative anxiety traits aged 7, Score2	-0.059	-0.039	0.003
	(0.023)**	(0.024)	(0.026)
Negative anxiety traits aged 7, Score4	-0.037	-0.082	0.059
	(0.032)	(0.034)**	(0.037)
Low School attendance (<75%)	-0.077	0.004	0.002
	(0.031)**	(0.030)	(0.034)
Sick1	-0.030	-0.012	0.012
	(0.018)	(0.019)	(0.021)
Sick2	-0.083	-0.052	-0.003
	(0.028)**	(0.029)*	(0.033)
Probation by age 16	-0.125	0.034	-0.045
	(0.058)**	(0.051)	(0.058)

	Wage at 23 (Table 2b column III)	Wage at 33 (Table 3b column IV)	Wage at 42 (Table 4b column V)
Vocabulary, 2nd quintile score aged 11	0.119	0.043	0.033
	(0.032)**	(0.033)	(0.036)
Vocabulary 3rd quintile score aged 11	0.106	0.059	0.026
	(0.032)**	(0.033)*	(0.036)
Vocabulary 4th quintile score aged 11	0.125	0.059	0.062
	(0.033)**	(0.033)*	(0.036)*
Vocabulary 5th quintile score aged 11	0.130	0.112	0.059
	(0.034)**	(0.035)**	(0.038)
Arithmetic 2nd quintile score aged 11	-0.001	0.010	0.015
	(0.027)	(0.027)	(0.030)
Arithmetic 3rd quintile score aged 11	-0.002	-0.039	0.009
	(0.027)	(0.028)	(0.031)
Arithmetic 4th quintile aged 11	-0.021	-0.012	0.011
	(0.028)	(0.029)	(0.032)
Arithmetic 5th quintile score aged 11	0.002	0.039	0.078
	(0.029)	(0.031)	(0.034)**
IQ 2nd quintile score aged 11	0.024	0.036	0.071
	(0.027)	(0.028)	(0.031)**
IQ 3rd quintile score aged 11	0.052	0.062	0.084
	(0.028)*	(0.029)**	(0.032)**
IQ 4th quintile score aged 11	0.081	0.071	0.028
	(0.029)**	(0.031)**	(0.033)
IQ 5th quintile score aged 11	0.111	0.068	0.054
	(0.030)**	(0.032)**	(0.035)