

# **The Determinants and Effects of Lifelong Learning**

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## Executive Summary

Despite the policy importance of lifelong learning, there is very little hard evidence from the UK on a) the *extent* of lifelong learning, b) *who* undertakes lifelong learning and *why*, and c) the *benefits* of lifelong learning. This paper attempts to address all three of these questions. Specifically it identifies the factors that determine whether someone undertakes lifelong learning, defined very narrowly for the purposes of this research as learning between the ages of 33 and 42 that results in a qualification. It then models the effect of the different qualifications acquired via lifelong learning on individuals' economic outcomes, namely wages and the likelihood of being employed.

The paper uses a rich longitudinal panel data set of individuals born in 1958, called the National Child Development Study. The rich data arising from this cohort study enable us to identify the effect of lifelong learning on wages and employment *after* allowing for a myriad of other factors that also affect these labour market outcomes. A particular modelling issue that we attempt to overcome is endogeneity bias. This bias arises if characteristics, such as innate ability, make some people more likely to undertake lifelong learning and also ensures that they earn more anyway. If we do not allow for these characteristics, *e.g.* by including measures of ability in our model, then some of the apparent benefit of lifelong learning may really be down to the fact that only very able individuals undertake lifelong learning in the first place. We do not claim to have overcome this potential source of bias and indeed our results suggest it may be a problem in our research. Future work will focus further on this issue.

Our results provide strong evidence that there are employment effects associated with lifelong learning. Those who were out of the labour market in 1991 were more likely to be in work in 2000 if they had undertaken lifelong learning in the intervening period. We also found convincing evidence that learning leads to learning. Undertaking one episode of lifelong learning increased the probability of the individual undertaking more learning. Conversely, those who had attempted a course leading to a qualification between the ages of 33 and 42 but failed to obtain the qualification were less likely to be current learners in the 2000 survey. The results also show that, for individuals with no qualifications in 1991, those who undertook lifelong learning between 1991 and 2000 were earning higher wages in 2000 than those who had not engaged in lifelong learning over this period. We found only limited evidence of positive wage effects from lifelong learning for other groups. For example,

women who obtain a degree or level 4 occupational qualifications (e.g. nursing, teacher training) between the ages of 33 and 42 earn more than their otherwise similar peers who do not, while for men, the results suggest that higher degrees yield a wage premium if taken as a mature student.

Our research has highlighted some important research questions. Firstly, we need to improve our understanding of who is undertaking lifelong learning, and why. We know that adult learning may lead to more adult learning. However, we still know very little about the motivation behind any lifelong learning. Only when we have a clearer picture of why people undertake lifelong learning (and who pays for it) can we understand when and why lifelong learning may or may not have effects on wages and employment outcomes. For instance, one would not expect lifelong learning that is undertaken for non-economic and non-job related reasons necessarily to lead to higher wages. In fact it may result in lower wages, if individuals have to take time off work or become less focused on their work as a result of being lifelong learners. This does not mean however that there are not non-economic benefits associated with lifelong learning. Another point that needs to be borne in mind is that our study focuses on qualification-oriented learning and this is a very particular subset of all lifelong learning. Also, the possible differences between short-term and long-term effects of lifelong learning have not been explored in this paper. For all these reasons, we propose to continue our research in partnership with the DfES *Centre for the Wider Benefits of Learning*, which will enable us to investigate lifelong learning in a more holistic manner. We intend to consider other potential, non-economic, outcomes and to try to understand the motivation behind the extensive amount of lifelong learning that is evident in the NCDS data.

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This paper builds on, and draws heavily from, previous work on measuring the impact of qualifications on employment outcomes found in Dearden *et al.*, (2000) and McIntosh and Vignoles (forthcoming). The authors would also like to thank Gavan Conlon for his comments. All errors and omissions remain our own.

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## 1. Introduction

During the last two decades, increasing emphasis has been placed by policy-makers, employers and individuals alike, on the positive role of human capital in promoting economic prosperity and social inclusion. There has also been a presumption that continual skill formation (one aspect of lifelong learning) will become increasingly important for those who are already in the labour market, if the skill needs of employers are to be adequately met. Despite the rhetoric around lifelong learning however, most of the research emphasis in this field has been on the acquisition of human capital by the young. This focus on the education, qualifications and training of the young has largely been driven by lack of data on the learning experiences of adults. In fact, despite the policy importance of lifelong learning that has been stressed in numerous government reports (e.g. The DfES Learning Age Green Paper), there is very little hard evidence on a) the extent of lifelong learning, b) who undertakes lifelong learning and why, and c) the benefits of lifelong learning.

This paper attempts to address all three of these questions. To the best of our knowledge, this research is unique in at least two respects. Firstly, unlike most of the limited amount of published UK research on the outcomes associated with lifelong learning, we do not focus specifically on mature graduates. Instead we assess the extent of lifelong learning leading to the *full range* of qualifications, and try to assess the economic benefits of all qualifications acquired through later learning. Secondly, we use a rich longitudinal panel data set. This enables us to control for a huge array of factors that may influence whether someone undertakes lifelong learning. This is crucial if (as discussed at length below) we are to avoid endogeneity bias. We restrict our analysis to the labour market benefits of lifelong learning and to qualification-oriented learning, namely the effect of adult learning on employment prospects and wages. However, as we discuss at length below, our analysis suggests that individuals may undertake lifelong learning for a variety of reasons unrelated to the labour market. Hence we suggest that future work on this issue should also focus on the non-economic benefits of adult learning, including any intergenerational transfers of knowledge and ‘love of learning’, and should also investigate a range of different definitions of lifelong learning in addition to learning which leads to qualifications. Indeed the two DfES Centres for the *Economics of Education* (CEE) and the *Wider Benefits of Learning* (WBL) intend to collaborate to take this preliminary research forward.

## 2. Literature Review

### 2.1 Participation in lifelong learning

Sources of information on the extent of participation in lifelong learning include surveys by NIACE (Sargant *et al.*, 1997; Sargant, 2000; Aldridge and Tuckett, 2001); the National Adult Learning Survey (Beinart and Smith, 1998); the Labour Force Survey (see the discussion in Hillage *et al.*, 2000); and research based on IALS, the International Adult Literacy Survey (O'Connell, 1999). These surveys adopt differing definitions of what constitutes an adult, and more crucially, what constitutes learning and, as a result, present very different estimates of the extent of participation in adult learning.

The NIACE (National Institute of Adult Continuing Education) studies surveyed adults aged 17 and over in the UK. Learning was defined in a long statement at the beginning of the questionnaire as:

Learning can mean practising, studying or reading about something. It can also mean being taught, instructed or coached. This is so you can develop skills, knowledge, abilities or understanding of something. Learning can also be called education or training. You can do it regularly (each day or month) or you can do it for a short period of time. It can be full time or part time, done at home, at work, or in another place like college. Learning does not have to lead to a qualification. We are interested in any learning you have done, whether or not it was finished (Sargant *et al.*, 1997, p 119).

Those answering the questionnaire were asked to pick one response from:

You are currently doing some learning activity.

You have done some learning activity in the past three years.

You have studied/learned but it was over three years ago.

You have not studied/learnt since you left full time education.

On this broad definition of lifelong learning, in 1996, 23 per cent of adults said they were in current learning and a further 17 per cent had done some learning in the last three years. The 1999 survey, using an identical question, found that 22 per cent of adults were current learners and 18 per cent were recent learners. Both surveys, then, suggest that 40 per cent of adults could be described as either recent or current learners. The most recent survey, conducted in March/April 2001 (Aldridge and Tuckett, 2001) found that current learning had increased to 29 per cent, taking the total of current/recent learners up to 46 per cent.



The sampling frame for the National Adult Learning Survey (NALS) was all adults ages 16 to 69. A distinction was made in the questionnaire between taught and non-taught learning, and respondents were asked a series of questions about whether they had undertaken various kinds of taught and non-taught learning in the three years prior to the interviews (which took place in 1997). The definition of lifelong learning was extremely broad. It was found that 68 per cent of 16 to 69 year olds had taken part in some kind of learning activity in this time frame, and 62 per cent had done some vocational learning in the previous three years.<sup>1</sup>

In a careful discussion of methodology, the NALS researchers showed that the differences between their results and those in the NIACE survey were overwhelmingly because of the broader definition of learning adopted in the NALS research (Beinart and Smith, 1998, pp 35-37).

The Labour Force Survey (LFS) definition of adult learning is much narrower than those adopted by either NIACE or NALS. It encompasses those adults between the ages of 25 and 64 who were either enrolled for part-time study at educational institutions, or undertaking part-time correspondence courses, or had been involved in vocational training in the last four weeks (Hillage *et al.*, 2000, p 46). On this definition, some 3.3 million adults were participating in learning at the end of 1998. This was about 13 per cent of all adults in the age group, and there were a further 300,000 in full-time education (Hillage *et al.*, 2000, p 47).

The International Adult Literacy Survey (IALS) took place in 1994/95 and covered a sample of adults, aged 25 to 64, in a range of countries. One question asked whether, over the preceding twelve months, the respondent had received 'any training or education including courses, private lessons, correspondence courses, workshops, on-the-job training, apprenticeship training, arts, crafts, recreation courses or any other training or education'. On this basis, some 45 per cent of the UK sample were participants in adult education and training.

Overall, given the variation in results from these four surveys it should be very clear that measuring the extent of participation in lifelong learning is very sensitive to the definition of lifelong learning adopted.

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<sup>1</sup> Since leaving full-time education in the case of those who had left full-time education less than three years previously.

## **2.2 Changes over time in the extent of participation**

The NIACE surveys were conducted in 1990, 1996, 1999 and 2001. They suggest that, at the aggregate level, participation was roughly constant in the 1990s. In 1990, 39 per cent of respondents were engaged in current or recent learning, compared to 40 per cent in 1996 and 40 per cent in 2000.<sup>2</sup> This rather static overall picture masked some variation by age, with increasing participation by the under 25s, at least partly because more of them stayed on in initial full-time further and higher education; more participation by those aged 25 to 64, and a decline in participation among older members of the population, both in the 65 to 74 age group and among the 75 and overs. However, as mentioned in the previous section, the most recent survey, conducted in 2001, found a marked increase in the proportion of current learners on the NIACE definition, taking the overall figure for current or recent learning up from about 40 per cent in the 1990s to 46 per cent in 2001. Preliminary analysis of this very recent data has suggested that the increase is quite broadly based across a wide range of ages and occupational groups (Aldridge and Tuckett, 2001).

Data from the LFS suggest that the percentage of current/very recent adult learners rose from about 11 per cent in 1990 to 13 per cent by 1998 (Hillage *et al.*, 2000). Note, however, that Green (1999) has shown that the average length of a training episode fell over this period so that the volume of vocational training, at least, may not have increased in the 1990s.

## **2.3 International evidence on participation in lifelong learning**

There is some evidence that participation in adult learning has been growing elsewhere, both in North America and in other European countries. Field (2000) cites evidence suggesting that in Canada the proportion of adults involved in organised learning rose from 20 per cent in the mid-1980s to 38 per cent in the mid-1990s; estimates for the US are for a 46 per cent participation rate in adult learning in 1999, which represents growth of about one-third since 1991. In Finland participation in organised adult learning increased 28 per cent between 1972 and 1995, while in the Netherlands participation rose from 15 per cent in the 1960s to 20 per cent in the 1980s and had reached almost 38 per cent in the mid-1990s (figures from various authors, all cited in Field, 2000, p 39). These figures do clearly suggest increases in

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<sup>2</sup> The questions asked in 1996, 1999 and 2001 were identical, but the 1990 questions were slightly different.

participation over time. However, because of the sensitivity of estimates of participation in lifelong learning to the definition of lifelong learning adopted, it would be extremely unwise to use these figures to make cross-country comparisons of participation in adult learning.

An analysis of the IALS data by O'Connell (1999) provides a much better basis for international comparisons. Admittedly, the sample sizes for each country, at only some 2,000 to 4,500 respondents, were on the small side for nationally representative surveys, but the IALS was at least designed with international comparisons in mind. Eleven countries, including seven European countries; Australia, New Zealand, Canada and the United States, were covered by O'Connell's study. At 45 per cent, the UK's participation rate in adult learning compared well with the (unweighted) mean for all countries in the study of 36 per cent. The highest participation rates were in Sweden (54 per cent) and New Zealand (46 per cent), while low participation rates were recorded for Poland, at only 14 per cent, Ireland and Belgium (22 per cent each).

## **2.4 Explaining participation and non-participation**

In the NIACE surveys, social class was found to be important for explaining participation. For example, in the 1996 survey 53 per cent of those in the sample defined as social class AB were either currently engaged in learning or had done some learning in the three years before the study; the equivalent figure for those in social class DE was only 26 per cent. For the whole sample, 36 per cent had done no learning since leaving full-time education, but this figure varied from only 19 per cent of social class AB, 27 per cent for C1s, 42 per cent of C2s and 53 per cent of those in social class DE (Sargant *et al.*, 1997).

The more initial education and training people had received, the greater the likelihood of their learning later on. Only 20 per cent of those leaving initial education before the age of 16 were found to be current or recent participants in adult learning, compared to 39 per cent of those who had left initial education at the age of 16/17, and 59 per cent of those who had stayed in education to the age of eighteen or beyond.

A number of other variables were also associated with participation in adult education. These included age, with the elderly being less likely to participate; and gender, with men being more likely to be involved in education and training than women; and there were also variations according to the part of the country in which people lived, with those in the south-east scoring highest for participation (Sargant *et al.*, 1997). However, the NIACE

surveys venture no further than the compilation of frequency tables and cross-tabulations, so it is unclear whether all these variables would remain significant in a multivariate analysis.

To control for the effects of interaction among explanatory variables, the NALS presented results from logistic regressions with participation in vocational learning and participation in non-vocational learning as the dependent variables (Beinart and Smith, 1998). In this multivariate framework it was found that those who had left initial full-time education with qualifications were more likely than those without qualifications to have undertaken vocational learning, and the probability of participation increased the higher the level of qualifications obtained. Participation also varied by current activity. People in full-time work were more likely to undertake vocational learning than part-time workers, and much more so than those who were looking after a family or retired. Non-manuals were more likely to be participants than manual workers, people under 60 were more commonly in vocational learning than the over-60s, males had a slightly higher probability of participation than females and those of white ethnic background were more likely to have undertaken vocational learning than those from other ethnic backgrounds.

As for non-vocational learning in the NALS the results of logistic regressions again showed that obtaining qualifications from initial full-time education, white ethnic background, and non-manual status were also predictors for this type of learning. However, females were more likely than males to engage in non-vocational learning, and retired people were more commonly non-vocational learners than those in work.

Studies of vocational training in Britain, using the LFS and other sources, generally find that workers with higher levels of qualifications are far more likely to obtain training than those with lower qualifications or no qualifications. Green (1999), summarising 1997 LFS data, reports that some 23 per cent of workers with degree level qualifications had received training in the four weeks prior to the survey, and 20 per cent of those with A-level qualifications had received some training. Less than 10 per cent of workers with NVQ1 level qualifications, and a mere 4 per cent of those with no qualifications had received training on the LFS definition. These figures imply a real danger of what Green refers to as 'a chain of cumulative advantage' in the provision of training. Younger workers were also more likely to obtain training than their older colleagues (Hillage, 1996). Another area of concern is the difference in the incidence of training between large and small firms, with the provision of training in large firms far higher than among small firms (Green, 1999; Hillage, 1996). There is also some evidence that unionised firms are more likely to provide training than non-unionised firms. This most likely occurs via the voice that unions provide for employees, and

also through union effects on worker tenure, rather than directly through the bargaining process (Green, 1999). Prior qualifications, firm size and unionisation appear to be the main sources of variation in the receipt of training, and variation by gender and employment status (full-time/part-time) is less marked. By the late 1990s a marginally higher proportion of women were receiving training than men, according to the LFS data, while slightly fewer part-time workers obtained training than full-time workers (Green, 1999).

## **2.5 The benefits of lifelong learning**

Although there are certainly hundreds, possibly thousands, of studies that evaluate the economic returns to years of schooling, analysis of the economic benefits that adult learners derive from investments in education and training has only begun to be undertaken very recently, and accordingly the literature is still very sparse.<sup>3</sup>

In the UK, some research in this field was conducted for the Dearing Enquiry, and focused on the earnings of mature graduates (Steel and Sausman, 1997). This work attempted to compare the returns (both social and private) earned by mature graduates and those who graduated at the 'usual' age of 21. Social returns for male graduates averaged over all age groups were estimated at 6-8 per cent, compared to 7-9 per cent for males who had entered higher education at age 18. The gap in private returns was slightly wider, at 9-11 per cent for all entrants, compared to 11-13 per cent for 18-year-old males. The main conclusion of the research, then, was that rates of return for more mature graduates were lower than, but quite close to, those obtained by early graduates. The returns for mature graduates were lower because they had higher foregone earnings than 18-21 year-olds and less time in the labour market post-graduation. They were close to the estimates for 21-year-old graduates because most 'mature' graduates were still relatively young, often under 30 on entry into higher education (Steel and Sausman, 1997, pp 91-92).

More recent studies have continued to focus on the pay and career paths of mature graduates. A series of papers by Egerton explore these topics, drawing mainly on data from the General Household Survey (Egerton 2000a,b; 2001a,b). Egerton (2000a) analyses the pay differentials between men who obtained a degree at the conventional age, and men who obtained their degrees as mature students. Data were taken from the General Household Surveys (GHS) for the years 1983 to 1992. A mature graduate was defined as one who had

obtained a first degree after the age of 25, or who completed a higher degree after the age of 28. The sample consisted of 3,733 early graduate males and 616 mature graduate males, all in full-time employment and with good pay data (current net weekly earnings).

Mature male graduates earned more than those with A-levels but less than early graduates, over most of their graduate careers. More precisely, in the first years of their graduate careers, the mature graduates earned more than the early graduates, because of greater labour market experience, but after ten years in the labour market and beyond, early graduates earned more than mature graduates.

In an OLS wage equation with a dummy variable for mature graduate status, and a dummy to measure whether or not the individual had obtained a higher or professional degree, the initial estimate of the disparity between mature and early graduate net weekly earnings was  $-0.098$ , or about £31 per week in 1999 prices. Adding in work experience (and its square) reduced the disparity by about two-thirds but it was still significant at the 5 per cent level. Further variables to reflect father's social class and whether the degree-awarding institution was a university or polytechnic further reduced the income disparity, and it became statistically insignificant. Additional variables, including region and job characteristics (especially whether public or private sector) improved the fit of the equation and further reduced the differential between mature and early graduate pay.<sup>4</sup>

These results, then, show that mature male graduates earned less than early graduates. Lower mature graduate pay was explained by a number of factors. Social origin was important, with fewer mature graduates having a middle class background. The institution of education also mattered, since mature graduates had a higher probability of having attended a polytechnic (note that the study covers the period up to 1992). Other important variables were region, with the mature graduates more likely to be working outside the southeast, and employment sector, since mature graduates were much more likely to be working in the public sector.

Further analysis of the career paths of both male and female mature graduates, also using data from the GHS (Egerton, 2001a) revealed that mature graduates were more successful occupationally than those with just A-level or other sub-degree qualifications, but the probability that mature graduates worked in 'lower service' rather than 'higher service' jobs was significantly greater than for early graduates. Moreover, analysis of the changing

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<sup>3</sup> A survey article by Cohn and Addison (1998) with the promising title 'The Economic Returns to Lifelong Learning in OECD Countries' actually turns out to be a review of the schooling and youth training literature and contains very little information on the returns to adult learning.

proportions entering the finance/business sector and the welfare sector (health, education, social services) from the late 1950s through to the early 1990s, found that both male and female early graduates increasingly went into business/finance and became less likely to enter welfare services, while the opposite applied to mature graduates. So, mature graduates became more likely to enter the less well-paid segments of the labour market. Mature graduates are also likely to take longer to obtain work once they have graduated. This appears to be partly because they have lower mobility than younger graduates and partly because some employers, especially 'fast track' recruiters are unwilling to employ more mature graduates, although other sectors, notably the public sector and retailing welcome applications from older graduates (Pitcher and Purcell, 1998; Egerton, 2000a).

Egerton and Parry (2001) also utilise the GHS to obtain estimates of rates of return for both male and female mature graduates. Separate earnings equations were estimated for early graduates, mature graduates and matriculates (*i.e.* those with two A-levels or equivalent as their highest qualification). The control variables included social class, region, ethnicity and sampling year. Rates of return were then calculated as the differential in earnings between graduates and matriculates, minus the costs of study, discounted to net present value. The costs of study estimates assumed three years for completion of a degree course with foregone earnings at the level of matriculates, and allowing for any student subsidy such as maintenance grants. On this basis, mature male graduates had a rate of return of just 1.5 per cent over matriculates, while for mature women the figure was 5.6 per cent.<sup>5</sup> For men, the return was not sufficient to compensate for loan repayments, with the researchers estimating a loss in lifetime earnings of £9000 in 1987 prices. For women, on average, the return on their investment was estimated to be just sufficient to repay the costs of loans and tuition fees. However, for older women within the mature graduate group, with higher foregone earnings and less post-study years in the labour market, the investment in education would probably not be worthwhile in simple earnings terms.

Blundell *et al.*, (1997) used data from the National Child Development Study (NCDS) to examine the economic benefits of higher education in Britain. Details of the NCDS data can be found in the next section. Broadly, the NCDS is a longitudinal panel of people born in 1958. The research compared the earnings of those with A-level qualifications only with people who had completed higher education courses. Although the main focus of the study

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<sup>4</sup> These results do not control for any potential endogeneity bias.

<sup>5</sup> For comparison, Egerton and Parry's results show that male early graduates earned rates of return of between 6 and 10 per cent. Female early graduates earned returns of between 22 and 27 per cent.

was not mature students, a variable was included in some regressions to measure whether those who had started their first higher education course after the age of 21 earned different returns from those who completed higher education at a younger age.

Generally, large returns to higher education were found, of around 12 to 14 per cent for men and 22 to 34 per cent for women. Men who began their course at over 21 earned a return about seven percentage points lower, while starting late did not appear to have any detrimental effect on women's earnings. Since the cohort were only 33 at the time of the study, it is not possible to say whether these effects would persist over the rest of their working lives, nor do we know the consequences of getting a higher education qualification much later in life as opposed to just a few years late. Nonetheless, the results are interesting, and the difference between men and women is particularly striking. The contrast in the results obtained by Egerton and Parry compared to those of Blundell et al may partly be accounted for by differences in the ages of the people in their samples – all the individuals in the NCDS study were 33, while those in the GHS were a range of ages up to 61, partly by differences in the measurement of foregone earnings and by other differences of computation.

There appears to be little other UK work on this issue. Some UK research has looked at the extent of earnings gains among students taking and/or completing part-time degree courses. These studies have found earnings increases (relative to national average earnings and controlling for gender, age and other variables) for those undertaking part-time degrees at the Open University and other higher education institutions (Brennan *et al.*, 2000; Woodley and Simpson, 2001).<sup>6</sup> There is also some related work which examines the perceptions of adult learners about the benefits which they derived from their course of study – for more on this, see Hillage *et al.*, (2000).

## **2.6 International evidence on the benefits of lifelong learning**

There also appears to be very little research conducted in the rest of Europe or the United States on rates of return for adult learners. A paper by Leigh and Gill (1997) investigated the returns for American adults taking two or four-year college courses after the age of 25, in comparison to those who did the courses at a younger age. The data source was the National Longitudinal Survey of Youth (NLSY) through to the 1993 wave, when respondents had reached the ages of 28 to 35. The sample size was approximately 5,000. The researchers

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<sup>6</sup> The study by Brennan *et al.*, was commissioned by DfEE.



defined a dummy variable ADULT to represent returning adults (*i.e.* those doing their course over the age of 25), and essentially estimated an equation of the form:

$$\text{LnW} = a_0 + a_1\text{POSTSEC} + a_2(\text{POSTSEC}*\text{ADULT}) + a_3\text{X} + u$$

with POSTSEC representing post-secondary education, X a host of background variables, and the interaction term picking up whether the returns for adults differed from those of ‘continuing’ students, who did their course as part of initial education. In practice, the POSTSEC term shown here consisted of several variables representing different types of education (AA degrees, BA degrees, two-year non-degree courses, four-year non-degree courses).

The results obtained showed that, for males, two-year college programs gave higher returns to adults than to continuing students, although this result was significant only at the 10 per cent level. For AA degrees (these are two-year courses, usually undertaken at community colleges) there was no significant effect, while for BA degrees and four-year college courses, the returns for adults were lower than for continuing students. For females, the estimates of adult increments (*i.e.* the interaction term in the above equation) were generally small and/or insignificant with the exception of BA degrees, which were found to increase the wages of adult returners relative to continuing students (again at a 10 per cent level of significance).

There is also a sizeable literature on students obtaining the GED, or General Educational Development certificate. This certificate provides the main second chance for Americans who drop out of high school prior to graduation. Cameron and Heckman (1994) show that GED recipients do substantially less well in the labour market, in terms of earnings, than high school graduates. More tentatively they suggest that those with GED certification do somewhat better than ‘permanent’ dropouts. Subsequent analysis (Murnane *et al.*, 2000; Tyler *et al.*, 2000) has revealed that different types of GED recipients obtain varying benefits from certification. In these studies, obtaining a GED is associated with higher earnings at age 27 for those male dropouts who had very weak cognitive skills at school, as measured by maths test scores, but not those with stronger cognitive skills. The intuition for this result seems to be that dropouts with low test scores who later increase their skills are able to use the GED to signal this improvement to employers. By this means they are able to increase their earnings level well beyond that of permanent dropouts with similarly low school maths scores. There is also evidence that post-secondary education pays

off for GED holders as well as for high school graduates. However, in their sample, Murnane *et al.*, found that only some 8 per cent of GED recipients had completed two years of college by age 27.

In interpreting this evidence it should be noted that many of the people obtaining GED certification in these datasets are actually quite young when they do so, often in fact only a little older than those who complete high school and graduate in the conventional way. Studies of the outcomes of GED certification, then, only partially relate to adult learning.

A study by Hill (2001) focuses more specifically on the outcomes associated with learning by mature students. She used US data from the National Longitudinal Survey (NLS) Mature Women's Cohort to examine the labour market effects of education and training on women at pre-retirement ages. The cohort were first interviewed in 1967 when they were aged between 30 and 44, and they were followed up at various dates up to 1984, when the most senior of them were on the verge of retirement. The sample with pay data for 1984 consisted of some 3,422 women. Various waves of the survey asked about post-school-age education and training, and by 1984, 62 per cent of the women had one or more incidents of this ('usual schooling age' was defined as whatever age the respondent ceased going to school full-time). Broken down by type of training incident, 26 per cent had received formal education, 32 per cent on-the-job training, and 42 per cent other training.

A probit analysis found that several characteristics were significantly associated with the likelihood of receiving any of these types of education and training during the survey period; these included age, with older respondents obtaining less training. Those who had received education and training after leaving school but before 1967, and those at higher education levels were more likely to report education and training by all methods more frequently than less educated women.<sup>7</sup>

As for wage effects, Hill reports equations with the log of the 1984 wage level as the dependent variable, and including a Heckman selectivity model to control for the fact that not all women were working in 1984. Younger women, those with more work experience and women who lived outside the south tended to experience higher wages than other women. All types of training obtained at early ages (prior to 1967) were associated with higher wages in 1984. When occupational dummies were included, only those who received on-the-job training between 1977 and 1984 were found to obtain higher wages. The other education/training variables – formal education 1967 to 1984, and other training 1977 to 1984

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<sup>7</sup> These results included controls for work experience, marital status, and ethnic background.

– were not significant in the wage equation. However, when the occupational dummies were omitted, both education 1967 to 1984, and on-the-job training 1977 to 1984 were found to be significant, while other training remained insignificant. This may suggest that adult education pays off by enabling women to shift into better-paying occupations. An equation for the change in wages 1967 to 1984 again found that on-the-job training was significant, while other kinds of education/training were not. In general, Hill's results show that on-the-job training was strongly associated with higher wages and wage growth, while there was also some evidence for a positive relationship between adult education and wages.

A review of the literature on the economic benefits of vocational training by Barrett and Hovels (1998), which examined studies from both the United States and Europe, found that there were no papers reporting formal rates of return but a range of papers assessing the wage and productivity changes associated with vocational training. Generally, vocational training was found to have positive effects on wages and on productivity in most of the research surveyed, and there was some evidence that, for those employees changing jobs, training received from one employer increased productivity and wages with another employer also.

## **2.7 Summary**

The main conclusion must be that research on the economic returns to lifelong learning has only begun to be undertaken in the last few years, and that there is still a real shortage of work in this field. For the UK such studies as exist concentrate on the returns obtained by mature graduates. The evidence here shows that mature graduates do achieve higher earnings as a result of their studies. However, most available studies suggest that the returns to a degree for mature graduates are lower than for early graduates. Whether mature graduates gain sufficiently to make learning a worthwhile investment remains undecided, with one recent study suggesting that it may not be a good investment for many mature graduates, at least when returns are measured solely in income terms. There is an absence of work on the returns to other kinds of qualifications for adult learners in the British economy, and on learning that may not result in a qualification. In this paper we focus particularly on the former issue.

### 3. Methodology

In this paper we attempt both to explain participation in key types of lifelong learning, specifically participation which leads to a qualification, and to estimate the wage and employment returns to qualifications acquired in adult life, specifically between the ages of 33 and 42. Our exploration of the determinants of the decision to undertake lifelong learning is modelled using a probit model, where the dependent variable takes the value of one if the respondent acquired a qualification between 1991 and 2000, and zero otherwise. We then estimate OLS wage equations, where the dependent variable is log earnings in 2000, which we try to explain by (amongst many other factors) any qualifications acquired through lifelong learning between 1991 and 2000. We also estimate OLS equations for the change in real log earnings between 1991 and 2000, and investigate the impact of lifelong learning on the extent of this change in wages. As for the effect of lifelong learning on employment in 2000 this is modelled using probit models, where the dependent variable takes the value of one if the person is employed (in full- or part-time work) in 2000, and zero otherwise.

Note that, throughout the paper, we distinguish between a range of qualifications obtained between 1991 and 2000, but we do not attempt to allow for variations in the time elapsed since the lifelong learning qualification was obtained, *i.e.* we do not differentiate between an individual who got, say, an ‘A’ level in 1993 and someone who got their ‘A’ level in 1997. The returns to qualifications which we estimate will therefore be averages, in terms of time elapsed, over the period 1991 to 2000. Not taking account of the time elapsed since obtaining the lifelong learning qualification may bias results. Assume, for example, that the benefits of lifelong learning only become apparent five years after acquiring the qualification. Then if in our sample, most qualifications were acquired early in the period (close to age 33) the benefits of these qualifications will be quite obvious. If however, most qualifications were acquired close to the end of the period (age 42), then we may not be able to measure any apparent benefit. Our approach is a convenient simplification, given the data currently available, but the time elapsed since obtaining the qualification is an issue which we hope to explore further in future research.

A methodological issue that must be faced is the question of endogeneity bias. As has been discussed in the literature (Blundell *et. al.*, 1999 and 2001; Card, 1999) standard OLS estimates of the wage returns to different qualifications may be biased. For example, estimates may be upward biased due to ability bias or downward biased due to measurement

error. Upward ability bias occurs if more able individuals, who would earn more as a result of being more able, also undertake more education. If one does not allow for their ability in a model of wages, some of the positive effects associated with education will actually be due to the greater inherent ability of the individual. In the context of our study, we are most concerned that individuals who undertake lifelong learning are not a random subset of the population. They may be more motivated and inherently more able, characteristics that may themselves increase individuals' wages and make them more likely to be employed. The bias may however, be in the opposite direction. For example, lifelong learning may be largely undertaken by those who missed out on adequate schooling first time around. Thus it may be the most disadvantaged individuals who undertake lifelong learning, and they may have other characteristics that depress their employment prospects.

To overcome the potential endogeneity of lifelong learning we use two separate strategies. Firstly, we attempt to adequately control for factors that influence both the likelihood of undertaking lifelong learning *and* also an individual's employment prospects. Using the extremely rich NCDS data, we condition for a large number of individual characteristics in our wage and employment equations, thus attempting to control for all factors that determine wages, other than lifelong learning itself, that are either observable or well proxied by observable variables. We also attempt to allow for heterogeneity in our modelling. We extend the basic OLS model to allow interactions between a person's characteristics and their participation in lifelong learning. Specifically, we investigate whether the wage return to lifelong learning varies according to the initial education level of the individual. Previous work has also suggested that these ability interactions are likely to be particularly important. For example, Dearden *et al.*, (2000) showed that certain vocational qualifications had a higher pay off for lower ability individuals.

Our second strategy to overcome the potential problem of endogeneity of the lifelong learning variables is to use a first difference equation. This utilises the panel nature of the NCDS data, to allow for unobservable but fixed characteristics. Basically the strategy is to estimate the effect of lifelong learning on the change in wages between 1991 and 2000. If an individual is inherently more able and therefore likely to both earn more and undertake lifelong learning, this unobserved ability is assumed to be the same in 1991 and 2000. By focusing on the effect of lifelong learning on the *change* in wages between these two dates, any unobserved fixed characteristics cancel themselves out. Suppose that the earnings of individual  $i$  at time  $t$  ( $y_{i,t}$ ) can be written as

$$y_{i,t} = a \cdot f_i + b \cdot x_{i,t} + c \cdot e_{i,t} + u_i + v_{i,t}, \text{ for } t=\{1,2\}$$

Here earnings depend on observable characteristics that are fixed ( $f_i$ ), for example gender; observable characteristics that may change ( $x_{i,t}$ ), such as sector of work; a person's education level ( $e_{i,t}$ ) which may change over time (lifelong learning). The final two components of the model are unobserved characteristics, with  $u$  representing an individual fixed capacity to obtain earnings and  $v$  an unobserved source of heterogeneity across individuals and time which is unrelated to any of the other variables.

The individual specific unobservable components (the  $u_i$  terms) are likely to be correlated with the observable characteristics we want to include as regressors. For example, some dimensions of unobserved ability will affect earnings and may also be related simultaneously to factors such as parental background information and job characteristics that we do observe. The first differencing technique takes care of this since all the fixed factors drop out of the equation. By first differencing, we obtain an expression for the changes in earnings throughout the period.

$$y_{i,t} - y_{i,t-1} = b \cdot (x_{i,t} - x_{i,t-1}) + c \cdot (e_{i,t} - e_{i,t-1}) + (v_{i,t} - v_{i,t-1})$$

This equation satisfies the assumptions required for OLS estimates to be consistent. Under the assumptions that the changes in educational attainment (through lifelong learning) and the changes in other observable time varying characteristics (such as marital status) are not correlated with changes in unobservable characteristics, we can obtain more reliable information on the effects of lifelong learning on an individual's earnings than by simply using the level of earnings in 2000.

However, it is worth noting that this method also has some disadvantages. Firstly, the effects of any fixed observable variables are not identified, as they will be dropped from the expression after first differencing. Secondly, standard errors will be larger and the statistical significance of the estimates considerably reduced when the sample size is small.

Another analytical technique that we utilise in this paper is the matching approach. Ideally, we wish to compare the earnings of individuals who do not undertake lifelong learning with the earnings of the same individuals if they were to undertake lifelong learning. However, we can only observe the earnings of a particular individual with or without lifelong learning, not both. Matching methods are an alternative way to identify this hypothetical difference in earnings between those with and without lifelong learning. Each individual who has undertaken lifelong learning is matched to an otherwise extremely similar individual who has not undertaken lifelong learning. Their earnings are then compared and the difference attributed to lifelong learning. Individuals can be matched on each individual characteristic, such as ability, gender, ethnicity etc. Alternatively, as here, one can model the likelihood or propensity of an individual to undertake lifelong learning. Each individual who has not undertaken lifelong learning is then assigned a propensity score and matched with an individual with a similar score who has undertaken lifelong learning. Again, the difference in their earnings is attributable to lifelong learning.

Other methods to overcome the potential endogeneity of lifelong learning include the use of instrumental variables and other techniques summarised in Blundell *et al.*, (2001). Some proved impossible with our data. For example, we were unable to find instruments that satisfied the necessary statistical criteria; *i.e.* we could not identify factors that influence the propensity to undertake lifelong learning but do not influence earnings. However, future work on this issue would need to explore the endogeneity issue further.

#### **4. Data**

Most of the data used in this paper come from the National Child Development Study (NCDS). The NCDS is a continuing longitudinal survey of people living in Great Britain who were born between 3 and 9 March 1958. Members of the NCDS cohort have been interviewed six times, the last full survey having been undertaken in 2000 when the cohort

members were 42 years of age. A description of the samples obtained from each of these surveys is given in Table 1<sup>8</sup>.

We focus particularly on changes in individuals' academic and vocational qualifications that occurred between the 1991 sweep of the NCDS (age 33) and the 2000 survey (age 42). Hence our definition of lifelong learning is largely determined by the nature of the NCDS data and is based on whether an individual acquired a qualification between sweeps 5 and 6 of the NCDS survey.

The huge advantage of using the longitudinal NCDS data is the richness of the information held about each cohort member, which includes their ability at the age of 7 (scores on tests taken in reading and mathematics), school and family background variables (parents' interest in child's education, parents' education, father's social class, indicators of financial difficulties and type of school). This array of data enables us to be more successful in separating out the effect of lifelong learning on labour market outcomes from the effect of other factors, such as early ability and initial education levels.

We investigate the impact of lifelong learning that occurred between 1991 and 2000 on the individuals' employment outcomes in 2000, namely their wages and likelihood of being employed. In addition, we are able to use labour market information from the 1991 survey to estimate a first difference equation (see below) and check the robustness of our results. We drop from our sample self-employed individuals, those with missing observations on wages in 1991 and 2000, those who did not sit ability tests at the age of 7 and those with missing data on their qualifications. We also drop individuals who are in full-time education. This yields a sample of 5127, although in most of the wage equations, due to missing data on the explanatory variables, the sample is just 4382 (2378 males and 2004 females). For the estimates of employment effects we looked separately at a sample of 4,941 people who were in the labour market in 1991, and at a sample of 1,633 who were out of the labour market in 1991.

In order to explore the impact of lifelong learning, we first coded the qualifications acquired between the ages of 33 and 42 using the official National Qualifications Framework, which distinguishes three types of qualifications, each with five levels. The categories used are shown in Table 2.<sup>9</sup> Although this framework produces a large number of different

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<sup>8</sup> Attrition from the NCDS (up to sweep 5) and the possible bias that may result are discussed in Ferri (ed.), (1993).

<sup>9</sup> This coding is based on the National Qualifications Framework developed by the Department for Education and Skills and the Qualifications and Curriculum Authority. Qualifications not formally assigned to the



categories, it has the advantage of more precisely identifying the type of qualification acquired. This proved very useful in understanding our estimation results.

Table 3 reports the numbers obtaining qualifications within each category. Although only small numbers of individuals took each specific category of qualification, overall, as much as one third of the cohort acquired a qualification of some description during the 1991-2000 period. In the raw data 31 per cent of males and 37 per cent of females in the sample undertook lifelong learning, according to our definition. Our estimates are somewhat lower than the results of both the NIACE and NALS surveys. Recall however, that, compared to those surveys, the definition of lifelong learning being applied here is relatively narrow, namely that an individual acquired a recognised qualification between the ages of 33 and 42.

Most qualification-oriented lifelong learning led to occupational qualifications, rather than academic or vocationally related qualifications. In particular, 16 per cent of the sample obtained occupational qualifications at level one of the framework. These include NVQ level one, lower level RSA qualifications and other low level qualifications such as Pitmans level one and HGV licences. Some 7 per cent of the sample obtained occupational qualifications at level two, which include City and Guilds part one and NVQ level two qualifications.

Relatively small numbers took academic qualifications between the age of 33 and 42, the exception being the approximately 200 respondents (4 per cent of the sample) who undertook a degree. Even fewer cohort members obtained vocationally related qualifications such as BTEC diplomas and GNVQs.

Other descriptive statistics are given in Table 4, although it is noteworthy that most of the variables (such as mean wages) do not differ significantly between the group that undertook lifelong learning and the group that did not. However, those who undertook lifelong learning between 1991 and 2000 were more likely to be in full time employment, particularly amongst women. Those undertaking lifelong learning did appear to have higher levels of initial qualifications, an issue we explore in more detail in the next section. We did not find statistically significant differences in the ability or social class of the group who undertook lifelong learning and the group that did not. This is encouraging in that it hints that ability bias may not be a major issue, although this hypothesis is tested rigorously below.

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Framework were aligned with their nearest equivalent. Advice on how best to do this was received from individuals in the DfES, the QCA and City & Guilds, and is gratefully acknowledged.

## 5. Participation in Lifelong Learning

### 5.1 Who is undertaking lifelong learning?

Table 5 shows the results of modelling the decision to undertake lifelong learning, (defined as throughout the paper as learning between the ages of 33 and 42 and leading to a qualification). The model is a standard probit, and the table shows the marginal effects of each variable on the probability of undertaking lifelong learning, as we have defined it. Initially, we estimated the model for males and females combined (Table 5), before showing results separately for each gender (Tables 6 and 7). Our basic estimation strategy was to start by considering the effect of a person's initial qualification level (*i.e.* up to age 33) on the likelihood of that person undertaking lifelong learning between the ages of 33 and 42. Then we sequentially added various background factors to the model. Specifically, we added variables describing the person's attainment in mathematics and reading at age 7, the type of school they attended, their parents' own education and social class, as well as their parents' interest in their child's education. Lastly we added three variables describing the labour market position of the individual in 1991, *i.e.* their sector of work (public or private sector), size of firm and whether the respondent was a union member.

Column 1 of Table 5 indicates that initial education level is an important determinant of the likelihood of undertaking a further qualification as an adult<sup>10</sup>. The base case in this equation is having no initial qualifications. Generally the higher the level of qualification in 1991, the more likely a person is to undertake lifelong learning. This, along with the descriptive statistics in Table 3, suggest that a significant proportion of lifelong learning can be characterised as more educated individuals undertaking occupationally related qualifications, perhaps partially funded by their firms<sup>11</sup>. However, among the post-school qualifications obtained prior to 1991, while vocational qualifications generally have a significant effect of raising the probability of engagement in lifelong learning, surprisingly

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<sup>10</sup> Note however the overall low predictive power of this equation. We were unable to explain a lot of the variation in the decision to undertake lifelong learning.

<sup>11</sup> As yet we have no hard evidence on the extent to which lifelong learning is funded by employers (either directly or indirectly by allowing time off for study). However, most lifelong learning in the NCDS does appear occupationally related and is focused on the types of courses that are often partially funded by employers. Further work is needed on this issue.

having obtained a degree does not appear to have any positive effect on lifelong learning. Females are six percentage points more likely to undertake lifelong learning<sup>12</sup>.

These results remain robust when a myriad of background factors are added to the model. By and large family background and type of school attended do not have an effect on whether someone undertakes lifelong learning (column 2 Table 5). Reading attainment (assessed at age 7) also does not make a significant difference to the probability of an adult acquiring a qualification. However, mathematical attainment at age 7 does seem important. For example, those in the top quintile of mathematical attainment at age 7 have a 5 percentage point higher probability of undertaking lifelong learning. This is consistent with the view that it is the more educated and able workers that are undertaking lifelong learning, rather than those who missed out on school qualifications the first time around.

Parental interest in the child's education also appears to have an impact, although interpreting these results is difficult. Specifically, children whose fathers had some interest in, or who were very interested in, their education (as compared to those with fathers who were not interested) are *less* likely to undertake lifelong learning. Yet children with mothers who had some interest in their child's education (as compared to none) are more likely (by 4 percentage points) to undertake lifelong learning.

Lastly, in column 3 of Table 5, we added sector, firm size and union variables. The data tell us about whether a worker was in the private or public sectors, a large or small firm, and a unionised or non-unionised environment in 1991 and in 2000, but not in the intervening period. Clearly, many workers will have changed jobs between 1991 and 2000, and some of them will have done so before they obtained their lifelong learning qualifications. Hence using the data from 1991 on sector, firm size, and union environment is an imperfect measure of where workers were located when they did their lifelong learning. Future research will attempt to construct work histories, which will provide better measures, but for the moment the 1991 data are the best available and we utilise them. Bearing these caveats in mind, the results suggest that individuals who worked in a large firm (more than 500 workers) in 1991, and those who were union members, were around 6 percentage points more likely to acquire a qualification between the ages of 33 and 42. Those working in the public sector in 1991 were three percentage points more likely to have obtained qualifications between age 33 and

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<sup>12</sup> This finding contradicts evidence from NIACE (Sargant *et al.*, 1997) and possibly some of the evidence from NALS (Beinart and Smith, 1998). In the NALS females were less likely to undertake vocational learning but more likely to undertake non-vocational learning.

age 42. Again, this evidence is consistent with more educated/able workers who work in large unionised and/or public sector firms undertaking more occupationally related training.

Tables 6 and 7 show similar models, for males and females separately. For males (Table 6), it is school qualifications that have the largest apparent impact on the decision to undertake lifelong learning<sup>13</sup>. Attainment at age 7 (in mathematics or reading) does not seem to matter. Most of the family background variables are insignificant, although men from a semi-skilled manual background are actually less likely (by 10 percentage points) to undertake lifelong learning, as compared to the comparator group - those whose parents were unskilled. For males, having a father who was very interested in their child's education has a negative effect on the probability of lifelong learning. However, the most consistently significant variables in the model for males, other than school qualifications, are firm size and union membership in 1991. Males who were in large firms in 1991 and who were union members in 1991 are 5 percentage points more likely to acquire a qualification later in life. Male public sector workers are 4 percentage points more likely to undertake lifelong learning, although this is only significant at the 10 per cent level.

For females (Table 7), school qualifications are extremely important. Indeed school qualification levels have a bigger impact on the likelihood of lifelong learning for women. Some post school qualifications also have a big positive impact on the likelihood of undertaking lifelong learning. Mathematical attainment at age 7 is also an important determinant for women (but not for men). Women from higher social classes are also more likely to undertake lifelong learning. The parental interest variables are confusing to interpret for women. Some fatherly interest in a respondent's education seems to have a negative effect, as does having a mother who expects too much of her daughter, in terms of education. Once again firm size and union membership in 1991 have a large positive impact (7 percentage points) on the likelihood of undertaking lifelong. Sector of work (again as measured in 1991) does not matter for women.

## **5.2 Repeat spells of lifelong learning**

The issue of repeat spells of lifelong learning was also investigated. We wanted to test whether an individual who undertakes some lifelong learning is likely to come back for more. We modelled this as a zero/one binary choice. Table 8 shows the results from a probit model

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<sup>13</sup> This is consistent with evidence from both NIACE and NALS (Sargant *et al.*, 1997; Beinart and Smith, 1998).

where the dependent variable is equal to one if the person is a current learner (on a course leading to a qualification), and zero otherwise. All coefficients are given as marginal effects. About 11 per cent of the sample are current learners. Slightly fewer males are current learners (10 per cent), as compared to women (12 per cent).

Obviously many factors determine whether an individual undertakes lifelong learning, as we discussed earlier in this section. However, we are most interested in the impact of prior lifelong learning on current lifelong learning. We therefore include a dummy variable indicating whether the person acquired a qualification between 1991 and 2000, *i.e.* our usual lifelong learning variable. Hence the model tests the impact of acquiring a qualification between 1991 and 2000 on the likelihood of being a learner in 2000. The model also allows for whether the person has failed a qualification *as an adult*, as well as their initial education level (in 1991), gender, ability at age 7, school type, parental education and social class, parental interest in the respondent's early education, whether (in 2000) the worker is employed in a large firm, is a union member and works in the public sector.

The results are consistent for males and females.<sup>14</sup> A person who acquired a qualification between 1991 and 2000 was 11 percentage points more likely to be a learner in 2000. Individuals who failed a qualification during the same period were three percentage points less likely to be a current learner. Of the other explanatory variables, school qualification levels remain important for women only. The higher the level of the woman's school qualifications, the more likely she was to be a learner in 2000, even after controlling for the effects of lifelong learning in the 1991 to 2000 period. For males in particular, firm size, union membership and sector of work are important determinants of being a learner. Specifically men who worked in a large firm or who were union members in 2000 were 3 percentage points more likely to be a current learner. Males in the public sector were four percentage points more likely to be a current learner. For women these variables were not significant.

### **5.3 Summary**

In general how well a person does at school does determine the likelihood of them acquiring a qualification later in life, particularly for women. The more qualified you are when you leave school; the more likely you are to go back to learning and obtain another qualification.

Women are also, on average, more likely to return to learning later in life. Most family background factors do not have a large impact on the probability of acquiring qualifications late in life, although more able women (as measured by mathematical attainment at age 7) are more likely to undertake lifelong learning. However, it is the nature of the person's employment that seems to be particularly important in determining whether they acquire qualifications later in life. Working for a large firm, being a union member and being in the public sector all make it more likely that someone will gain a qualification as an adult. This might be because larger, unionised and public sector organisations are more likely to fund adult learning, or at least give workers time off to study. It may also be related to the greater likelihood of large firms to offer, and to utilise, formal occupational qualifications. These issues require further investigation. Our results also show that having undertaken lifelong learning in the past has a positive and substantial effect on the probability of being a current learner.

Some caution is required. The equations in Tables 5-7 might seem to imply that lifelong learning, at least in the 1990s, was about improving the occupational skills of the most educated, rather than a means of giving a second chance for those who missed out educationally first time around. However, the model does not explain a great deal of the variation in individuals' likelihood of undertaking lifelong learning. Certainly further work is needed to try to explain the motivation behind individuals' decisions to undertake lifelong learning.

## **6. The Effects of Lifelong Learning on Wages**

### **6.1 Wage equations**

Table 9 gives results from standard OLS wage regressions. The dependent variable is log wages in 2000, and we attempt to explain earnings at age 42 by a number of factors, including whether the person has undertaken lifelong learning between age 33 and age 42. The base case is someone who undertakes no lifelong learning during this period *i.e.* we are comparing the wage levels of those undertaking lifelong learning with those who do not, and, as before, sequentially adding in controls for a range of other factors. We start by

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<sup>14</sup> They are also consistent with other studies which adopt different definitions of lifelong learning to the one

considering males and females together<sup>15</sup>. Column 1 presents the results from a model that only includes gender and a series of lifelong learning dummy variables indicating the specific qualifications (see Table 2) acquired by the individual between 1991 and 2000.

The results confirm, in line with the rest of the literature, that females are, on average, paid nearly 40 per cent less than males. However, it is the lifelong learning variables that are of primary interest. Interestingly those acquiring academic level 1 qualifications (CSE or equivalent) between 1991 and 2000 actually earn 40 per cent less than those who do not acquire any qualifications at all. Note however, that this specification does not attempt in anyway to control for any other factors influencing wages. Hence it may be that individuals who take these low-level academic qualifications have other characteristics that make them low paid, such as innate ability or different prior work histories. Acquiring academic level 4 and 5 qualifications as an adult is associated with sizeable raw wage premiums, namely 13 per cent and 38 per cent respectively.

Low level vocationally related qualifications, *e.g.* foundation GNVQ, appear to yield a positive wage premium (27 per cent), although the number taking this category of qualification is so small (only six individuals) that no secure generalisations can be advanced. Those taking vocationally related level 2 qualifications (*e.g.* BTEC first certificate) actually earn 10 per cent less than those who take no qualifications. Lower level occupationally related qualifications (such as NVQ1 and NVQ2) yield a negative wage premium, whilst higher-level occupational qualifications (such as NVQ4 and professional qualifications at NVQ5) yield sizeable 12 per cent and 19 per cent wage premiums respectively.

These results however, do not control for the numerous other factors that influence earnings. Column 2 adds prior qualification level to the model, *i.e.* qualifications held in 1991. Prior qualification levels are very important determinants of earnings, as one would expect. However, here we focus only on the effect on the lifelong learning variables from adding these prior qualifications to the model. Basically, the magnitude of some coefficients on the lifelong learning variables is reduced. In particular, higher-level academic qualifications yield only a 5 per cent wage premium (level 4) and a 13 per cent wage premium (level 5) respectively. Thus some of the high wage premium associated with high

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used here – for example the most recent NIACE survey (Aldridge and Tuckett, 2001).

<sup>15</sup> In this preliminary work, we have not allowed for the selectivity of women in the labour market. However, it is possible that women who are observed in work in 2000 are not representative of the entire female NCDS cohort. There may be factors that determine whether a woman works or is out of the labour market and these same factors may influence wages. Furthermore, in the context of lifelong learning, there may be domestic factors that simultaneously influence whether a woman works and whether she undertakes lifelong learning. This requires further investigation (see Section 7).

level *academic* lifelong learning is actually due to the fact that individuals who are already more educated tend to undertake this type of lifelong learning. The coefficients on the higher level occupationally related lifelong learning variables are also reduced in magnitude and remain significant only at the 10 per cent level.

Adding family background variables and early attainment variables to the model further reduces the effect of the lifelong learning variables (column 3 Table 9). Specifically, level 4 and 5 academic qualifications acquired as an adult now yield a 5 per cent (significant at 10 per cent level) and 12 per cent wage premium respectively. Academic qualifications at level 3 now appear to yield a negative and statistically significant earnings premium of some 15 per cent for those who undertake them. This result is quite surprising. It indicates that even allowing for the ability and initial education level of the worker, some lifelong learning appears not to 'pay off' in the labour market. This may be because workers who undertake these qualifications actually undertake them for reasons unrelated to their job, perhaps for their own enjoyment. Such workers may need to be in less stressful and demanding jobs (and may therefore be lower paid) in order to find the time to undertake lifelong learning for non-job related purposes. However, at present this is speculation and serves to underscore the difficulty of interpreting these results in the absence of contextual information about the individuals undertaking the qualifications, such as their work histories. Clearly further exploration of these matters is needed. Vocationally related level 1 qualifications continue to have a large positive effect (26 per cent) but the numbers taking this category of qualification are too small for one to be confident of this result. The positive wage premium associated with occupationally related level 4 and 5 qualifications is just 5 to 6 per cent (significant at the 10 per cent level only). These findings may suggest that some of the apparent value of lifelong learning is due, not only to more educated workers undertaking lifelong learning, but also to more able workers, and those with more positive family background factors being more likely to undertake late learning.

Lastly, in column 4 (Table 9), variables describing the person's current work are included, namely union membership, firm size and firm sector. These variables have been found to be important determinants of earnings (*e.g.* Hildreth, 1999; Green *et al.*, 1996; Rees and Shah, 1995; Choudhury, 1994). Furthermore, we found earlier that public sector workers are more likely to undertake lifelong learning. Since public sector pay is lower for other reasons, we need to allow for sector in our model. Only then can we be sure that we are identifying the wage effects of lifelong learning, as opposed to the (negative) wage effects of being in the public sector. Again, we only focus on the effect that adding these variables to



the model has on the lifelong learning variables. In fact although the sector, firm size and unionisation variables are clearly important, they do not have a major effect on the coefficients of other variables, including the lifelong learning variables. In this final specification, those acquiring low-level academic qualifications (level 1 – CSE or equivalent) still earn less (31 per cent) than those who do not do any lifelong learning at all. The puzzling negative effect of level 3 academic qualifications, discussed earlier, continues to hold.

By and large only those acquiring very high-level academic qualifications (level 5) earn a wage premium from their lifelong learning (11 per cent). Low-level occupationally related qualifications (NVQ1 and NVQ2) still result in a wage penalty (3 per cent and 8 per cent respectively). Higher-level occupational qualifications no longer yield a wage premium that is significant.

Tables 10 and 11 show results for males and females separately. In the final specification (Table 10 column 4), males who undertake academic level 1 qualifications (an admittedly small group) earn 60 per cent less than those who do no lifelong learning at all. The effect for women from this qualification is negative but insignificant. For women, acquiring an A-level (academic level 3 qualification) is associated with *lower* earnings (by 19 per cent). However, an academic level 4 qualification, *i.e.* a degree, boosts earnings by 7 per cent. For males, obtaining a GCSE Grade A\*-C boosts earnings by 15 per cent, as does obtaining an academic level 5 qualification, which also has a wage premium of around 15 per cent.

Comparing the results obtained for men and for women suggests that there are many similarities, but also some important differences. Level 1 vocationally related qualifications yield a premium for men and women of 31-32 per cent, although this result is not robust due to small numbers. Level 2 occupational qualifications (NVQ2) yield a *negative* wage premium of 11 per cent for men and 6 per cent for women, as compared to those who take no qualifications at all. Higher-level occupational qualifications do not pay off for men, and while level 4 occupational qualifications yield a positive significant premium (of 9 per cent) for women.

## 6.2 Interaction effects

Table 12 shows the effect on wages from interacting each individual's prior qualification level (*i.e.* in 1991) with a single dummy variable indicating whether the person undertook

lifelong learning between 1991 and 2000. This tests whether lifelong learning (crudely measured by a single dummy variable) yields a wage premium that varies with the person's initial level of education. Unfortunately sample sizes were too small to interact each lifelong learning dummy with each prior qualification variable. Three specifications are shown; males and females combined, males only and finally females only. In each model full account is taken of prior qualification level, early ability, family background, parental interest in the child, job characteristics in 2000 *etc.* The first overall lifelong learning variable attempts to measure the average effect of undertaking lifelong learning on wages. It is insignificant in all cases. In terms of the interactions, males who had a higher vocational qualification (HND) already in 1991 and who then undertook lifelong learning between 1991 and 2000 actually earn 18 per cent less than those who undertook no lifelong learning at all.

### **6.3 First difference equations**

In order to explore the endogeneity issue we estimated first difference equations, as discussed in the methodology section above. The results are shown in Table 13. The only explanatory variables that we include are the lifelong learning variables. This is because only factors that change over the period 1991 to 2000 should be included, such as education level<sup>16</sup>. Again the model is estimated for males and females combined, then separately for males and females.

For males, the vocationally related level one qualification is still yielding a positive and significant coefficient. This is consistent with our main results, namely that lifelong learning that results in a level one vocationally related qualification does boost earnings. However, tiny small sample sizes for this category (only six members of the whole sample took such a qualification) mean that this result is not at all robust. Again consistent with our main results, for males, occupational level one and two qualifications (which were taken by sizeable numbers of people in our sample) actually reduce earnings significantly. However, unlike our main results, we find no positive and robust earnings effect from lifelong learning for males at all, not even if the lifelong learning led to higher-level academic qualifications. This hints that the apparently positive effect from academic level five qualifications that we found in Table 10 may be because individuals with unobserved qualities that make them likely to earn more also are more likely to undertake this higher level lifelong learning.

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<sup>16</sup> Other factors may change too but we have not yet been able to code up the 2000 NCDS data to allow for other things that may also be changing over the period.

Women who undertake lifelong learning leading to academic level three (A-levels) or level five (higher degree) qualifications actually experience slower earnings growth over the period. The first of these findings is consistent with the results in our wage level regressions, but the results for academic level 5 is the reverse of that found in our wage level regressions. Generally the positive wage effects found in our main results do not hold up using this first difference specification. This leads to the suspicion that endogeneity bias may have generated some of the apparent wage gains from certain qualifications. Further investigation of this issue is needed, especially once we are able to look more closely at other observable life and work history variables that have not as yet been coded for the 2000 sweep of the NCDS data.

#### **6.4 Wage effects by educational attainment in 1991**

One potential problem with the estimates discussed in section 6.1 is that they do not control for actual work experience or job tenure effects on wages. Even though all the individuals in the NCDS sample are the same age, there will still be variation in the amount of work experience that they have obtained. At present, it is not possible to control for work experience or job tenure because the data are not yet available.<sup>17</sup>

We estimated wage regressions separately for each initial educational group, with the results shown in Table 14. This method helps to reduce the size of the bias created because we are unable to directly control for work experience or job tenure. Individuals with similar levels of initial education will have had similar amounts of time out of the labour market for study and will therefore have similar amounts of work experience. In addition, we are controlling for the fact that lifelong learning will have different impacts for individuals with a different educational attainment at the beginning of the period in which we are considering learning decisions. We can therefore interpret the estimates in Table 14 as the effect of a particular type of lifelong learning undertaken between 1991 and 2000 on a representative individual from a group with a given level of initial education and a typical career path until 1991. The initial educational groups used are individuals with no qualifications; those with CSEs; those with between two and five O levels; those with more than five O levels; those with A-levels; those with a degree/higher degree.

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<sup>17</sup> The construction of life histories for the NCDS cohort is a task intended to form part of the research programme of the CEE and WBL research centres in the near future.

When using this method the results are somewhat limited by sample sizes, which can affect the significance of estimates. To overcome this, we use more aggregate measures of lifelong learning. Firstly, we use indicator variables that take a value of one for each distinct type of lifelong learning between 1991 and 2000, namely, academic, vocationally related and occupational lifelong learning. A second alternative measure used simply indicates whether any lifelong learning took place during the period from 1991 to 2000 (this is reported in Table 15). All estimations also control for whether the individual is currently undertaking lifelong learning.

The estimates in Table 14 suggest that those with no qualifications obtain some earnings benefits from lifelong learning undertaken between 1991 and 2000.<sup>18</sup> In fact, for those with no qualifications, academic learning brings rewards, and the interaction terms in the equation imply that this effect is strongest for those with the higher maths attainment scores at age 7. The results suggest that those with the highest qualifications who have undertaken occupational or vocationally-related qualifications between 1991 and 2000 appear to obtain negative rewards for their efforts.

Table 15, which utilises a more aggregate measure of lifelong learning, also reports some effect of lifelong learning on earnings for those with no qualifications in 1991. Among those who had no qualifications in 1991, undertaking lifelong learning leading to a qualification between 1991 and 2000 delivered a wage premium of about 12 per cent, although this effect was only significant at the 10 per cent level. Lifelong learning did not have a significant impact on the wages of other groups, except for those with degrees/higher degrees. Here there appears to be a large negative effect associated with lifelong learning but positive effects for those in the upper quintiles of mathematical attainment at age 7. Since most of the people with a degree/higher degree are likely to be in the upper quintiles of maths attainment, this suggests that there is only a small net negative effect for those in this category undertaking lifelong learning, perhaps because the kind of courses taken by people with degrees in 1991 could well be recreational courses or PhDs which would not lead to increased earnings.

We also investigated the changes in earnings between 1991 and 2000 by the extent of educational attainment in 1991. The mean changes, comparing lifelong learners and those not engaged in lifelong learning are reported in Table 16. Generally the differences between

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<sup>18</sup> Note that we have included regional dummies (according where the individual lived in 1991) as additional controls in these equations. The base category for region is London.

the lifelong learners and those who did not participate in lifelong learning are quite small and mostly insignificant. The exceptions were that females with more than five 'O' levels who undertook lifelong learning had significantly faster wage growth than females with more than five 'O' levels who did not undertake lifelong learning, and males with higher degrees who engage in lifelong learning between 1991 and 2000 also had faster wage growth than males with higher degrees who were not lifelong learners in this period. Table 17 reports the impact of lifelong learning on wage changes in regression models for each level of educational attainment. The lifelong learning variables are generally insignificant in these equations, with the exception of those with CSEs in 1991 who were current learners in 2000.

Finally, we attempted to analyse the differences in wage growth between lifelong learners and non-participants in lifelong learning using a matching approach (Table 18). The intuition behind the matching estimator is that we would like to identify the effect of lifelong learning by comparing individuals who obtain some type of qualification with individuals who only differ from the former in terms of the learning outcome. It can be shown that, in many cases, it is sufficient to compare individuals (learners and non learners) who have a very similar propensity to be learners. The practicalities of this are that we firstly model the decision to undertake learning, as discussed in section 5 above, in order to obtain estimates of the probability of participating in learning for each individual. Then, for each learner in the sample, we try to match them with a comparable individual who did not undertake learning in the 1991 to 2000 period but who had a similar probability of participating given the information which we have on their other characteristics, such as family background, initial schooling, region and so on. Our assessment of the impact of learning is again based on the change in earnings between 1991 and 2000, comparing the matched learners and non-learners.

The results in Table 18 reveal that those people with no qualifications, people with more than five O levels, and people with degrees/higher degrees who had undertaken lifelong learning experienced wage growth of nine to 10 per cent more over the years 1991 to 2000 than their respective equivalents who had not participated in lifelong learning. However, these differences were not statistically significant for the groups with no qualifications or those with degrees, but were significant for the group with more than five O levels. There was no evidence that lifelong learners in any of the educational groups had experienced slower wage growth than people who had not undertaken lifelong learning.

## 6.5 Summary

The most encouraging finding of our analysis of the NCDS data was that those with no qualifications in 1991 who undertook lifelong learning leading to a qualification between 1991 and 2000 obtained higher earnings than those with no qualifications in 1991 who did not engage in lifelong learning (on this definition) between 1991 and 2000. Other evidence of positive effects of lifelong learning on wages was quite limited. However, for women, in the standard OLS wage equations, qualifications at academic level four (degree) did yield a sizeable wage premium. This is consistent with Blundell *et al.*, (1997) who found, also using the NCDS, that late acquisition of a degree did not penalise women, in terms of its impact on wages. Women also earned a wage premium of nearly 10 per cent for level four occupational qualifications (*e.g.* NVQ4). For males, only good GCSEs and very high-level academic qualifications (higher degree) generated a positive wage premium.

Caution needs to be applied however, for the following reasons. Firstly we found evidence of negative wage premiums from certain qualifications, which may undermine our results. It could be that less able individuals (who will earn less) are more likely to take certain qualifications late in life and that our ability measures are not adequate to deal with this problem. Secondly, our first difference equations and matching estimates generated very mixed results, again suggesting that endogeneity bias may be an issue.

## 7. Employment Effects of Lifelong Learning

Does lifelong learning have any impact on the probability of being employed? To answer this question, we first compared the likelihood of remaining in employment in 2000 for those people who were in employment in 1991, according to whether they had undertaken some lifelong learning in the intervening period. Tables 19 reports the results for men and women combined, while Tables 20 and 21 provide information about men only and women only respectively. The dependent variable is a dummy variable equal to one if the person is employed (full- or part-time) in 2000. We use a probit model and all the coefficients are estimated marginal effects. We follow the same strategy as for the wage regressions. We start by evaluating the raw effect of the lifelong learning variables on the probability of being employed in 2000. We then add variables indicating the individual's prior (1991) education

level (column 2) and then various family background measures (column 3 – as described in the previous section). In the sample 90 per cent are employed in 2000, although the employment rate is higher for men (94 per cent) than for women (86 per cent).

Table 19 provides weak evidence that individuals who have taken vocationally related level four qualifications later in life are more likely to be employed (by six percentage points – significant at the 10 per cent level). Otherwise all the lifelong learning variables are insignificant. When we look at men and women separately (Tables 20 and 21), lifelong learning has no impact on the likelihood of remaining in employment, regardless of the specification.

Table 22 models the likelihood of being in employment in 2000 for those individuals who were out of the labour market in 1991. Again, this is a probit model. There were just over 1,600 individuals in the NCDS sample who were not in the labour market in 1991, and most of these (over 1,300) were females. The estimates show that all kinds of lifelong learning, academic, vocationally-related and occupational, significantly raised the probability of women returning to the labour market in 2000, while occupational qualifications obtained between 1991 and 2000 increased the probability that men would return to the labour market. Having obtained qualifications at school, including CSEs, O levels and A-levels, also tended to increase the likelihood of returning to the labour market, for both men and women.

In summary, our main result is that there is quite compelling evidence that those who were out of the labour market in 1991 were able to use lifelong learning to help them in their transition into the labour market. However, undertaking lifelong learning did not have significant effects on the probability of remaining in employment in 2000 for those who were already in employment in 1991.

## **8. Conclusions and Ideas for Future Research**

Our research has uncovered strong evidence of employment effects from lifelong learning. Undertaking lifelong learning is associated with increases in the probability of being in the labour market in 2000 for those who were out of the labour market in 1991. This result applies for both men and women. We also found compelling evidence that learning leads to learning. Undertaking one episode of lifelong learning increased the probability of the individual undertaking more learning. Conversely failing a qualification as an adult was

associated with a lower probability of undertaking learning in the future. As for the earnings effects of lifelong learning, we found that, for those with no qualifications in 1991, people who undertook lifelong learning had faster earnings growth during 1991 to 2000 than those with no qualifications in 1991 who did not undertake lifelong learning in this period. Looking at results for the sample as a whole (rather than sub-groups) there was only limited evidence of associations between lifelong learning and higher earnings. For women, taking a degree or level 4 occupational qualifications (*e.g.* nursing, teacher training) later in life does appear to yield a wage premium. For males, only higher degrees yield a wage premium if taken as a mature student. However, these results were not robust to specification checks for endogeneity bias.

Our work has highlighted some important questions that require further investigation. Firstly, who is undertaking lifelong learning, and why, cannot be separated, at least from a research perspective, from the potential benefits of lifelong learning. Most individuals may acquire qualifications late in life for reasons that are not directly to do with bettering their labour market prospects. The motivation behind an individual's lifelong learning is critical therefore. Is the person undertaking a degree for his or her own enjoyment? Is he or she taking a health and safety course as a requirement of his/her job? In each case one might not expect an economic return from this type of lifelong learning. The fact that we found very little evidence of significant returns from lifelong learning may therefore be unsurprising. For most of the 1991-2000 period there were very few government programmes promoting lifelong learning to the disadvantaged/excluded as a means of improving their economic situation. It might well be the case that lifelong learning during this period was not used as a mechanism to reduce social and economic exclusion<sup>19</sup> but rather was undertaken for personal enjoyment or to serve the particular needs of companies. In each instance, one might not find the gains from lifelong learning in individuals' wage packets. Furthermore, we have focused very much on learning that results in a qualification. Future research needs to include broader definitions of lifelong learning, including lifelong learning that does not lead to a recognised qualification.

We therefore propose to continue our research in partnership with the DfES *Centre for the Wider Benefits of Learning*, which will enable us to investigate lifelong learning in a more holistic manner. We intend to consider other potential, non-economic, outcomes and to

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<sup>19</sup> We may be able to investigate this further using the British Cohort Study data, which is a panel of individuals born in 1970, since it covers a more recent period during which there was greater government promotion of lifelong learning.



try to understand the motivation behind the extensive amount of lifelong learning that is evident in the NCDS data. To do this we need to undertake the detailed work of constructing comprehensive work and personal event histories for each NCDS cohort member, using the latest 2000 NCDS survey. This will enable us to track domestic changes (children going to school, divorce *etc.*), work changes (a job move) and relate this to the likelihood of undertaking, and impact of, lifelong learning. For example, as noted earlier in the paper, we do not allow for the selectivity of women in the labour market. If women in particular make decisions to participate in the labour force simultaneously with decisions about lifelong learning, then detailed event histories are needed to untangle the modelling issues raised by this.

Even from the point of view of investigating the impact of lifelong learning on labour market outcomes, our study is not complete. The NCDS, by nature of being a cohort data set, does not enable us to test whether the return from a particular qualification differs according to the age the qualification is acquired. All the respondents in the NCDS are the same age and therefore one cannot make the necessary allowances for differences in labour market experience and time since the qualification was acquired, when comparing early and late learners. Future research might therefore focus, as we have done, on the wage premium associated with different qualifications acquired later in life, but using a mixed age sample. This would enable one to test whether someone who obtains a NVQ2 at the age of 18 and has two years labour market experience since acquiring the qualification earns a higher or lower return than someone who obtained the same qualification at the age of 35 and who also has two years experience after acquiring the qualification.

**Table 1: National Child Development Study (NCDS)**

<b>Sweep</b>	<b>Date of Survey</b>	<b>Age of Respondents</b>	<b>Sample Size</b>
Perinatal	1958	0	17,414
I	1965	7	15,468
II	1969	11	15,503
III	1974	16	14,761
IV	1981	23	12,537
V	1991	33	11,407
VI	2000	42	11,419

**Table 2: National Qualifications Framework**

<b>Level of Qualification</b>	<b>General (Academic)</b>	<b>Vocationally-related (Applied)</b>	<b>Occupational (Vocational)</b>
5	Higher Degree		NVQ level 5 <b>PGCE</b> Professional degree level qualifications
4	Degree HE Diploma	BTEC Higher Certificate/Diploma HNC/HND	<b>NVQ level 4</b> <b>Nursing/paramedic</b> <b>Other teacher training qualification</b> City & Guilds Part 4/Career Ext/Full Tech RSA Higher Diploma
3	A level AS levels Scottish Highers Scottish Cert of 6 <sup>th</sup> Year Studies	Advanced GNVQ BTEC National Diploma ONC/OND	NVQ level 3 City & Guilds Part 3/Final/Advanced Craft RSA Advanced Diploma Pitmans level 3
2	GCSE grade A*-C O levels grade A-C O levels grade D-E CSE grade 1 Scottish standard grades 1-3 Scottish lower or ordinary grades	Intermediate GNVQ BTEC First Certificate BTEC First Diploma	NVQ level 2 Apprenticeships City & Guilds Part 2/Craft/Intermediate City & Guilds Part 1/Other RSA First Diploma Pitmans level 2
1	GCSE grade D-G CSEs grades 2-5 Scottish standard grades 4-5 Other Scottish school qualification	Foundation GNVQ <b>Other GNVQ</b>	NVQ level 1 Other NVQ Units towards NVQ RSA Cert/Other Pitmans level 1 Other vocational qualifications HGV

**Table 3: Incidence of Lifelong Learning in NCDS**

Numbers obtaining Qualifications between ages of 33 and 42  
by National Qualifications Framework levels

	<b>Number</b>	<b>Percent</b>
Academic Level 1	12	0.23
Academic Level 2	105	2.05
Academic Level 3	58	1.13
Academic Level 4	201	3.92
Academic Level 5	84	1.64
Vocationally-related Level 1	6	0.12
Vocationally-related Level 2	88	1.72
Vocationally-related Level 3	58	1.13
Vocationally-related Level 4	65	1.27
Occupational Level 1	807	15.74
Occupational Level 2	353	6.89
Occupational Level 3	150	2.93
Occupational Level 4	229	4.47
Occupational Level 5	159	3.10
<b>Total Sample*</b>	<b>5127</b>	<b>100.00</b>

\*Note that individuals may acquire more than one qualification during this period.

**Table 4: Descriptives Statistics**

**Combined Sample**

**Wages**

	Non- Lifelong Learners			Lifelong Learners*		
	N of Obs	Mean	Std. Dev.	N of Obs	Mean	Std. Dev.
log wage 1991	3375	2.0266	0.4941	1734	2.0314	0.4722
log wage 2000	2975	2.16	0.553	1541	2.172	0.491

**Current Main Activity**

	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	Percent	N of Obs	Percent
f/t paid employee (30+ hrs)	2504	73.97	1317	75.65
p/t paid employee (lt 30 hrs)	535	15.81	254	14.59
unemployed seeking work	46	1.36	23	1.32
f/t education	3	0.09	24	1.38
government training scheme	3	0.09	2	0.11
temporarily sick/disabled	9	0.27	12	0.69
permanently sick/disabled	102	3.01	41	2.35
looking after home/family	162	4.79	54	3.1
wholly retired	3	0.09	3	0.17
other	18	0.53	11	0.63
Total	3385	100	1741	100

**Prior Qualifications**

Prior School Qualifications:	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
No prior school qualifications	440	13.45	114	6.80
CSE grade 2-5	515	15.74	212	12.64
< 5 O levels	1038	31.73	600	35.78
> 5 O levels	506	15.47	329	19.62
A levels	772	23.60	422	25.16
Total	3271	100.00	1677	100.00

**Prior Post-School Qualifications:**

	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
No prior post school qualifications	1730	52.89	779	46.45
Lower vocational	615	18.80	353	21.05
Middle vocational	256	7.83	145	8.65
Higher vocational	326	9.97	235	14.01
Degree	344	10.52	165	9.84
	3271	100.00	1677	100.00

**Ability Test Scores**

	Non- Lifelong Learners			Lifelong Learners		
	N of Obs	Mean	Std. Dev.	N of Obs	Mean	Std. Dev.
Age 7 test score -reading	2839	23.35505	8.946834	1456	25.09959	8.060108
Age 7 test score -maths	2839	22.0465	7.261109	1456	22.94025	6.687723

**Social Class of Origin**

Father's social class 1974:	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
Professional	138	4.08	77	4.42
Intermediate	478	14.12	285	16.37
Skilled non-manual	240	7.09	145	8.33
Skilled manual	1050	31.01	531	30.50
Semi-skilled Non-manual	37	1.09	18	1.03
Semi-skilled manual	330	9.75	137	7.87
Unskilled manual	1113	32.87	548	31.48
Total	3386	100.00	1741	100.00

\*Lifelong learners defined as those obtaining any qualification between 1991 and 2000

## Males

### Wages

	Non- Lifelong Learners			Lifelong Learners*		
	N of Obs	Mean	Std. Dev.	N of Obs	Mean	Std. Dev.
log wage 1991	1817	2.1979	0.4279	831	2.2262	0.3845
log wage 2000	1681	2.327	0.513	773	2.339	0.461

### Current Main Activity

	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	Percent	N of Obs	Percent
f/t paid employee (30+ hrs)	1698	93.09	777	92.94
p/t paid employee (lt 30 hrs)	13	0.71	8	0.96
unemployed seeking work	29	1.59	16	1.91
government training scheme	1	0.05	5	0.6
temporarily sick/disabled	5	0.27	2	0.24
permanently sick/disabled	56	3.07	4	0.48
looking after home/family	10	0.55	18	2.15
wholly retired	3	0.16	2	0.24
other	9	0.49	4	0.48
Total	1824	100	836	100

### Prior Qualifications

Prior School Qualifications:	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
No prior school qualifications	237	13.46	60	7.57
CSE grade 2-5	303	17.21	118	14.88
< 5 O levels	530	30.10	268	33.80
> 5 O levels	260	14.76	135	17.02
A levels	431	24.47	212	26.73
Total	1761	100.00	793	100.00

**Prior Post-School Qualifications:**

	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	Mean	N of Obs	Mean
No prior post school qualifications	857	48.67	351	44.26
Lower vocational	325	18.46	145	18.28
Middle vocational	214	12.15	123	15.51
Higher vocational	172	9.77	85	10.72
Degree	193	10.96	89	11.22
Total	1761	100.00	793	100.00

**Ability Test Scores**

	Non- Lifelong Learners			Lifelong Learners		
	N of Obs	Mean	Std. Dev.	N of Obs	Mean	Std. Dev.
Age 7 test score -reading	1534	22.80117	9.214214	702	24.21795	8.313547
Age 7 test score -maths	1534	22.17992	7.417841	702	22.95299	6.854036

**Social Class of Origin**

Father's social class 1974:	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
Professional	74	4.05	44	5.26
Intermediate	265	14.52	138	16.51
Skilled non-manual	150	8.22	61	7.30
Skilled manual	563	30.85	263	31.46
Semi-skilled Non-manual	17	0.93	9	1.08
Semi-skilled manual	180	9.86	64	7.66
Unskilled manual	576	31.56	257	30.74
Total	1825	100.00	836	100.00

\*Lifelong learners defined as those obtaining any qualification between 1991 and 2000



## Females

### Wages

	Non- Lifelong Learners			Lifelong Learners*		
	N of Obs	Mean	Std. Dev.	N of Obs	Mean	Std. Dev.
log wage 1991	1558	1.8269	0.4912	903	1.8522	0.4746
log wage 2000	1294	1.942	0.526	768	2.004	0.461

### Current Main Activity

	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	Percent	N of Obs	Percent
f/t paid employee (30+ hrs)	806	51.63	540	59.67
p/t paid employee (lt 30 hrs)	522	33.44	246	27.18
unemployed seeking work	17	1.09	7	0.77
f/t education	3	0.19	19	2.1
government training scheme	2	0.13	8	0.88
temporarily sick/disabled	4	0.26	23	2.54
permanently sick/disabled	46	2.95	52	5.75
looking after home/family	152	9.74	3	0.33
other	9	0.58	7	0.77
Total	1561	100	905	100

### Prior Qualifications

Prior School Qualifications:	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
No prior school qualifications	203	13.44	54	6.11
CSE grade 2-5	212	14.04	94	10.63
< 5 O levels	508	33.64	332	37.56
> 5 O levels	246	16.29	194	21.95
A levels	341	22.58	210	23.76
Total	1510	100.00	884	100.00

**Prior Post-School Qualifications:**

	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
No prior post school qualifications	873	57.81	428	48.42
Lower vocational	290	19.21	208	23.53
Middle vocational	42	2.78	22	2.49
Higher vocational	154	10.20	150	16.97
Degree	151	10.00	76	8.60
Total	1510	100.00	884	100.00

**Ability Test Scores**

	Non- Lifelong Learners			Lifelong Learners		
	N of Obs	Mean	Std. Dev.	N of Obs	Mean	Std. Dev.
Age 7 test score -reading	1305	24.00613	8.579829	754	25.92042	7.732344
Age 7 test score -maths	1305	21.88966	7.07205	754	22.92838	6.533612

**Social Class of Origin**

Father's social class 1974:	Non- Lifelong Learners		Lifelong Learners	
	N of Obs	%	N of Obs	%
Professional	64	4.10	33	3.65
Intermediate	213	13.65	147	16.24
Skilled non-manual	90	5.77	84	9.28
Skilled manual	487	31.20	268	29.61
Semi-skilled Non-manual	20	1.28	9	0.99
Semi-skilled manual	150	9.61	73	8.07
Unskilled manual	537	34.40	291	32.15
Total	1561	100.00	905	100.00

\*Lifelong learners defined as those obtaining any qualification between 1991 and 2000

**Table 5: The Determinants of the Decision to Undertake Lifelong Learning - Combined Sample**

*Estimated using probit model*  
*Dependent variable takes value of 1 if person has acquired a qualification between the ages of 33 and 42, zero otherwise.*

<u>Explanatory Variables</u>	<u>dF/dx</u>	<u>Robust Std. Err.</u>	<u>P&gt; z </u>		<u>dF/dx</u>	<u>Robust Std. Err.</u>	<u>P&gt; z </u>		<u>dF/dx</u>	<u>Robust Std. Err.</u>	<u>P&gt; z </u>	
Female	0.0564	0.0138	0.000 **	*	0.0565	0.0141	0.000 ***		0.0617	0.0145	0.000 ***	
<i>Prior School Qualifications:</i>												
CSE grade 2-5	0.0967	0.0302	0.001 **	*	0.0888	0.0306	0.003 ***		0.0870	0.0307	0.004 ***	
< 5 O levels	0.1621	0.0260	0.000 **	*	0.1504	0.0270	0.000 ***		0.1479	0.0271	0.000 ***	
> 5 O levels	0.1873	0.0299	0.000 **	*	0.1715	0.0321	0.000 ***		0.1631	0.0323	0.000 ***	
A levels	0.1701	0.0302	0.000 **	*	0.1576	0.0336	0.000 ***		0.1430	0.0338	0.000 ***	
<i>Prior Post-School Qualifications:</i>												
Lower vocational	0.0428	0.0186	0.019 **		0.0400	0.0187	0.030 **		0.0417	0.0187	0.024 **	
Middle vocational	0.0525	0.0273	0.050 **		0.0518	0.0276	0.056 *		0.0475	0.0276	0.079 *	
Higher vocational	0.0700	0.0236	0.002 **	*	0.0641	0.0236	0.006 ***		0.0504	0.0236	0.030 **	
Degree	-0.0208	0.0273	0.450		-0.0237	0.0276	0.395		-0.0250	0.0277	0.372	
<i>Maths attainment at age 7:</i>												
5th quintile (highest)					0.0517	0.0263	0.046 **		0.0489	0.0264	0.061 *	
4th quintile					0.0354	0.0248	0.149		0.0332	0.0249	0.178	
3rd quintile					0.0456	0.0249	0.063 *		0.0461	0.0250	0.061 *	
2nd quintile					0.0233	0.0242	0.330		0.0234	0.0243	0.332	
<i>Reading attainment at age 7:</i>												
5th quintile (highest)					0.0026	0.0276	0.926		-0.0003	0.0276	0.990	
4th quintile					0.0253	0.0265	0.337		0.0230	0.0266	0.383	
3rd quintile					0.0385	0.0260	0.135		0.0375	0.0261	0.146	
2nd quintile					0.0166	0.0254	0.511		0.0135	0.0254	0.594	

*Type of school 1974:*

Secondary modern	-0.0113	0.0191	0.557	-0.0110	0.0192	0.568
Grammar	-0.0168	0.0232	0.474	-0.0180	0.0232	0.442
Private	-0.0521	0.0335	0.133	-0.0522	0.0333	0.130
Other	-0.0736	0.0500	0.165	-0.0734	0.0504	0.170

*Parents' education:*

Father's years of edn	0.0072	0.0050	0.151	0.0077	0.0050	0.128
Father's edn missing	0.0672	0.0720	0.343	0.0703	0.0722	0.323
Mother's years of edn	-0.0037	0.0060	0.539	-0.0046	0.0060	0.444
Mother's edn missing	-0.0532	0.0730	0.475	-0.0618	0.0727	0.406

*Father's social class 1974:*

Professional/Intermediate	0.0188	0.0262	0.470	0.0223	0.0264	0.394
Skilled non-manual	0.0278	0.0317	0.375	0.0319	0.0319	0.311
Skilled manual	-0.0079	0.0234	0.736	-0.0102	0.0234	0.664
Semi-skilled non-manual	-0.0232	0.0691	0.740	-0.0229	0.0688	0.743
Semi-skilled manual	-0.0500	0.0289	0.093 *	-0.0503	0.0289	0.092 *
Bad finances 1969 or 1974	-0.0007	0.0193	0.971	-0.0021	0.0193	0.913

*Father's interest in education:*

Expects too much	0.0070	0.0681	0.918	0.0240	0.0694	0.727
Very interested	-0.0378	0.0216	0.083 *	-0.0386	0.0216	0.078 *
Some interest	-0.0546	0.0180	0.003 ***	-0.0508	0.0181	0.006 ***

*Mother's interest in education:*

Expects too much	0.0076	0.0474	0.873	0.0058	0.0473	0.902
Very interested	0.0159	0.0249	0.524	0.0159	0.0250	0.525
Some interest	0.0456	0.0215	0.033 **	0.0436	0.0215	0.042 **
Employed in large firm in 1991				0.0595	0.0173	0.000 ***
Union member in 1991				0.0575	0.0150	0.000 ***
Employed in private sector firm in 1991				-0.0335	0.0155	0.030 **

Number of observations	4951	4951	4951
Chi2 (8)	101.40	139.93	183.87
Log likelihood	-	-3098.50	-3073.92
	3117.6		
	3		
Pseudo R2	0.02	0.02	0.03

**Table 6: The Determinants of the Decision to Undertake Lifelong Learning - Males**

Estimated using probit model

Dependent variable taking value of 1 if person has acquired a qualification between the ages 16-19, zero otherwise.

Explanatory variables	Robust			Robust			Robust		
	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z
<i>Prior School Qualifications:</i>									
CSE grade 2-5	0.085	0.040	0.027 **	0.077	0.040	0.048 **	0.071	0.040	0.069 *
< 5 O levels	0.142	0.035	0.000 ***	0.123	0.036	0.001 ***	0.120	0.037	0.001 ***
> 5 O levels	0.151	0.041	0.000 ***	0.127	0.044	0.003 ***	0.123	0.044	0.004 ***
A levels	0.153	0.040	0.000 ***	0.128	0.045	0.003 ***	0.120	0.045	0.006 ***
<i>Prior Post-School Qualifications:</i>									
Lower vocational	0.020	0.026	0.446	0.017	0.026	0.520	0.021	0.026	0.414
Middle vocational	0.062	0.030	0.033 **	0.064	0.030	0.031 **	0.067	0.031	0.026 **
Higher vocational	0.012	0.033	0.717	0.005	0.033	0.889	0.011	0.033	0.736
Degree	-0.012	0.036	0.734	-0.021	0.036	0.561	-0.019	0.036	0.599
<i>Maths attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)				0.037	0.036	0.296	0.035	0.036	0.327
4 <sup>th</sup> quintile				0.013	0.034	0.693	0.009	0.034	0.793
3 <sup>rd</sup> quintile				0.014	0.034	0.676	0.012	0.034	0.729
2 <sup>nd</sup> quintile				0.014	0.033	0.666	0.012	0.034	0.715
<i>Reading attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)				0.035	0.038	0.349	0.033	0.038	0.381
4 <sup>th</sup> quintile				0.038	0.035	0.275	0.034	0.035	0.334
3 <sup>rd</sup> quintile				0.047	0.034	0.155	0.045	0.034	0.176
2 <sup>nd</sup> quintile				0.025	0.032	0.431	0.021	0.032	0.508
<i>Type of school 1974:</i>									
Secondary modern				-0.041	0.026	0.121	-0.041	0.026	0.125
Grammar				-0.041	0.031	0.196	-0.043	0.030	0.164
Private				-0.070	0.042	0.117	-0.069	0.042	0.123
Other				-0.087	0.063	0.204	-0.088	0.063	0.204
<i>Parents' education:</i>									
Father's years of edn				0.007	0.007	0.278	0.007	0.007	0.305
Father's edn missing				0.054	0.101	0.586	0.045	0.100	0.651
Mother's years of edn				-0.001	0.008	0.938	0.000	0.008	0.965
Mother's edn missing				-0.052	0.103	0.619	-0.047	0.103	0.658
<i>Father's social class 1974:</i>									
Professional/Intermediate				-0.019	0.035	0.595	-0.016	0.035	0.645
Skilled non-manual				-0.065	0.038	0.103	-0.063	0.038	0.112
Skilled manual				-0.034	0.032	0.295	-0.035	0.032	0.279
Semi-skilled non-manual				-0.006	0.096	0.951	-0.005	0.095	0.956
Semi-skilled manual				-0.097	0.036	0.013 **	-0.094	0.037	0.018 **
Bad finances 1969 or 1974				0.001	0.027	0.973	0.001	0.027	0.960
<i>Father's interest in education:</i>									
Expects too much				-0.093	0.071	0.235	-0.081	0.073	0.304
Very interested				-0.060	0.030	0.047	-0.060	0.030	0.047 *
Some interest				-0.034	0.025	0.176	-0.033	0.025	0.192
<i>Mother's interest in education:</i>									
Expects too much				0.114	0.065	0.067 *	0.111	0.065	0.072 *
Very interested				0.045	0.035	0.199	0.045	0.035	0.196
Some interest				0.040	0.030	0.170	0.040	0.030	0.178
Employed in large firm in 1991							0.054	0.022	0.015 **
Union member in 1991							0.045	0.020	0.025 **
Employed in private sector firm in 1991							-0.039	0.021	0.066 *
Number of observations									
	2554			2554			2554		
Chi-squared									
	29.17			58.97			78.11		
log likelihood									
	-1567			-1552			-1541		
Pseudo R2									
	0.009			0.019			0.026		

\*\*\*, \*\*, \* represent significant at 1%, 5%, 10% respectively.

**Table 7: The Determinants of the Decision to Undertake Lifelong Learning - Females**

Estimated using probit model

Dependent variable taking value of 1 if person has acquired a qualification between the ages of 16 and 24, and zero otherwise.

	Robust			Robust			Robust		
	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z
<i>Prior School Qualifications:</i>									
CSE grade 2-5	0.108	0.046	0.016 **	0.097	0.047	0.033 **	0.103	0.047	0.025 **
< 5 O levels	0.184	0.038	0.000 ***	0.174	0.040	0.000 ***	0.172	0.040	0.000 ***
> 5 O levels	0.224	0.043	0.000 ***	0.218	0.047	0.000 ***	0.205	0.047	0.000 ***
A levels	0.183	0.045	0.000 ***	0.180	0.051	0.000 ***	0.158	0.051	0.002 ***
<i>Prior Post-School Qualifications:</i>									
Lower vocational	0.061	0.027	0.020 **	0.060	0.027	0.025 **	0.061	0.027	0.022 **
Middle vocational	-0.037	0.061	0.554	-0.044	0.062	0.485	-0.056	0.061	0.377
Higher vocational	0.121	0.034	0.000 ***	0.118	0.034	0.000 ***	0.089	0.035	0.009 ***
Degree	-0.027	0.042	0.525	-0.016	0.044	0.714	-0.019	0.044	0.663
<i>Maths attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)				0.079	0.039	0.040 **	0.074	0.039	0.056 *
4 <sup>th</sup> quintile				0.065	0.036	0.072 *	0.065	0.036	0.072 *
3 <sup>rd</sup> quintile				0.085	0.037	0.020 **	0.089	0.037	0.014 **
2 <sup>nd</sup> quintile				0.033	0.035	0.336	0.036	0.035	0.296
<i>Reading attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)				-0.031	0.042	0.463	-0.036	0.042	0.389
4 <sup>th</sup> quintile				0.010	0.041	0.806	0.007	0.041	0.863
3 <sup>rd</sup> quintile				0.027	0.041	0.509	0.022	0.041	0.590
2 <sup>nd</sup> quintile				0.006	0.041	0.885	0.001	0.041	0.986
<i>Type of school 1974:</i>									
Secondary modern				0.021	0.028	0.449	0.022	0.028	0.428
Grammar				0.005	0.035	0.875	0.007	0.035	0.837
Private				-0.039	0.053	0.473	-0.041	0.053	0.450
Other				-0.054	0.079	0.507	-0.051	0.079	0.525
<i>Parents' education:</i>									
Father's years of edn				0.006	0.008	0.423	0.007	0.008	0.328
Father's edn missing				0.082	0.105	0.433	0.100	0.106	0.341
Mother's years of edn				-0.007	0.009	0.430	-0.009	0.009	0.323
Mother's edn missing				-0.061	0.106	0.574	-0.082	0.105	0.448
<i>Father's social class 1974:</i>									
Professional/Intermediate				0.065	0.039	0.096 *	0.069	0.040	0.078 *
Skilled non-manual				0.151	0.050	0.002 ***	0.157	0.050	0.001 ***
Skilled manual				0.022	0.034	0.530	0.017	0.034	0.616
Semi-skilled non-manual				-0.044	0.098	0.664	-0.038	0.099	0.706
Semi-skilled manual				-0.008	0.044	0.859	-0.012	0.044	0.789
Bad finances 1969 or 1974				0.003	0.028	0.910	-0.001	0.028	0.977
<i>Father's interest in education:</i>									
Expects too much				0.179	0.125	0.148	0.193	0.125	0.122
Very interested				-0.016	0.031	0.606	-0.017	0.032	0.584
Some interest				-0.082	0.026	0.003 ***	-0.076	0.027	0.005 ***
<i>Mother's interest in education:</i>									
Expects too much				-0.146	0.063	0.040 **	-0.143	0.063	0.047 **
Very interested				-0.016	0.036	0.647	-0.016	0.036	0.654
Some interest				0.052	0.031	0.097 *	0.049	0.031	0.120
Employed in large firm in 1991							0.072	0.027	0.007 ***
Union member in 1991							0.071	0.023	0.002 ***
Employed in private sector firm in 1991							-0.020	0.023	0.391
Number of observations	2394			2394			2394		
Chi squared	67.71			106.66			130.15		
log likelihood	-1542			-1521			-1508		
Pseudo R2	0.0217			0.0354			0.0434		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively

**Table 8: Determinants of Current Learning Activity***Estimated using probit model**Dependent variable takes value of 1 if person on a course leading to a qualification in 2000, zero otherwise.*

Explanatory variables	Combined Sample			Males			Females			
	dF/dx	Robust Std. Err.	P> z	dF/dx	Robust Std. Err.	P> z	dF/dx	Robust Std. Err.	P> z	
Female	0.008	0.010	0.376							
<i>Lifelong Learning Variables</i>										
Any qualification 1991 to 2000	0.106	0.011	0.000 ***	0.107	0.015	0.000 ***	0.100	0.016	0.000 ***	
Failed qualification 1991 to 2000	-0.027	0.009	0.003 ***	-0.025	0.012	0.042 **	-0.029	0.013	0.023 **	
<i>Prior School Qualifications:</i>										
CSE grade 2-5	0.034	0.025	0.148	-0.025	0.021	0.276	0.188	0.066	0.000 ***	
< 5 O levels	0.061	0.022	0.003 ***	0.020	0.023	0.379	0.154	0.046	0.000 ***	
> 5 O levels	0.061	0.028	0.014 **	0.016	0.028	0.543	0.174	0.061	0.001 ***	
A levels	0.065	0.028	0.010 ***	0.021	0.028	0.434	0.170	0.060	0.001 ***	
<i>Prior Post-School Qualifications:</i>										
Lower vocational	0.007	0.012	0.583	0.026	0.018	0.118	-0.010	0.017	0.562	
Middle vocational	0.004	0.017	0.795	0.021	0.019	0.237	-0.054	0.030	0.170	
Higher vocational	0.003	0.015	0.843	0.010	0.021	0.634	0.002	0.021	0.917	
Degree	0.013	0.019	0.471	0.004	0.022	0.844	0.026	0.032	0.388	
<i>Maths attainment at age 7:</i>										
5 <sup>th</sup> quintile (highest)	0.007	0.017	0.668	0.002	0.021	0.922	0.018	0.028	0.491	
4 <sup>th</sup> quintile	0.011	0.017	0.505	-0.006	0.020	0.774	0.035	0.027	0.167	
3 <sup>rd</sup> quintile	0.014	0.017	0.386	0.006	0.021	0.777	0.031	0.027	0.222	
2 <sup>nd</sup> quintile	-0.016	0.015	0.310	-0.017	0.019	0.398	-0.014	0.023	0.564	
<i>Reading attainment at age 7:</i>										
5 <sup>th</sup> quintile (highest)	0.004	0.018	0.830	0.016	0.026	0.522	-0.019	0.026	0.477	
4 <sup>th</sup> quintile	-0.006	0.017	0.743	-0.004	0.021	0.848	-0.017	0.025	0.503	
3 <sup>rd</sup> quintile	-0.018	0.016	0.290	0.006	0.021	0.791	-0.053	0.022	0.031 **	
2 <sup>nd</sup> quintile	-0.018	0.016	0.282	-0.006	0.019	0.759	-0.043	0.022	0.092 *	
<i>Type of school 1974:</i>										
Secondary modern	0.027	0.014	0.041 **	0.025	0.018	0.145	0.026	0.020	0.175	
Grammar	-0.006	0.014	0.674	-0.014	0.017	0.432	0.007	0.023	0.760	
Private	0.003	0.023	0.890	0.002	0.028	0.952	0.013	0.039	0.726	
Other	0.019	0.038	0.599	0.017	0.044	0.673	0.021	0.064	0.731	
<i>Parents' education:</i>										
Father's years of edn	0.002	0.003	0.584	0.004	0.004	0.227	-0.004	0.005	0.482	
Father's edn missing	0.052	0.052	0.284	0.074	0.078	0.276	0.017	0.071	0.800	
Mother's years of edn	-0.002	0.004	0.668	0.000	0.005	0.980	-0.003	0.006	0.586	
Mother's edn missing	-0.036	0.042	0.431	-0.038	0.053	0.517	-0.035	0.063	0.608	
<i>Father's social class 1974:</i>										
Professional/Intermediate	-0.008	0.016	0.608	-0.036	0.016	0.055 *	0.039	0.031	0.169	
Skilled non-manual	-0.020	0.018	0.297	-0.037	0.018	0.097 *	0.013	0.032	0.670	
Skilled manual	-0.011	0.015	0.450	-0.024	0.018	0.215	0.006	0.023	0.787	
Semi-skilled non-manual	0.013	0.051	0.788	0.009	0.060	0.876	0.021	0.084	0.791	
Semi-skilled manual	-0.001	0.020	0.976	-0.020	0.021	0.385	0.027	0.035	0.403	
Bad finances 1969 or 1974	0.016	0.014	0.226	-0.011	0.016	0.526	0.053	0.022	0.010 ***	
<i>Father's interest in education:</i>										
Expects too much	-0.027	0.035	0.498	-0.029	0.042	0.558	-0.025	0.055	0.681	
Very interested	0.015	0.015	0.300	0.012	0.019	0.524	0.015	0.022	0.470	
Some interest	0.027	0.014	0.036 **	0.011	0.016	0.491	0.046	0.022	0.024 **	
<i>Mother's interest in education:</i>										
Expects too much	0.020	0.032	0.521	0.005	0.035	0.880	0.034	0.057	0.510	
Very interested	-0.021	0.016	0.197	-0.024	0.019	0.229	-0.014	0.025	0.572	
Some interest	-0.032	0.013	0.021 **	-0.040	0.016	0.018 **	-0.016	0.021	0.465	
Union member in 2000	0.030	0.010	0.002 ***	0.028	0.012	0.022 **	0.025	0.016	0.100 *	
Employed in large firm in 2000	0.021	0.011	0.048 **	0.027	0.015	0.047 **	0.017	0.017	0.291	
Employed in public sector in 2000	0.027	0.011	0.015 **	0.044	0.017	0.004 ***	0.017	0.015	0.272	
Number of observations	4466			2415			2051			
Wald chi-squared	229.49			144.47			122.08			
Pseudo R-squared	0.0766			0.0939			0.0873			
Log likelihood	-1438.2			-714.33			-699.3			

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.

**Table 9: The Effect of Lifelong Learning on Wages - OLS Regression - Combined Sample**  
 Dependent variable is log hourly earnings in 2000

Explanatory Variables	Robust			Robust			Robust			Robust		
	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t
Constant	2.331	0.011	0.000 ***	1.974	0.020	0.000 ***	1.817	0.073	0.000 ***	1.773	0.073	0.000 ***
Female	-0.368	0.015	0.000 ***	-0.368	0.014	0.000 ***	-0.364	0.014	0.000 ***	-0.353	0.014	0.000 ***
<i>Qualifications since 1991 by NQF level</i>												
Academic Level 1	-0.388	0.120	0.001 ***	-0.337	0.135	0.013 **	-0.325	0.136	0.017 **	-0.307	0.132	0.020 **
Academic Level 2	0.049	0.044	0.271	0.067	0.044	0.126	0.067	0.043	0.124	0.063	0.043	0.141
Academic Level 3	-0.112	0.072	0.119	-0.146	0.064	0.022 **	-0.154	0.065	0.018 **	-0.152	0.064	0.017 **
Academic Level 4	0.125	0.030	0.000 ***	0.055	0.029	0.057 *	0.049	0.029	0.095 *	0.036	0.029	0.209
Academic Level 5	0.384	0.057	0.000 ***	0.134	0.057	0.020 **	0.121	0.056	0.031 **	0.109	0.057	0.055 *
Vocationally-related Level 1	0.274	0.075	0.000 ***	0.230	0.069	0.001 ***	0.263	0.061	0.000 ***	0.245	0.060	0.000 ***
Vocationally-related Level 2	-0.101	0.044	0.021 **	-0.075	0.044	0.087 *	-0.066	0.042	0.115	-0.073	0.041	0.073 *
Vocationally-related Level 3	-0.043	0.047	0.361	0.011	0.040	0.784	0.005	0.039	0.901	0.011	0.039	0.779
Vocationally-related Level 4	-0.022	0.045	0.625	-0.002	0.048	0.959	-0.002	0.050	0.969	-0.015	0.050	0.769
Occupational Level 1	-0.035	0.019	0.072 *	-0.032	0.018	0.066 *	-0.033	0.018	0.061 *	-0.033	0.017	0.051 *
Occupational Level 2	-0.137	0.024	0.000 ***	-0.074	0.024	0.002 ***	-0.076	0.024	0.002 ***	-0.084	0.023	0.000 ***
Occupational Level 3	0.008	0.038	0.829	0.024	0.035	0.506	0.032	0.036	0.367	0.032	0.035	0.363
Occupational Level 4	0.121	0.033	0.000 ***	0.055	0.031	0.071 *	0.053	0.031	0.084 *	0.039	0.030	0.187
Occupational Level 5	0.191	0.038	0.000 ***	0.067	0.038	0.074 *	0.060	0.037	0.108	0.051	0.036	0.160
<i>Prior School Qualifications:</i>												
CSE grade 2-5				0.143	0.025	0.000 ***	0.132	0.025	0.000 ***	0.121	0.025	0.000 ***
< 5 O levels				0.255	0.023	0.000 ***	0.223	0.024	0.000 ***	0.216	0.024	0.000 ***
> 5 O levels				0.411	0.027	0.000 ***	0.351	0.029	0.000 ***	0.337	0.028	0.000 ***
A levels				0.585	0.026	0.000 ***	0.499	0.029	0.000 ***	0.481	0.029	0.000 ***
<i>Prior Post-School Qualifications:</i>												
Lower vocational				0.011	0.017	0.512	0.005	0.017	0.769	0.009	0.017	0.584
Middle vocational				0.050	0.027	0.066 *	0.048	0.027	0.073 *	0.046	0.027	0.086 *
Higher vocational				0.156	0.021	0.000 ***	0.153	0.021	0.000 ***	0.150	0.021	0.000 ***
Degree				0.193	0.029	0.000 ***	0.165	0.029	0.000 ***	0.168	0.029	0.000 ***
<i>Maths attainment at age 7:</i>												
5 <sup>th</sup> quintile (highest)							0.090	0.025	0.000 ***	0.090	0.025	0.000 ***
4 <sup>th</sup> quintile							0.058	0.023	0.012 **	0.056	0.023	0.015 **
3 <sup>rd</sup> quintile							0.029	0.023	0.220	0.028	0.023	0.222
2 <sup>nd</sup> quintile							0.039	0.023	0.087 *	0.042	0.022	0.059 *
<i>Reading attainment at age 7:</i>												
5 <sup>th</sup> quintile (highest)							0.008	0.027	0.762	0.006	0.027	0.825
4 <sup>th</sup> quintile							0.026	0.026	0.319	0.022	0.026	0.390
3 <sup>rd</sup> quintile							0.031	0.025	0.205	0.027	0.024	0.274
2 <sup>nd</sup> quintile							0.020	0.024	0.394	0.016	0.023	0.506
<i>Type of school 1974:</i>												
Secondary modern							-0.003	0.019	0.860	0.001	0.018	0.949
Grammar							0.037	0.023	0.116	0.035	0.023	0.131
Private							0.115	0.037	0.002 ***	0.119	0.037	0.001 ***
Other							0.014	0.046	0.761	0.003	0.046	0.948
<i>Parents' education:</i>												
Father's years of edn							0.006	0.005	0.277	0.006	0.005	0.231
Father's edn missing							0.055	0.069	0.421	0.069	0.067	0.303
Mother's years of edn							0.007	0.006	0.262	0.007	0.006	0.250
Mother's edn missing							0.063	0.074	0.391	0.051	0.071	0.471
<i>Father's social class 1974:</i>												
Professional/Intermediate							-0.028	0.027	0.305	-0.026	0.027	0.323
Skilled non-manual							0.024	0.030	0.422	0.028	0.030	0.354
Skilled manual							-0.041	0.023	0.079 *	-0.040	0.023	0.081 *
Semi-skilled non-manual							0.033	0.087	0.707	0.022	0.087	0.801
Semi-skilled manual							-0.061	0.028	0.030 **	-0.060	0.028	0.031 **
Bad finances 1969 or 1974							-0.020	0.018	0.274	-0.021	0.018	0.257
<i>Father's interest in education:</i>												
Expects too much							0.043	0.075	0.569	0.036	0.073	0.623
Very interested							0.017	0.021	0.418	0.020	0.021	0.334
Some interest							-0.008	0.018	0.647	-0.007	0.018	0.694
<i>Mother's interest in education:</i>												
Expects too much							0.061	0.048	0.208	0.062	0.048	0.192
Very interested							0.029	0.024	0.228	0.029	0.024	0.221
Some interest							0.034	0.021	0.102	0.037	0.021	0.075 *
Union member in 2000										0.051	0.014	0.000 ***
Employed in large firm in 2000										0.160	0.016	0.000 ***
Employed in public sector in 2000										-0.026	0.016	0.101
Number of Observations	4382.000			4382.000			4382.000			4382.000		
R2	0.145			0.325			0.337			0.355		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.



**TABLE 10: Wage Regression - OLS Regression - Males**

Dependent variable is log hourly earnings in 2000

Explanatory variables	Robust			Robust			Robust			Robust		
	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t
constant	2.340	0.102	0.000 ***	1.965	0.025	0.000 ***	1.821	0.103	0.000 ***	1.798	0.104	0.000 ***
<i>Qualifications since 1991 by NQF level</i>												
Academic Level 1	-0.573	0.048	0.000 ***	-0.621	0.070	0.000 ***	-0.617	0.076	0.000 ***	-0.604	0.051	0.000 ***
Academic Level 2	0.151	0.081	0.063 *	0.115	0.080	0.152	0.159	0.081	0.049 **	0.150	0.081	0.063 *
Academic Level 3	-0.018	0.155	0.907	-0.093	0.125	0.459	-0.083	0.130	0.526	-0.084	0.128	0.509
Academic Level 4	0.048	0.047	0.304	-0.008	0.045	0.861	-0.027	0.046	0.560	-0.039	0.045	0.393
Academic Level 5	0.375	0.080	0.000 ***	0.153	0.080	0.056 *	0.158	0.078	0.042 **	0.149	0.077	0.054 **
Vocationally-related Level 1	0.241	0.094	0.011 **	0.182	0.044	0.000 ***	0.250	0.090	0.005 ***	0.324	0.077	0.000 ***
Vocationally-related Level 2	-0.094	0.062	0.130	-0.061	0.063	0.336	-0.051	0.061	0.406	-0.062	0.060	0.306
Vocationally-related Level 3	0.006	0.063	0.926	0.037	0.058	0.518	0.032	0.057	0.573	0.057	0.058	0.325
Vocationally-related Level 4	-0.051	0.058	0.381	-0.044	0.065	0.498	-0.050	0.069	0.467	-0.058	0.069	0.402
Occupational Level 1	-0.018	0.027	0.513	-0.021	0.024	0.382	-0.023	0.024	0.356	-0.025	0.024	0.295
Occupational Level 2	-0.179	0.033	0.000 ***	-0.111	0.033	0.001 ***	-0.110	0.033	0.001 ***	-0.112	0.032	0.000 ***
Occupational Level 3	-0.018	0.057	0.748	0.007	0.053	0.895	0.023	0.054	0.672	0.027	0.054	0.609
Occupational Level 4	-0.100	0.050	0.043 **	-0.091	0.046	0.049 **	-0.094	0.047	0.043 **	-0.069	0.044	0.120
Occupational Level 5	0.188	0.048	0.000 ***	0.077	0.046	0.094 *	0.065	0.046	0.162	0.062	0.044	0.155
<i>Prior School Qualifications:</i>												
CSE grade 2-5				0.185	0.032	0.000 ***	0.168	0.033	0.000 ***	0.163	0.033	0.000 ***
< 5 O levels				0.300	0.030	0.000 ***	0.254	0.031	0.000 ***	0.253	0.031	0.000 ***
> 5 O levels				0.431	0.037	0.000 ***	0.348	0.039	0.000 ***	0.340	0.039	0.000 ***
A levels				0.586	0.034	0.000 ***	0.477	0.039	0.000 ***	0.469	0.039	0.000 ***
<i>Prior Post-School Qualifications:</i>												
Lower vocational				0.000	0.025	0.989	-0.002	0.025	0.929	-0.002	0.025	0.947
Middle vocational				0.048	0.029	0.105	0.047	0.029	0.108	0.045	0.029	0.118
Higher vocational				0.119	0.030	0.000 ***	0.117	0.030	0.000 ***	0.120	0.030	0.000 ***
Degree				0.171	0.039	0.000 ***	0.133	0.039	0.001 ***	0.137	0.039	0.000 ***
<i>Maths attainment at age 7:</i>												
5 <sup>th</sup> quintile (highest)							0.121	0.035	0.000 ***	0.125	0.034	0.000 ***
4 <sup>th</sup> quintile							0.068	0.031	0.029 **	0.067	0.031	0.028 **
3 <sup>rd</sup> quintile							0.072	0.032	0.023 **	0.075	0.031	0.016 **
2 <sup>nd</sup> quintile							0.088	0.030	0.003 ***	0.095	0.030	0.001 ***
<i>Reading attainment at age 7:</i>												
5 <sup>th</sup> quintile (highest)							0.022	0.037	0.551	0.021	0.037	0.569
4 <sup>th</sup> quintile							0.044	0.034	0.199	0.042	0.034	0.219
3 <sup>rd</sup> quintile							0.043	0.031	0.173	0.039	0.031	0.207
2 <sup>nd</sup> quintile							0.056	0.029	0.052 **	0.056	0.028	0.050 **
<i>Type of school 1974:</i>												
Secondary modern							-0.012	0.025	0.644	-0.007	0.025	0.781
Grammar							0.064	0.032	0.047 **	0.058	0.032	0.068 *
Private							0.135	0.053	0.011 ***	0.129	0.052	0.013 ***
Other							0.062	0.061	0.308	0.045	0.060	0.455
<i>Parents' education:</i>												
Father's years of edn							0.014	0.007	0.061 *	0.014	0.007	0.051 **
Father's edn missing							0.128	0.098	0.189	0.139	0.097	0.152
Mother's years of edn							-0.005	0.009	0.603	-0.004	0.009	0.622
Mother's edn missing							-0.052	0.110	0.636	-0.054	0.109	0.621
<i>Father's social class 1974:</i>												
Professional/Intermediate							0.006	0.038	0.871	0.007	0.038	0.845
Skilled non-manual							0.061	0.042	0.153	0.066	0.042	0.115
Skilled manual							-0.050	0.032	0.118	-0.045	0.032	0.158
Semi-skilled non-manual							0.068	0.154	0.659	0.043	0.154	0.780
Semi-skilled manual							-0.074	0.040	0.065 *	-0.068	0.040	0.087 *
Bad finances 1969 or 1974							-0.043	0.025	0.084 *	-0.042	0.025	0.091 *
<i>Father's interest in education:</i>												
Expects too much							0.046	0.101	0.650	0.038	0.097	0.693
Very interested							0.023	0.031	0.467	0.025	0.031	0.412
Some interest							0.007	0.024	0.772	0.005	0.024	0.821
<i>Mother's interest in education:</i>												
Expects too much							0.025	0.059	0.670	0.035	0.058	0.543
Very interested							0.001	0.033	0.966	0.011	0.032	0.740
Some interest							0.017	0.027	0.521	0.024	0.027	0.366
Union member in 2000										-0.022	0.019	0.245
Employed in large firm in 2000										0.152	0.022	0.000 ***
Employed in public sector in 2000										-0.072	0.021	0.001 ***
Number of Observations	2378			2378			2378			2378		
R2	0.0284			0.2155			0.2398			0.2581		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.

**TABLE 11: Wage Regression - OLS Regression - Females**  
 Dependent variable is log hourly earnings in 2000

	Robust			Robust			Robust			Robust		
	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t
constant	1.953	0.014	0.000 ***	1.623	0.031	0.000 ***	1.444	0.103	0.000 ***	1.424	0.100	0.000 ***
<i>Qualifications since 1991 by NQF level</i>												
Academic Level 1	-0.298	0.169	0.078 *	-0.174	0.175	0.322	-0.154	0.162	0.341	-0.197	0.157	0.212
Academic Level 2	0.001	0.049	0.990	0.046	0.050	0.363	0.045	0.049	0.367	0.039	0.048	0.420
Academic Level 3	-0.162	0.073	0.028 **	-0.186	0.074	0.012 **	-0.211	0.074	0.005 ***	-0.188	0.070	0.007 ***
Academic Level 4	0.171	0.037	0.000 ***	0.093	0.037	0.013 **	0.079	0.038	0.037 **	0.066	0.036	0.063 *
Academic Level 5	0.412	0.068	0.000 ***	0.116	0.073	0.113	0.093	0.076	0.219	0.081	0.077	0.290
Vocationally-related Level 1	0.405	0.080	0.000 ***	0.397	0.048	0.000 ***	0.394	0.043	0.000 ***	0.314	0.048	0.000 ***
Vocationally-related Level 2	-0.092	0.064	0.150	-0.081	0.064	0.208	-0.083	0.061	0.176	-0.087	0.057	0.124
Vocationally-related Level 3	-0.077	0.069	0.265	-0.004	0.054	0.937	0.017	0.055	0.761	0.013	0.054	0.811
Vocationally-related Level 4	0.012	0.078	0.881	0.050	0.073	0.497	0.069	0.076	0.367	0.032	0.073	0.664
Occupational Level 1	-0.048	0.027	0.078 *	-0.040	0.025	0.111	-0.039	0.025	0.120	-0.034	0.024	0.148
Occupational Level 2	-0.111	0.034	0.001 ***	-0.048	0.033	0.151	-0.049	0.035	0.154	-0.062	0.033	0.065 *
Occupational Level 3	0.041	0.049	0.399	0.041	0.047	0.383	0.055	0.047	0.244	0.041	0.048	0.389
Occupational Level 4	0.252	0.040	0.000 ***	0.132	0.040	0.001 ***	0.135	0.041	0.001 ***	0.089	0.039	0.022 **
Occupational Level 5	0.198	0.060	0.001 ***	0.053	0.062	0.390	0.059	0.060	0.330	0.033	0.059	0.579
<i>Prior School Qualifications:</i>												
CSE grade 2-5				0.088	0.040	0.027 **	0.080	0.040	0.047 **	0.063	0.039	0.106
< 5 O levels				0.208	0.036	0.000 ***	0.189	0.039	0.000 ***	0.168	0.038	0.000 ***
> 5 O levels				0.387	0.040	0.000 ***	0.345	0.042	0.000 ***	0.311	0.041	0.000 ***
A levels				0.585	0.042	0.000 ***	0.526	0.045	0.000 ***	0.476	0.044	0.000 ***
<i>Prior Post-School Qualifications:</i>												
Lower vocational				0.022	0.025	0.360	0.020	0.024	0.417	0.032	0.024	0.182
Middle vocational				-0.029	0.074	0.696	-0.053	0.074	0.474	-0.043	0.074	0.561
Higher vocational				0.172	0.031	0.000 ***	0.165	0.031	0.000 ***	0.127	0.030	0.000 ***
Degree				0.214	0.042	0.000 ***	0.183	0.043	0.000 ***	0.180	0.043	0.000 ***
<i>Maths attainment at age 7:</i>												
5 <sup>th</sup> quintile (highest)							0.056	0.037	0.127	0.041	0.036	0.259
4 <sup>th</sup> quintile							0.049	0.035	0.161	0.046	0.034	0.184
3 <sup>rd</sup> quintile							-0.018	0.035	0.603	-0.025	0.035	0.471
2 <sup>nd</sup> quintile							-0.014	0.034	0.681	-0.010	0.034	0.769
<i>Reading attainment at age 7:</i>												
5 <sup>th</sup> quintile (highest)							-0.015	0.044	0.726	-0.022	0.043	0.616
4 <sup>th</sup> quintile							0.004	0.043	0.931	-0.005	0.042	0.908
3 <sup>rd</sup> quintile							0.022	0.041	0.591	0.017	0.040	0.680
2 <sup>nd</sup> quintile							-0.034	0.043	0.422	-0.048	0.041	0.242
<i>Type of school 1974:</i>												
Secondary modern							-0.003	0.028	0.922	-0.006	0.027	0.828
Grammar							0.007	0.034	0.844	0.017	0.033	0.615
Private							0.117	0.050	0.019 **	0.137	0.049	0.005 ***
Other							-0.047	0.068	0.490	-0.047	0.070	0.502
<i>Parents' education:</i>												
Father's years of edn							-0.002	0.007	0.782	-0.002	0.007	0.711
Father's edn missing							-0.023	0.096	0.811	-0.026	0.090	0.774
Mother's years of edn							0.019	0.008	0.016 **	0.018	0.007	0.014 **
Mother's edn missing							0.201	0.098	0.041 **	0.181	0.092	0.050 **
<i>Father's social class 1974:</i>												
Professional/Intermediate							-0.069	0.037	0.063 *	-0.072	0.036	0.045 **
Skilled non-manual							-0.021	0.042	0.621	-0.034	0.041	0.401
Skilled manual							-0.024	0.034	0.485	-0.034	0.033	0.303
Semi-skilled non-manual							0.001	0.070	0.991	-0.019	0.070	0.791
Semi-skilled manual							-0.054	0.039	0.171	-0.058	0.038	0.123
Bad finances 1969 or 1974							0.006	0.027	0.824	-0.005	0.027	0.846
<i>Father's interest in education:</i>												
Expects too much							0.029	0.104	0.780	0.002	0.097	0.987
Very interested							0.012	0.029	0.686	0.013	0.028	0.638
Some interest							-0.031	0.028	0.259	-0.022	0.027	0.420
<i>Mother's interest in education:</i>												
Expects too much							0.097	0.080	0.228	0.093	0.080	0.245
Very interested							0.059	0.036	0.096	0.054	0.035	0.115
Some interest							0.057	0.031	0.070 *	0.052	0.031	0.090 *
Union member in 2000										0.141	0.022	0.000 ***
Employed in large firm in 2000										0.173	0.023	0.000 ***
Employed in public sector in 2000										-0.004	0.023	0.877
Number of obs	2004			2004			2004			2004		
R-squared	0.0478			0.2691			0.2852			0.3243		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.

**TABLE 12 Wage Regression with interactions - OLS Regressions**  
 Dependent variable is log hourly earnings in 2000

Explanatory Variables	Combined Sample			Males			Females		
	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t
Constant	1.758	0.074	0.000 ***	1.792	0.106	0.000 ***	1.416	0.103	0.000 ***
<i>Lifelong Learning</i>									
Any Qualification since 1991	0.041	0.043	0.334	0.048	0.060	0.421	0.007	0.062	0.916
<i>Interactions of Prior Qualifications and Lifelong Learning</i>									
CSE grade 2-5*any qualification since 1991	0.011	0.055	0.845	0.000	0.073	0.997	0.068	0.086	0.430
< 5 O levels*any qualification since 1991	-0.012	0.049	0.800	-0.060	0.069	0.390	0.061	0.072	0.395
> 5 O levels*any qualification since 1991	-0.027	0.055	0.630	-0.026	0.079	0.740	-0.025	0.079	0.755
A levels*any qualification since 1991	-0.031	0.057	0.584	0.008	0.078	0.922	-0.060	0.082	0.465
Lower vocational*any qualification since 1991	-0.054	0.035	0.124	-0.046	0.051	0.366	-0.051	0.048	0.294
Middle vocational*any qualification since 1991	-0.039	0.052	0.448	-0.070	0.059	0.233	0.272	0.137	0.047 **
Higher vocational*any qualification since 1991	-0.113	0.041	0.006 ***	-0.186	0.057	0.001 ***	-0.056	0.058	0.334
Degree*any qualification since 1991	-0.093	0.059	0.112	-0.060	0.081	0.463	-0.105	0.083	0.205
Female	-0.353	0.014	0.000 ***						
<i>Prior School Qualifications:</i>									
CSE grade 2-5	0.116	0.028	0.000 ***	0.157	0.037	0.000 ***	0.049	0.044	0.269
< 5 O levels	0.215	0.028	0.000 ***	0.265	0.035	0.000 ***	0.146	0.046	0.002 ***
> 5 O levels	0.347	0.034	0.000 ***	0.350	0.047	0.000 ***	0.335	0.053	0.000 ***
A levels	0.495	0.033	0.000 ***	0.470	0.042	0.000 ***	0.507	0.054	0.000 ***
<i>Prior Post-School Qualifications:</i>									
Lower vocational	0.025	0.022	0.260	0.009	0.032	0.778	0.045	0.030	0.134
Middle vocational	0.059	0.036	0.100 *	0.067	0.038	0.080 *	-0.146	0.104	0.159
Higher vocational	0.202	0.028	0.000 ***	0.181	0.038	0.000 ***	0.175	0.043	0.000 ***
Degree	0.203	0.036	0.000 ***	0.163	0.046	0.000 ***	0.219	0.055	0.000 ***
<i>Maths attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)	0.090	0.025	0.000 ***	0.125	0.034	0.000 ***	0.042	0.036	0.246
4 <sup>th</sup> quintile	0.056	0.023	0.015 **	0.067	0.031	0.029 **	0.048	0.035	0.163
3 <sup>rd</sup> quintile	0.026	0.023	0.261	0.070	0.031	0.026 **	-0.023	0.034	0.495
2 <sup>nd</sup> quintile	0.041	0.022	0.071 *	0.091	0.029	0.002 ***	-0.008	0.034	0.807
<i>Reading attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)	0.005	0.027	0.850	0.024	0.037	0.514	-0.028	0.043	0.505
4 <sup>th</sup> quintile	0.021	0.026	0.408	0.039	0.034	0.247	-0.008	0.042	0.858
3 <sup>rd</sup> quintile	0.023	0.024	0.341	0.037	0.032	0.247	0.006	0.040	0.880
2 <sup>nd</sup> quintile	0.016	0.023	0.485	0.058	0.029	0.042 **	-0.050	0.041	0.223
<i>Type of school 1974:</i>									
Secondary modern	-0.002	0.018	0.895	-0.012	0.025	0.642	-0.010	0.027	0.712
Grammar	0.034	0.023	0.136	0.058	0.032	0.068 *	0.015	0.033	0.645
Private	0.122	0.038	0.001 ***	0.129	0.053	0.014 **	0.132	0.050	0.008 ***
Other	0.002	0.046	0.965	0.040	0.061	0.510	-0.046	0.074	0.536
<i>Parents' education:</i>									
Father's years of edn	0.006	0.005	0.209	0.015	0.007	0.038 **	-0.003	0.007	0.697
Father's edn missing	0.069	0.067	0.303	0.152	0.097	0.115	-0.041	0.090	0.652
Mother's years of edn	0.006	0.006	0.266	-0.006	0.009	0.481	0.018	0.007	0.012 **
Mother's edn missing	0.051	0.071	0.470	-0.079	0.108	0.468	0.195	0.091	0.032 **
<i>Father's social class 1974:</i>									
Professional/Intermediate	-0.026	0.027	0.329	0.004	0.037	0.916	-0.067	0.036	0.060 *
Skilled non-manual	0.021	0.030	0.488	0.061	0.042	0.149	-0.041	0.041	0.324
Skilled manual	-0.041	0.023	0.075 *	-0.044	0.031	0.161	-0.034	0.033	0.310
Semi-skilled non-manual	0.023	0.087	0.790	0.047	0.154	0.760	-0.004	0.069	0.950
Semi-skilled manual	-0.062	0.028	0.026 **	-0.065	0.039	0.097 *	-0.062	0.038	0.106
Bad finances 1969 or 1974	-0.022	0.018	0.220	-0.043	0.025	0.083 *	-0.005	0.027	0.858
<i>Father's interest in education:</i>									
Expects too much	0.025	0.072	0.729	0.027	0.097	0.785	-0.001	0.094	0.992
Very interested	0.018	0.021	0.391	0.022	0.031	0.480	0.008	0.028	0.773
Some interest	-0.006	0.018	0.754	0.003	0.024	0.910	-0.020	0.027	0.462
<i>Mother's interest in education:</i>									
Expects too much	0.074	0.048	0.123	0.041	0.058	0.486	0.108	0.081	0.181
Very interested	0.030	0.024	0.212	0.012	0.032	0.706	0.060	0.034	0.082 *
Some interest	0.033	0.021	0.116	0.022	0.027	0.426	0.049	0.031	0.114
Union member in 2000	0.052	0.014	0.000 ***	-0.024	0.019	0.202	0.144	0.022	0.000 ***
Employed in large firm in 2000	0.163	0.016	0.000 ***	0.155	0.022	0.000 ***	0.179	0.022	0.000 ***
Employed in public sector in 2000	-0.021	0.016	0.184	-0.067	0.021	0.001 ***	0.001	0.023	0.964
Number of observations	4382			2378			2004		
R-squared	0.351			0.253			0.323		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.

**TABLE 13 First Difference Equations - OLS Regressions**  
**Dependent variable is the change in log hourly wage 1991 to 2000**

Explanatory Variables	Combined sample			Males			Females		
	Robust			Robust			Robust		
	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t	Coef.	Std. Err.	P> t
<i>Qualifications since 1991 by NQF level</i>									
Academic Level 1	-0.060	0.116	0.605	-0.042	0.168	0.803	-0.102	0.147	0.488
Academic Level 2	0.063	0.042	0.135	0.130	0.066	0.049 **	0.036	0.052	0.490
Academic Level 3	-0.134	0.066	0.042 **	0.006	0.097	0.952	-0.196	0.083	0.018 **
Academic Level 4	0.005	0.032	0.889	-0.026	0.045	0.569	0.021	0.046	0.649
Academic Level 5	0.013	0.055	0.820	0.089	0.077	0.253	-0.103	0.069	0.138
Vocationally-related Level 1	0.247	0.164	0.133	0.404	0.163	0.013 **	0.126	0.247	0.610
Vocationally-related Level 2	0.038	0.035	0.277	-0.016	0.046	0.735	0.082	0.052	0.116
Vocationally-related Level 3	-0.029	0.046	0.526	-0.006	0.058	0.924	-0.045	0.068	0.504
Vocationally-related Level 4	0.099	0.044	0.024 **	0.012	0.050	0.805	0.217	0.074	0.003 ***
Occupational Level 1	0.000	0.017	0.988	-0.014	0.023	0.543	0.016	0.026	0.548
Occupational Level 2	-0.018	0.024	0.451	-0.048	0.033	0.148	0.007	0.034	0.840
Occupational Level 3	0.031	0.041	0.446	0.001	0.058	0.988	0.065	0.057	0.255
Occupational Level 4	0.015	0.032	0.627	-0.050	0.045	0.263	0.051	0.044	0.241
Occupational Level 5	0.025	0.035	0.474	0.014	0.044	0.751	0.042	0.057	0.456
Constant	0.112	0.007	0.000 ***	0.116	0.010	0.000 ***	0.108	0.011	0.000 ***
Number of observations	4382			2378			2004		
R-squared	0.003			0.005			0.011		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.

**Table 14 Wage Regressions by maximum educational attainment with ability interactions and on-going learning.**  
 Dependent variable is log hourly earnings in 2000

Educational attainment in 1991	No Qualifications		CSE		<5 0-levels		>5 0-levels		A levels		Degree/Higher degree	
	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error
Constant	1.814	[0.316]***	2.071	[0.259]***	2.155	[0.156]***	2.206	[0.224]***	2.239	[0.247]***	2.854	[0.343]***
<i>Lifelong Learning</i>												
Any academic qualification since 1991	0.479	[0.198]**	-0.349	[0.181]*	0.368	[0.183]**	0.117	[0.140]	1.173	[0.861]	0.404	[0.262]
Any vocationally-related qualification since 1991	0.023	[0.126]	0.261	[0.294]	-0.029	[0.141]	0.026	[0.151]	-0.161	[0.164]	-0.546	[0.132]***
Any occupational qualification since 1991	0.035	[0.077]	0.093	[0.104]	0.014	[0.079]	0.282	[0.146]**	-0.426	[0.184]**	-0.602	[0.271]**
Currently on a course leading to qualification	0.101	[0.078]	0.103	[0.048]**	0.059	[0.038]	-0.036	[0.056]	0.049	[0.049]	-0.143	[0.068]**
<i>Maths attainment at age 7</i>												
5 quintile	0.013	[0.083]	-0.011	[0.076]	0.128	[0.055]**	0.083	[0.091]	0.046	[0.080]	-0.285	[0.215]
4 quintile	0.062	[0.078]	0.053	[0.056]	0.116	[0.049]**	0.062	[0.092]	-0.032	[0.077]	-0.357	[0.225]
3 quintile	0.044	[0.059]	0.023	[0.050]	0.076	[0.054]	0.073	[0.098]	-0.101	[0.079]	-0.363	[0.218]*
2 quintile	0.082	[0.060]	0.03	[0.046]	0.109	[0.053]**	0.053	[0.090]	-0.07	[0.087]	-0.421	[0.221]*
<i>Reading attainment at age 7</i>												
5 quintile	0.003	[0.105]	-0.011	[0.077]	0.008	[0.059]	0.221	[0.102]**	0.026	[0.147]	-0.041	[0.229]
4 quintile	0.08	[0.084]	0.124	[0.063]**	0.023	[0.061]	0.224	[0.101]**	0.041	[0.146]	0.006	[0.230]
3 quintile	0.04	[0.064]	0.132	[0.059]**	-0.014	[0.055]	0.176	[0.102]**	0.059	[0.146]	-0.022	[0.231]
2 quintile	-0.053	[0.055]	0.095	[0.043]**	0.011	[0.058]	0.27	[0.115]**	-0.015	[0.146]	0.057	[0.241]
<i>Learning/attainment interactions</i>												
Acad*math5	-0.333	[0.311]	0.303	[0.202]	-0.214	[0.193]	0.12	[0.127]	-0.176	[0.163]	-0.335	[0.207]
Acad*math4	0.455	[0.242]**	-0.04	[0.189]	-0.355	[0.193]*	0.086	[0.131]	-0.122	[0.188]	-0.209	[0.235]
Acad*math3	-0.658	[0.206]***	0.185	[0.179]	-0.196	[0.182]	0.031	[0.123]	-0.126	[0.162]	-0.219	[0.266]
Acad*read5	-0.524	[0.244]**	0.437	[0.179]**	-0.232	[0.195]	-0.119	[0.137]	-0.82	[0.385]**	0	[0.000]
Acad*read4	-0.172	[0.369]	0.683	[0.240]**	0.109	[0.231]	-0.128	[0.142]	-1.102	[0.856]**	0.006	[0.221]
Acad*read3	-0.458	[0.263]**	0.157	[0.174]	-0.105	[0.179]	-0.169	[0.136]	-1.068	[0.856]**	0.056	[0.260]
Acad*read2	-0.716	[0.329]**	0.411	[0.185]**	-0.053	[0.179]	-0.138	[0.143]	-0.891	[0.837]	-0.401	[0.316]
Voc*math5	-0.008	[0.225]	-0.023	[0.170]	-0.135	[0.179]	-0.115	[0.137]	-1.19	[0.869]	0	[0.000]
Voc*math4	0	[0.000]	0.488	[0.312]	0.035	[0.096]	-0.073	[0.158]	-0.057	[0.175]	0	[0.000]
Voc*math3	-0.21	[0.169]	-0.139	[0.172]	-0.047	[0.095]	-0.042	[0.190]	0.63	[0.260]**	0	[0.000]
Voc*math2	-0.014	[0.155]	-0.048	[0.189]	0.195	[0.101]*	-0.204	[0.235]	0.202	[0.269]	0.568	[0.225]**
Voc*read5	-0.559	[0.123]***	-0.028	[0.174]	0.194	[0.115]*	0.086	[0.161]	0	[0.000]	0.297	[0.300]
Voc*read4	0.22	[0.301]	-0.021	[0.312]	-0.121	[0.144]	-0.123	[0.194]	-0.175	[0.186]	0	[0.000]
Voc*read3	0.523	[0.280]**	0.06	[0.295]	-0.065	[0.144]	-0.165	[0.168]	-0.26	[0.264]	0	[0.000]
Voc*read2	0.497	[0.213]**	-0.342	[0.288]	-0.009	[0.149]	0.072	[0.232]	-0.291	[0.280]	-0.038	[0.398]
Occ*math5	0.147	[0.149]	-0.411	[0.270]	-0.056	[0.138]	-0.118	[0.182]	0	[0.000]	0	[0.000]
Occ*math4	-0.3	[0.277]	0.185	[0.139]	-0.054	[0.088]	0.006	[0.140]	0.012	[0.126]	0.53	[0.313]*
Occ*math3	-0.21	[0.178]	0.071	[0.117]	-0.032	[0.084]	-0.004	[0.138]	0.018	[0.133]	0.604	[0.315]*
Occ*math2	0.125	[0.114]	0.099	[0.111]	-0.059	[0.087]	-0.035	[0.134]	0.104	[0.124]	0.574	[0.328]*
Occ*read5	0.01	[0.126]	-0.093	[0.104]	-0.056	[0.081]	0.006	[0.134]	0.204	[0.160]	0.504	[0.339]
Occ*read4	0.437	[0.294]	-0.181	[0.172]	0.056	[0.091]	-0.307	[0.138]**	0.398	[0.189]**	-0.03	[0.193]
Occ*read3	-0.208	[0.177]	-0.419	[0.154]***	0.038	[0.089]	-0.298	[0.136]**	0.316	[0.187]**	-0.075	[0.204]
Occ*read2	0.083	[0.154]	-0.119	[0.114]	0.027	[0.089]	-0.259	[0.141]**	0.364	[0.189]**	0.109	[0.286]
Occ*read1	0.201	[0.148]	-0.102	[0.102]	-0.055	[0.084]	-0.432	[0.151]***	0.428	[0.205]**	0	[0.000]
Female	-0.299	[0.040]***	-0.411	[0.036]***	-0.404	[0.024]***	-0.352	[0.040]***	-0.24	[0.038]***	-0.162	[0.049]***
<i>Region</i>												
north	-0.333	[0.106]***	-0.296	[0.094]***	-0.248	[0.066]***	-0.236	[0.096]**	-0.305	[0.138]**	-0.075	[0.159]
north west	-0.377	[0.098]***	-0.293	[0.083]***	-0.242	[0.054]***	-0.169	[0.087]**	-0.22	[0.080]***	-0.025	[0.099]
yorkshire & humberside	-0.397	[0.093]***	-0.369	[0.079]***	-0.236	[0.058]**	-0.154	[0.089]**	-0.239	[0.078]***	-0.162	[0.101]
west midlands	-0.372	[0.097]***	-0.337	[0.076]***	-0.212	[0.061]**	-0.125	[0.088]	-0.285	[0.089]***	-0.08	[0.129]
east midlands	-0.457	[0.105]***	-0.271	[0.085]**	-0.319	[0.061]**	-0.24	[0.097]**	-0.169	[0.091]**	-0.075	[0.102]
east anglia	-0.429	[0.128]***	-0.259	[0.089]**	-0.339	[0.070]**	-0.007	[0.141]	-0.195	[0.112]**	0.034	[0.151]
south west	-0.36	[0.118]***	-0.319	[0.079]**	-0.157	[0.060]**	-0.098	[0.099]	-0.142	[0.091]	-0.154	[0.104]
south east	-0.222	[0.101]**	-0.146	[0.078]*	-0.098	[0.053]*	-0.043	[0.080]	-0.097	[0.072]	-0.101	[0.091]
wales	-0.174	[0.153]	-0.589	[0.129]***	-0.239	[0.058]**	-0.272	[0.101]***	-0.064	[0.101]	-0.033	[0.136]
scotland	-0.422	[0.097]***	0.166	[0.119]	-0.307	[0.056]**	-0.164	[0.097]**	-0.266	[0.074]**	-0.017	[0.087]
<i>Type of school 1974</i>												
Secondary modern	0.059	[0.050]	-0.031	[0.033]	-0.021	[0.033]	-0.046	[0.052]	0.143	[0.086]*	0.09	[0.135]
Grammar school	0.078	[0.135]	-0.089	[0.137]	-0.06	[0.043]	0.117	[0.054]**	-0.004	[0.043]	0.01	[0.061]
Public school	-0.141	[0.188]	0.039	[0.201]	-0.007	[0.082]	0.104	[0.077]	0.156	[0.067]**	0.08	[0.071]
Other school	0.062	[0.092]	-0.147	[0.132]	0.066	[0.088]	-0.322	[0.095]**	-0.049	[0.100]	-0.02	[0.133]
<i>Parent's education</i>												
Father's years of edn	-0.008	[0.024]	0.023	[0.021]	0.002	[0.010]	0.01	[0.013]	0.012	[0.009]	0.003	[0.013]
Father's edn missing	-0.025	[0.286]	0.209	[0.220]	0.083	[0.118]	0.095	[0.162]	-0.015	[0.170]	-0.156	[0.223]
Mother's years of edn	0.044	[0.025]**	-0.02	[0.024]	0.002	[0.013]	-0.021	[0.014]	0.011	[0.011]	0.016	[0.015]
Mother's edn missing	0.281	[0.281]	-0.138	[0.246]	-0.06	[0.131]	-0.274	[0.175]	0.27	[0.171]	0.37	[0.216]*
<i>Father's social class 1974</i>												
intermediate	0.101	[0.120]	-0.073	[0.078]	-0.002	[0.050]	-0.073	[0.057]	-0.021	[0.062]	0.025	[0.074]
skilled non-manual	0.033	[0.151]	-0.014	[0.080]	-0.016	[0.052]	-0.034	[0.069]	0.091	[0.074]	0.102	[0.111]
skilled manual	-0.112	[0.103]	-0.047	[0.048]	-0.034	[0.039]	-0.05	[0.052]	0.075	[0.066]	0.009	[0.079]
semi-skilled non-man	0.011	[0.145]	-0.107	[0.254]	0.024	[0.097]	0.227	[0.404]	0.008	[0.148]	0	[0.000]
semi-skilled manual	-0.082	[0.102]	-0.022	[0.062]	-0.046	[0.046]	-0.092	[0.073]	0.014	[0.080]	-0.015	[0.127]
Bad finances 1969 or 1974	-0.074	[0.055]	-0.008	[0.036]	0.012	[0.032]	-0.05	[0.058]	-0.018	[0.052]	0.04	[0.071]
<i>Father's interest in education</i>												
Expects too much	0	[0.000]	-0.021	[0.093]	0.003	[0.071]	0.023	[0.158]**	-0.003	[0.132]	-0.203	[0.179]
Very interested	0.135	[0.083]	0.1	[0.060]	0.026	[0.041]	0.052	[0.071]	-0.008	[0.051]	0.112	[0.064]*
Some interest	0.005	[0.051]	0.082	[0.036]	-0.013	[0.036]	-0.04	[0.059]	0.031	[0.053]	0.044	[0.107]
<i>Mother's interest in education</i>												
Expects too much	-0.162	[0.107]	0.163	[0.099]	-0.018	[0.109]	0.378	[0.238]	0.147	[0.110]	0.177	[0.133]
Very interested	-0.069	[0.060]	0.031	[0.051]**	0.041	[0.036]	0.003	[0.056]	-0.004	[0.075]	-0.096	[0.103]
Some interest	-0.039	[0.047]	-0.023	[0.039]**	0.029	[0.030]	0.095	[0.047]**	0.016	[0.080]	-0.051	[0.123]
<i>Firm size</i>												
From 10 to 24 employees	0.076	[0.069]	0.09	[0.050]**	0.09	[0.042]**	0.155	[0.079]**	0.162	[0.072]**	0.07	[0.110]
From 25 to 99	0.074	[0.069]	0.171	[0.051]***	0.11	[0.038]**	0.151	[0.067]**	0.214	[0.070]**	-0.003	[0.100]
From 100 to 499	0.131	[0.071]**	0.144	[0.048]***	0.15	[0.037]**	0.238	[0.067]**	0.243	[0.067]**	0.143	[0.100]
More than 500	0.215	[0.085]**	0.282	[0.056]***	0.248	[0.040]**	0.241	[0.067]**	0.289	[0.069]**	0.31	[0.097]**
Union member in 2000	0.128	[0.041]***	0.026	[0.037]	0.093	[0.025]**	0.093	[0.040]**	0.009	[0.037]	-0.15	[0.059]**
Employed in public sector in 2000	0.081	[0.052]	0.027	[0.039]	0.026	[0.030]	-0.007	[0.044]	-0.058	[0.037]	-0.088	[0.061]
Observations	457		642		1445		747		641		433	
R-squared	0.39		0.4		0.28		0.26		0.27		0.29	

**Table 15: Wage Regressions by maximum educational attainment with ability interactions and on-going learning. (General definition of LLL)**

Dependent variable is log hourly earnings in 2000

	No Qualifications		CSE		<5 0-levels		>5 0-levels		A levels		Degree/Higher degree	
	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error
Constant	1.731 [0.288]***		2.076 [0.249]***		2.166 [0.156]***		2.224 [0.222]***		2.221 [0.243]***		2.854 [0.339]***	
Any qualification since 1991	0.125 [0.071]*		0.106 [0.096]		0.027 [0.076]		0.214 [0.138]		0.026 [0.393]		-0.694 [0.335]**	
Currently on a course leading to qualification	0.063 [0.071]		0.095 [0.047]**		0.061 [0.038]		-0.046 [0.054]		0.04 [0.051]		-0.14 [0.066]**	
<i>Interactions LLL and attainment at age 7</i>												
LLL*math5	-0.307 [0.219]		0.247 [0.132]*		-0.032 [0.084]		0.062 [0.119]		0.006 [0.132]		0.587 [0.290]**	
LLL*math4	-0.096 [0.154]		0.046 [0.107]		-0.052 [0.079]		0.059 [0.120]		0.078 [0.126]		0.676 [0.301]**	
LLL*math3	0.018 [0.100]		0.134 [0.099]		-0.03 [0.083]		-0.014 [0.120]		0.051 [0.122]		0.623 [0.308]**	
LLL*math2	-0.138 [0.115]		-0.003 [0.099]		-0.048 [0.078]		0.022 [0.120]		-0.04 [0.145]		0.617 [0.307]**	
LLL*read5	0.302 [0.216]		-0.031 [0.174]		0.034 [0.089]		-0.277 [0.130]**		-0.112 [0.424]		0.073 [0.166]	
LLL*read4	-0.282 [0.143]**		-0.35 [0.135]***		0.02 [0.085]		-0.285 [0.128]**		-0.116 [0.422]		0.006 [0.179]	
LLL*read3	0.053 [0.144]		-0.167 [0.103]		0.019 [0.085]		-0.194 [0.130]		-0.108 [0.421]		0 [0.000]	
LLL*read2	0.112 [0.115]		-0.202 [0.092]**		-0.063 [0.082]		-0.371 [0.143]***		0.036 [0.424]		0.108 [0.220]	
Female	-0.298 [0.038]***		-0.408 [0.035]***		-0.404 [0.024]***		-0.351 [0.037]***		-0.237 [0.038]***		-0.171 [0.049]***	
<i>Region</i>												
north	-0.306 [0.104]***		-0.284 [0.090]***		-0.243 [0.065]***		-0.228 [0.093]**		-0.324 [0.137]**		-0.065 [0.156]	
north west	-0.359 [0.094]***		-0.272 [0.082]**		-0.243 [0.054]***		-0.16 [0.085]*		-0.214 [0.083]***		-0.032 [0.094]	
yorkshire & humberside	-0.377 [0.089]***		-0.353 [0.077]***		-0.227 [0.058]***		-0.138 [0.085]		-0.241 [0.078]***		-0.175 [0.098]*	
west midlands	-0.359 [0.094]***		-0.328 [0.073]***		-0.207 [0.061]***		-0.102 [0.086]		-0.294 [0.088]***		-0.078 [0.126]	
east midlands	-0.415 [0.101]***		-0.273 [0.082]**		-0.322 [0.062]***		-0.237 [0.095]**		-0.188 [0.088]**		-0.085 [0.100]	
east anglia	-0.402 [0.125]***		-0.251 [0.087]**		-0.333 [0.070]***		0.008 [0.136]		-0.222 [0.112]**		0.043 [0.156]	
south west	-0.305 [0.116]***		-0.321 [0.076]**		-0.146 [0.059]**		-0.079 [0.096]		-0.175 [0.089]**		-0.15 [0.101]	
south east	-0.22 [0.097]**		-0.134 [0.077]*		-0.092 [0.053]*		-0.031 [0.078]		-0.099 [0.072]		-0.103 [0.090]	
wales	-0.171 [0.148]		-0.52 [0.121]***		-0.232 [0.058]**		-0.256 [0.099]***		-0.044 [0.103]		-0.015 [0.131]	
scotland	-0.421 [0.093]***		0.127 [0.109]		-0.305 [0.055]***		-0.159 [0.094]*		-0.268 [0.075]***		-0.02 [0.085]	
<i>Maths attainment at age 7</i>												
5 quintile	0.022 [0.080]		-0.012 [0.076]		0.125 [0.056]**		0.073 [0.091]		0.048 [0.078]		-0.28 [0.211]	
4 quintile	0.068 [0.076]		0.057 [0.056]		0.117 [0.050]**		0.042 [0.094]		-0.034 [0.076]		-0.357 [0.221]	
3 quintile	0.047 [0.057]		0.024 [0.050]		0.079 [0.055]		0.065 [0.100]		-0.084 [0.078]		-0.359 [0.213]*	
2 quintile	0.09 [0.060]		0.031 [0.045]		0.114 [0.054]**		0.04 [0.091]		-0.039 [0.084]		-0.416 [0.216]**	
<i>Reading attainment at age 7</i>												
5 quintile	-0.003 [0.102]		-0.016 [0.077]		0.011 [0.059]		0.22 [0.104]**		0.02 [0.142]		-0.052 [0.230]	
4 quintile	0.089 [0.082]		0.13 [0.063]**		0.019 [0.061]		0.223 [0.103]**		0.03 [0.140]		0.006 [0.231]	
3 quintile	0.044 [0.063]		0.143 [0.058]**		-0.016 [0.055]		0.162 [0.104]		0.066 [0.141]		-0.026 [0.233]	
2 quintile	-0.046 [0.053]		0.105 [0.042]**		0.009 [0.058]		0.271 [0.118]**		-0.055 [0.139]		0.031 [0.244]	
<i>Type of school 1974</i>												
Secondary modern	0.052 [0.048]		-0.029 [0.032]		-0.021 [0.032]		-0.042 [0.052]		0.119 [0.082]		0.102 [0.143]	
Grammar school	0.12 [0.121]		-0.081 [0.139]		-0.055 [0.043]		0.112 [0.052]**		0.003 [0.042]		-0.002 [0.059]	
Public school	-0.274 [0.156]*		0.053 [0.197]		-0.016 [0.082]		0.108 [0.077]		0.165 [0.072]**		0.075 [0.070]	
Other school	0.055 [0.090]		-0.072 [0.148]		0.058 [0.088]		-0.324 [0.093]***		-0.063 [0.145]		0.094 [0.181]	
<i>Parent's education</i>												
Father's years of edn	-0.011 [0.022]		0.02 [0.020]		0.002 [0.010]		0.008 [0.013]		0.009 [0.009]		0.004 [0.013]	
Father's edn missing	-0.083 [0.260]		0.186 [0.212]		0.074 [0.117]		0.078 [0.158]		-0.044 [0.169]		-0.126 [0.218]	
Mother's years of edn	0.049 [0.024]**		-0.02 [0.023]		0.001 [0.012]		-0.021 [0.014]		0.013 [0.011]		0.013 [0.015]	
Mother's edn missing	0.381 [0.264]		-0.138 [0.234]		-0.07 [0.130]		-0.272 [0.171]		0.302 [0.169]*		0.321 [0.211]	
<i>Father's social class 1974</i>												
intermediate	0.104 [0.114]		-0.067 [0.080]		-0.002 [0.050]		-0.085 [0.055]		-0.017 [0.061]		0.028 [0.073]	
skilled non-manual	0.085 [0.141]		-0.003 [0.078]		-0.017 [0.051]		-0.035 [0.067]		0.081 [0.074]		0.102 [0.107]	
skilled manual	-0.099 [0.096]		-0.035 [0.048]		-0.041 [0.038]		-0.057 [0.050]		0.059 [0.066]		0.013 [0.079]	
semi-skilled non-man	-0.004 [0.134]		-0.101 [0.247]		0.015 [0.096]		0.223 [0.392]		-0.006 [0.117]		0 [0.000]	
semi-skilled manual	-0.081 [0.097]		-0.016 [0.061]		-0.05 [0.045]		-0.096 [0.071]		0.014 [0.079]		-0.001 [0.121]	
Bad finances 1969 or 1974	-0.064 [0.052]		-0.012 [0.036]		0.01 [0.031]		-0.056 [0.058]		-0.036 [0.050]		0.037 [0.073]	
<i>Father's interest in education</i>												
Expects too much	0 [0.000]		0.147 [0.096]		0.002 [0.070]		0.379 [0.235]		0.134 [0.127]		-0.149 [0.176]	
Very interested	0.14 [0.079]*		0.03 [0.050]*		0.04 [0.035]		0.003 [0.055]		0.001 [0.049]		-0.065 [0.065]	
Some interest	-0.018 [0.049]		0.073 [0.036]		-0.018 [0.035]		0.103 [0.057]		0.094 [0.059]		0.084 [0.120]	
<i>Mother's interest in education</i>												
Expects too much	-0.171 [0.108]		-0.005 [0.094]		-0.03 [0.108]		0.04 [0.155]**		0.049 [0.101]		0.112 [0.123]	
Very interested	-0.061 [0.057]		0.087 [0.057]		0.026 [0.041]		0.053 [0.068]		0.026 [0.073]		0.093 [0.105]	
Some interest	-0.02 [0.046]		-0.028 [0.041]*		0.034 [0.029]		-0.044 [0.046]**		0.001 [0.089]		-0.07 [0.104]	
<i>Firm size</i>												
From 10 to 24 employees	0.107 [0.065]*		0.093 [0.048]*		0.092 [0.042]**		0.152 [0.077]**		0.155 [0.075]**		0.078 [0.111]	
From 25 to 99	0.096 [0.066]		0.17 [0.050]***		0.112 [0.037]***		0.15 [0.065]**		0.201 [0.076]***		-0.003 [0.101]	
From 100 to 499	0.157 [0.068]**		0.164 [0.046]***		0.152 [0.037]***		0.231 [0.066]***		0.227 [0.075]***		0.152 [0.102]	
More than 500	0.26 [0.080]***		0.281 [0.054]***		0.253 [0.040]***		0.245 [0.065]***		0.288 [0.074]***		0.321 [0.099]***	
Union member in 2000	0.122 [0.040]***		0.024 [0.036]		0.09 [0.025]***		0.1 [0.038]**		0.006 [0.037]		-0.161 [0.059]***	
Employed in public sector in 2000	0.076 [0.051]		0.037 [0.038]		0.034 [0.029]		-0.01 [0.043]		-0.058 [0.036]		-0.07 [0.060]	
Number of observations	457		642		1445		747		641		433	
R-Squared	0.36		0.37		0.27		0.26		0.23		0.27	

**Table 16: Changes in real log hourly earnings from 1991 to 2000.  
Lifelong learners vs non lifelong learners, by highest educational attainment in 1991**

Education in 1991		Males			Females			All		
		No LLL	LLL	Difference/Std Err	No LLL	LLL	Difference/Std Err	No LLL	LLL	Difference/Std Err
No Qualifications	Mean change	0.0498	-0.0006	-0.05044	0.131	0.15	0.0189	0.0845	0.0628	-0.0216
	Observations	205	59	0.05425	153	43	0.07704	358	102	0.0454
	Std Deviation	0.334	0.496247		0.4603	0.3915		0.3944	0.4401	
CSE	Mean change	0.1147	0.0489	-0.0657	0.065	0.1008	0.0358	0.09579	0.0701	-0.0257
	Observations	285	108	0.0461	176	74	0.0531	461	182	0.03494
	Std Deviation	0.4388	0.3148		0.3351	0.4798		0.4027	0.39	
<5 0-levels	Mean change	0.1078	0.0779	-0.0298	0.1283	0.1639	0.0355	0.1175	0.1235	0.006
	Observations	488	247	0.03	437	279	0.0345	925	526	0.0228
	Std Deviation	0.3995	0.3542		0.4527	0.4463		0.4254	0.4076	
>5 0-levels	Mean change	0.1133	0.1353	0.022	0.0883	0.161	0.0727	0.1019	0.1498	0.0479
	Observations	245	131	0.046	205	170	0.0424	450	301	0.0312
	Std Deviation	0.4665	0.3522		0.4077	0.4111		0.4404	0.428634	
A-levels	Mean change	0.1708	0.1689	-2.00E-03	0.1117	0.1462	0.0345	0.1469	0.1578	0.0109
	Observations	238	123	0.4417	162	119	0.048	400	242	0.0323
	Std Deviation	0.3845	0.4223		0.3905	0.4055		0.3876	0.4134	
Degree/ Higher degree	Mean change	0.1347	0.2461	0.1114	0.0576	0.04144	0.010755	0.1028	0.1525	0.05
	Observations	173	76	0.0622	122	64	0.070121	295	140	0.045
	Std Deviation	0.4229	0.5125		0.0161	0.0634		0.4188	0.4788	

**Table 17: Effects of Lifelong Learning on Wage Changes, by educational attainment in 1991**  
**Dependent Variable: Difference of real log hourly earnings between 1991 and 2000.**

Explanatory variables	No Qualifications		CSE		<5 0-levels		>5 0-levels		A-levels		Degree/Higher degree	
	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error	Coef.	Std Error
<i>Lifelong Learning Variables</i>												
Currently on course leading to a qualification	0.0818	0.0682	0.1322	0.0461	0.0092	0.0375	-0.0305	0.0496	0.0115	0.0605	-0.0931	0.0617
Any qualification since 1991	0.1261	0.0767	0.0982	0.1058	0.0341	0.0725	0.1742	0.1154	0.1692	0.2830	-0.1129	0.2433
<i>Interactions LLL and age 7 attainment</i>												
LLL* <i>math5</i>	-0.1264	0.2536	0.1239	0.1333	-0.0601	0.0861	-0.0247	0.1094	-0.0119	0.1177	0.0247	0.1957
LLL* <i>math4</i>	-0.1604	0.1540	-0.0442	0.1045	-0.0723	0.0784	0.0012	0.1086	-0.1024	0.1214	0.2321	0.2050
LLL* <i>math3</i>	-0.0604	0.1182	0.0853	0.1100	-0.0953	0.0833	0.0384	0.1124	0.0312	0.1098	0.1356	0.2256
LLL* <i>math2</i>	-0.2463	0.1230	-0.0679	0.0991	-0.0855	0.0775	0.0175	0.1071	-0.0108	0.1437	0.0565	0.2186
LLL* <i>read5</i>	0.1231	0.2157	-0.1906	0.1529	0.0561	0.0833	-0.0835	0.1097	-0.0931	0.3007	0.1602	0.1595
LLL* <i>read4</i>	-0.2741	0.1642	-0.2475	0.1335	0.0454	0.0819	-0.1251	0.1134	-0.1652	0.2916	0.0238	0.1727
LLL* <i>read3</i>	-0.0378	0.1506	-0.1508	0.1089	0.0589	0.0815	-0.1127	0.1149	-0.2737	0.2970 (dropped)		
LLL* <i>read2</i>	0.0568	0.1331	-0.1790	0.1012	-0.0147	0.0787	-0.3108	0.1238	0.0229	0.3009	0.0906	0.2176
Female	0.1063	0.0401	-0.0228	0.0345	0.0477	0.0229	-0.0035	0.0307	-0.0386	0.0314	-0.1037	0.0423
<i>Region</i>												
north	0.0299	0.1202	-0.0130	0.0732	0.0396	0.0707	0.0324	0.0725	-0.0597	0.1030	0.1315	0.1622
north west	-0.1829	0.1042	-0.0225	0.0662	-0.0394	0.0591	0.0103	0.0653	-0.0201	0.0833	-0.0038	0.0807
yorkshire & humberside	-0.1703	0.1075	-0.0602	0.0664	0.0179	0.0607	0.0669	0.0660	-0.0278	0.0764	-0.0025	0.0871
west midlands	-0.2093	0.1112	-0.0580	0.0645	0.0041	0.0662	0.0553	0.0707	0.0124	0.0810	-0.0063	0.1108
east midlands	-0.3248	0.1205	-0.1035	0.0728	-0.0898	0.0654	0.0130	0.0723	0.0460	0.0879	0.1874	0.0842
east anglia	-0.3816	0.1277	0.0196	0.0673	-0.0774	0.0657	0.1378	0.1237	-0.1580	0.1011	0.1448	0.1349
south west	-0.1821	0.1228	-0.0269	0.0745	0.0326	0.0634	0.0489	0.0741	0.0785	0.0823	0.0925	0.0889
south east	-0.2345	0.1070	-0.0317	0.0668	-0.0842	0.0575	-0.0177	0.0561	-0.0874	0.0735	-0.0014	0.0750
wales	0.1076	0.1461	-0.2019	0.1415	-0.0169	0.0642	0.0393	0.0747	0.0851	0.0813	0.0750	0.1128
scotland	-0.1862	0.1042	0.4453	0.0864	0.0097	0.0588	0.0454	0.0746	-0.0549	0.0718	0.0242	0.0773
<i>Maths attainment at age 7</i>												
2 quintile	0.0680	0.0575	0.0297	0.0515	0.0847	0.0482	0.0584	0.0650	-0.0019	0.0813	-0.1631	0.1373
3 quintile	0.0029	0.0575	-0.0252	0.0504	0.0368	0.0504	0.0570	0.0737	-0.0154	0.0779	-0.1349	0.1284
4 quintile	0.0307	0.0672	0.0705	0.0546	0.0717	0.0455	0.0535	0.0689	0.0505	0.0745	-0.2241	0.1319
5 quintile	-0.1036	0.0839	-0.0838	0.0841	0.0845	0.0509	0.0773	0.0703	-0.0025	0.0779	-0.0608	0.1236
<i>Reading attainment at age 7</i>												
2 quintile	-0.0801	0.0521	0.0891	0.0402	-0.0309	0.0518	0.0866	0.0801	-0.0963	0.0906	0.2355	0.2177
3 quintile	-0.0023	0.0617	0.0702	0.0617	-0.0678	0.0477	-0.0433	0.0720	-0.0313	0.0919	0.1893	0.2099
4 quintile	-0.0177	0.0726	0.0372	0.0673	-0.0729	0.0510	0.0480	0.0664	-0.1019	0.0875	0.1840	0.2100
5 quintile	-0.0303	0.0856	-0.0029	0.0766	-0.0812	0.0504	-0.0415	0.0654	-0.0939	0.0864	0.1423	0.2099
Constant	0.2097	0.0951	0.0886	0.0697	0.1146	0.0620	0.0166	0.0870	0.2677	0.1161	0.0689	0.2453
Observations	460		643		1450		751		642		434	
R-squared	0.136		0.05		0.022		0.04		0.05		0.066	



**Table 18: Matching estimates of the effects of lifelong learning on wage changes from 1991 to 2000.**

Highest educational attainment in 1991	No qualifications	CSE	<5 O-levels	>5 O-levels	A levels	Degree/Higher degree
Number of observations	537	719	1638	835	711	482
<i>Probit estimation of propensity to achieve qualification</i>						
Pseudo R-squared	0.108	0.0743	0.0234	0.0553	0.0333	0.0869
Log likelihood	-247.63	-402.818	-1050.9	-528.895	-454.395	-277.09
<i>Wage changes: Matching estimates</i>						
Matched lifelong learners	0.0628	0.06764	0.1235	0.1498	0.1578	0.15258
Matched control group of non learners	-0.02843	0.1269	0.124	0.05815	0.1797	0.06581
Differences in wage changes	0.09132	-0.05927	-0.0005	0.0917	-0.02188	0.086776
Standard Error	0.06734	0.0584	0.0334	0.0432	0.04673	0.069741

Note 1: Probit estimation includes gender, test scores at age 7, parental background information and regional dummies.

Note 2: Estimation process: One-to-one matching with replacement. Estimates proved robust to caliper choice. Standard errors obtained through bootstrapping.

**Table 19: Employment Equation - Combined Sample**  
*Estimated using probit model*  
*Dependent variable takes value of 1 if person in employment in 2000,*  
*zero otherwise.*

Explanatory Variables	Robust			Robust			Robust		
	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z
Female	-0.089	0.008	0.000 ***	-0.087	0.009	0.000 ***	-0.086	0.009	0.000 ***
<i>Qualifications since 1991 by NQF level</i>									
Academic Level 1	-0.050	0.096	0.542	-0.040	0.090	0.609	-0.038	0.087	0.614
Academic Level 2	0.009	0.026	0.748	0.010	0.026	0.702	0.007	0.026	0.785
Academic Level 3	-0.057	0.049	0.173	-0.059	0.050	0.162	-0.068	0.051	0.107
Academic Level 4	0.002	0.021	0.937	-0.009	0.023	0.675	-0.008	0.022	0.700
Academic Level 5	0.032	0.025	0.282	0.019	0.029	0.545	0.019	0.028	0.544
Vocationally-related Level 2	0.008	0.029	0.799	0.009	0.028	0.752	0.009	0.028	0.765
Vocationally-related Level 3	-0.016	0.041	0.688	-0.009	0.039	0.806	-0.009	0.038	0.811
Vocationally-related Level 4	0.062	0.020	0.065 *	0.060	0.021	0.078 *	0.056	0.021	0.100 *
Occupational Level 1	-0.005	0.011	0.643	-0.007	0.011	0.517	-0.009	0.011	0.408
Occupational Level 2	0.001	0.016	0.930	0.003	0.015	0.827	0.005	0.015	0.754
Occupational Level 3	0.003	0.024	0.907	0.003	0.023	0.882	0.005	0.022	0.813
Occupational Level 4	0.031	0.015	0.076 *	0.021	0.016	0.252	0.021	0.016	0.244
Occupational Level 5	0.031	0.019	0.158	0.024	0.020	0.290	0.024	0.020	0.282
<i>Prior School Qualifications:</i>									
CSE grade 2-5				0.031	0.012	0.019 **	0.027	0.012	0.042 **
< 5 O levels				0.035	0.011	0.003 ***	0.028	0.012	0.026 **
> 5 O levels				0.044	0.011	0.001 ***	0.033	0.013	0.018 **
A levels				0.047	0.012	0.001 ***	0.036	0.014	0.022 **
<i>Prior Post-School Qualifications:</i>									
Lower vocational				0.006	0.010	0.586	0.003	0.010	0.748
Middle vocational				0.020	0.015	0.232	0.015	0.016	0.370
Higher vocational				0.028	0.012	0.035 **	0.025	0.012	0.061 *
Degree				0.005	0.017	0.784	0.000	0.017	0.982
<i>Maths attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)							0.017	0.013	0.210
4 <sup>th</sup> quintile							0.013	0.012	0.299
3 <sup>rd</sup> quintile							0.010	0.013	0.428
2 <sup>nd</sup> quintile							-0.001	0.013	0.955
<i>Reading attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)							-0.007	0.016	0.633
4 <sup>th</sup> quintile							-0.002	0.015	0.911
3 <sup>rd</sup> quintile							-0.013	0.015	0.380
2 <sup>nd</sup> quintile							-0.008	0.015	0.575
<i>Type of school 1974:</i>									
Secondary modern							-0.003	0.011	0.813
Grammar							-0.003	0.014	0.817
Private							-0.016	0.023	0.446
Other							0.007	0.027	0.792
<i>Parents' education:</i>									
Father's years of edn							0.002	0.003	0.608
Father's edn missing							0.011	0.038	0.767
Mother's years of edn							-0.001	0.004	0.860
Mother's edn missing							-0.008	0.045	0.858
<i>Father's social class 1974:</i>									
Professional/Intermediate							0.003	0.014	0.860
Skilled non-manual							0.045	0.013	0.006 ***
Skilled manual							0.017	0.013	0.194
Semi-skilled non-manual							-0.003	0.036	0.933
Semi-skilled manual							0.010	0.016	0.536
Bad finances 1969 or 1974							-0.021	0.012	0.058 *
<i>Father's interest in education:</i>									
Expects too much							-0.016	0.041	0.673
Very interested							-0.013	0.014	0.323
Some interest							-0.005	0.011	0.629
<i>Mother's interest in education:</i>									
Expects too much							-0.032	0.031	0.252
Very interested							0.025	0.014	0.066 *
Some interest							0.002	0.012	0.846
Number of Observations	4941			4941			4941		
Wald chi-squared	129.63			165.03			198.37		
Pseudo R-squared	0.0401			0.0486			0.0588		
Log likelihood	-1509.788			-1496.403			-1480.295		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.

**Table 20: Employment Equation - Males**

*Estimated using probit model*

*Dependent variable takes value of 1 if person in employment in 2000, zero otherwise.*

Explanatory Variables	Robust			Robust			Robust		
	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z
<i>Qualifications since 1991 by NQF level</i>									
Academic Level 2	0.012	0.045	0.804	0.012	0.041	0.787	0.016	0.030	0.645
Academic Level 3	-0.033	0.085	0.651	-0.048	0.098	0.534	-0.042	0.092	0.570
Academic Level 4	0.007	0.029	0.814	-0.007	0.034	0.839	-0.012	0.035	0.695
Vocationally-related Level 2	0.024	0.033	0.570	0.021	0.031	0.581	0.014	0.032	0.696
Vocationally-related Level 3	0.006	0.049	0.901	0.004	0.049	0.937	-0.001	0.047	0.984
Occupational Level 1	-0.007	0.014	0.589	-0.011	0.014	0.411	-0.010	0.013	0.421
Occupational Level 2	0.016	0.018	0.446	0.018	0.016	0.340	0.016	0.015	0.347
Occupational Level 3	-0.029	0.037	0.368	-0.020	0.032	0.493	-0.017	0.029	0.523
Occupational Level 5	0.045	0.015	0.111	0.038	0.016	0.167	0.033	0.015	0.188
<i>Prior School Qualifications:</i>									
CSE grade 2-5				0.021	0.012	0.115	0.016	0.011	0.188
< 5 O levels				0.013	0.012	0.284	0.009	0.011	0.458
> 5 O levels				0.037	0.010	0.005 ***	0.028	0.011	0.034 **
A levels				0.039	0.012	0.008 ***	0.027	0.013	0.057 *
<i>Prior Post-School Qualifications:</i>									
Lower vocational				0.007	0.011	0.527	0.005	0.010	0.604
Middle vocational				0.026	0.010	0.036 **	0.023	0.010	0.043 **
Higher vocational				0.032	0.011	0.036 **	0.029	0.010	0.040 **
Degree				0.012	0.017	0.519	0.001	0.019	0.969
<i>Maths attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)							0.008	0.014	0.584
4 <sup>th</sup> quintile							0.014	0.012	0.289
3 <sup>rd</sup> quintile							0.000	0.013	0.974
2 <sup>nd</sup> quintile							-0.010	0.014	0.484
<i>Reading attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)							0.012	0.015	0.454
4 <sup>th</sup> quintile							-0.026	0.017	0.090 *
3 <sup>rd</sup> quintile							-0.013	0.015	0.344
2 <sup>nd</sup> quintile							-0.008	0.014	0.533
<i>Type of school 1974:</i>									
Secondary modern							0.002	0.011	0.855
Grammar							0.006	0.014	0.678
Private							0.021	0.017	0.343
Other							0.036	0.013	0.155
<i>Parents' education:</i>									
Father's years of edn							0.006	0.004	0.170
Father's edn missing							0.057	0.030	0.146
Mother's years of edn							-0.002	0.004	0.606
Mother's edn missing							-0.053	0.074	0.394
<i>Father's social class 1974:</i>									
Professional/Intermediate							0.000	0.016	0.987
Skilled non-manual							0.033	0.011	0.047 **
Skilled manual							0.007	0.013	0.577
Semi-skilled manual							0.011	0.014	0.477
Bad finances 1969 or 1974							-0.021	0.014	0.092 *
<i>Father's interest in education:</i>									
Expects too much							-0.021	0.041	0.545
Very interested							-0.031	0.018	0.053 *
Some interest							0.012	0.010	0.253
<i>Mother's interest in education:</i>									
Expects too much							-0.056	0.038	0.057 *
Very interested							0.032	0.014	0.028 **
Some interest							0.000	0.012	0.974
Number of observations		2396		2396			2372		
Wald chi-squared		4.45		34.3			70.92		
Pseudo R-squared		0.0054		0.0316			0.0723		
Log likelihood		-524.966		-511.165			-488.356		

\*, \*\*, \*\*\* indicate that the variable is significant at the 10%, 5% and 1% level respectively.

**Table 21: Employment Equation - Females**

*Estimated using probit model*

*Dependent variable takes value of 1 if person in employment in 2000, zero otherwise.*

Explanatory variables	Robust			Robust			Robust		
	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z	dF/dx	Std. Err.	P> z
<i>Qualifications since 1991 by NQF level</i>									
Academic Level 1	-0.102	0.149	0.426	-0.095	0.143	0.445	-0.086	0.135	0.462
Academic Level 2	0.012	0.041	0.776	0.015	0.040	0.719	0.013	0.041	0.767
Academic Level 3	-0.080	0.072	0.206	-0.083	0.073	0.192	-0.106	0.076	0.104 *
Academic Level 4	0.003	0.035	0.941	-0.006	0.036	0.864	-0.008	0.036	0.814
Academic Level 5	-0.005	0.061	0.934	-0.016	0.065	0.793	-0.008	0.061	0.894
Vocationally-related Level 2	-0.008	0.053	0.871	-0.005	0.052	0.928	-0.012	0.054	0.823
Vocationally-related Level 3	-0.039	0.073	0.571	-0.031	0.071	0.639	-0.034	0.070	0.601
Vocationally-related Level 4	0.074	0.049	0.251	0.072	0.050	0.271	0.071	0.048	0.262
Occupational Level 1	-0.004	0.019	0.825	-0.007	0.019	0.709	-0.011	0.019	0.577
Occupational Level 2	-0.012	0.028	0.647	-0.012	0.028	0.650	-0.008	0.028	0.755
Occupational Level 3	0.032	0.036	0.412	0.029	0.036	0.464	0.026	0.036	0.508
Occupational Level 4	0.024	0.028	0.417	0.008	0.031	0.787	0.005	0.031	0.868
Occupational Level 5	0.021	0.040	0.618	0.015	0.041	0.717	0.017	0.039	0.686
<i>Prior School Qualifications:</i>									
CSE grade 2-5				0.040	0.024	0.120	0.034	0.024	0.198
< 5 O levels				0.060	0.022	0.009 ***	0.047	0.023	0.053 **
> 5 O levels				0.053	0.023	0.033 **	0.034	0.026	0.217
A levels				0.058	0.024	0.031 **	0.043	0.028	0.158
<i>Prior Post-School Qualifications:</i>									
Lower vocational				0.007	0.018	0.701	0.009	0.018	0.622
Middle vocational				-0.022	0.048	0.639	-0.037	0.051	0.437
Higher vocational				0.031	0.023	0.200	0.028	0.023	0.244
Degree				-0.006	0.032	0.841	-0.006	0.032	0.858
<i>Maths attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)							0.032	0.024	0.197
4 <sup>th</sup> quintile							0.019	0.023	0.430
3 <sup>rd</sup> quintile							0.028	0.022	0.225
2 <sup>nd</sup> quintile							0.016	0.022	0.467
<i>Reading attainment at age 7:</i>									
5 <sup>th</sup> quintile (highest)							-0.024	0.031	0.414
4 <sup>th</sup> quintile							0.018	0.027	0.530
3 <sup>rd</sup> quintile							-0.022	0.029	0.443
2 <sup>nd</sup> quintile							-0.019	0.029	0.499
<i>Type of school 1974:</i>									
Secondary modern							-0.010	0.020	0.603
Grammar							-0.007	0.026	0.791
Private							-0.059	0.045	0.146
Other							-0.052	0.063	0.362
<i>Parents' education:</i>									
Father's years of edn							-0.003	0.005	0.574
Father's edn missing							-0.068	0.078	0.350
Mother's years of edn							0.001	0.006	0.860
Mother's edn missing							0.030	0.069	0.678
<i>Father's social class 1974:</i>									
Professional/Intermediate							0.004	0.026	0.892
Skilled non-manual							0.053	0.027	0.093 *
Skilled manual							0.028	0.022	0.228
Semi-skilled non-manual							-0.080	0.081	0.261
Semi-skilled manual							0.005	0.030	0.858
Bad finances 1969 or 1974							-0.018	0.020	0.345
<i>Father's interest in education:</i>									
Expects too much							-0.037	0.091	0.660
Very interested							-0.001	0.023	0.957
Some interest							-0.030	0.021	0.134
<i>Mother's interest in education:</i>									
Expects too much							0.026	0.044	0.580
Very interested							0.022	0.025	0.373
Some interest							0.000	0.021	0.997
Number of observations		2391		2391			2391		
Wald chi-squared		5.58		17.15			45.79		
Pseudo R-squared		0.0028		0.0086			0.0233		
Log likelihood		-976.778		-971.103			-956.693		

\*, \*\*, \*\*\* indicates that the variable is significant at the 10%, 5% and 1% level respectively.

**Table 22: Transition probability from non employment to employment (1991-2000).**

Sample is those out of the labour market (unemployed and 'inactive' ) in 1991

Estimated using probit model. Dependent variable takes the value 1 if employed in 2000, zero otherwise

Explanatory variables	Females			Males			All			All		
	dF/dx	Robust Std. Err.	P> z	dF/dx	Robust Std. Err.	P> z	dF/dx	Robust Std. Err.	P> z	dF/dx	Robust Std. Err.	P> z
<i>Type of lifelong learning</i>												
Academic	0.122	0.046	0.016 **	0.044	0.133	0.743	0.114	0.044	0.017 **	0.107	0.045	0.026 **
Vocationally-related	0.203	0.055	0.006 ***	0.053	0.150	0.727	0.183	0.054	0.006 ***	0.193	0.052	0.004 ***
Occupational	0.138	0.030	0.000 ***	0.211	0.065	0.003 ***	0.144	0.027	0.000 ***	0.148	0.027	0.000 ***
<i>Prior school qualification</i>												
CSE grade 2-5	0.181	0.036	0.000 ***	0.084	0.083	0.329	0.165	0.033	0.000 ***	0.145	0.035	0.000 ***
<5 O-levels	0.153	0.036	0.000 ***	0.213	0.071	0.005 ***	0.167	0.032	0.000 ***	0.142	0.034	0.000 ***
>5 O levels	0.135	0.042	0.003 ***	0.330	0.073	0.002 ***	0.153	0.038	0.000 ***	0.140	0.040	0.001 ***
A levels	0.182	0.044	0.000 ***	0.407	0.054	0.000 ***	0.205	0.039	0.000 ***	0.205	0.042	0.000 ***
<i>Post school qualification</i>												
Lower vocational	0.074	0.034	0.035 **	0.143	0.082	0.100 *	0.082	0.031	0.011 **	0.083	0.032	0.012 **
Middle vocational	0.023	0.076	0.770	0.177	0.099	0.110	0.077	0.060	0.223	0.065	0.062	0.316
Higher vocational	0.094	0.050	0.080 *	-0.375	0.150	0.036 **	0.054	0.050	0.297	0.048	0.051	0.361
Degree	-0.055	0.071	0.431	-0.188	0.223	0.405	-0.059	0.069	0.380	-0.069	0.070	0.310
<i>Maths attainment at age 7</i>												
Quintile 5	0.047	0.050	0.366	0.065	0.115	0.582	0.056	0.046	0.238	0.053	0.048	0.275
Quintile 4	0.057	0.046	0.229	0.158	0.091	0.104	0.073	0.041	0.090 *	0.084	0.042	0.054 *
Quintile 3	0.066	0.042	0.129	0.105	0.094	0.285	0.074	0.038	0.063 *	0.074	0.040	0.072 *
Quintile 2	0.027	0.042	0.535	0.097	0.088	0.287	0.041	0.038	0.282	0.047	0.038	0.229
<i>Reading attainment at age 7</i>												
Quintile 5	-0.052	0.054	0.326	0.038	0.121	0.756	-0.040	0.049	0.416	-0.058	0.052	0.256
Quintile 4	0.060	0.046	0.204	0.047	0.111	0.677	0.074	0.041	0.085 *	0.053	0.044	0.243
Quintile 3	-0.027	0.047	0.570	0.094	0.101	0.370	-0.001	0.042	0.989	-0.026	0.045	0.555
Quintile 2	-0.016	0.046	0.733	0.126	0.086	0.160	0.017	0.040	0.681	-0.009	0.042	0.827
<i>Region</i>												
north	0.088	0.067	0.220	-0.064	0.182	0.725	0.066	0.064	0.323	0.083	0.064	0.220
north west	0.093	0.059	0.136	-0.164	0.165	0.321	0.053	0.058	0.369	0.058	0.059	0.336
yorkshire & humberside	0.151	0.052	0.010 ***	-0.085	0.162	0.596	0.117	0.052	0.036 **	0.126	0.052	0.026 **
west midlands	0.159	0.057	0.019 **	-0.059	0.182	0.744	0.125	0.058	0.051 **	0.135	0.058	0.038 **
east midlands	0.142	0.058	0.032 **	0.106	0.158	0.523	0.142	0.054	0.020 **	0.143	0.055	0.022 **
east anglia	0.136	0.067	0.075 *	0.108	0.198	0.608	0.134	0.064	0.064 *	0.132	0.065	0.073 *
south west	0.194	0.050	0.002 ***	0.002	0.199	0.993	0.174	0.051	0.004 ***	0.183	0.052	0.003 ***
south east	0.146	0.052	0.008 ***	-0.048	0.156	0.755	0.117	0.050	0.023 **	0.126	0.050	0.017 **
wales	0.084	0.064	0.217	-0.325	0.168	0.079 *	0.033	0.064	0.605	0.043	0.064	0.510
scotland	0.099	0.065	0.157	-0.009	0.182	0.962	0.093	0.061	0.155	0.098	0.062	0.138
Female							0.039	0.032	0.219	0.031	0.033	0.340
<i>Father's interest in education</i>												
Very interested										0.035	0.044	0.433
Some interest										0.067	0.034	0.056 *
<i>Mother's interest in education</i>												
Expects too much										-0.078	0.110	0.464
Very interested										-0.042	0.045	0.352
Some interest										-0.002	0.036	0.958
<i>Type of school 1974</i>												
Secondary modern										0.004	0.034	0.914
Grammar school										-0.012	0.053	0.823
Public school										0.006	0.064	0.923
Other school										-0.234	0.078	0.003 ***
<i>Parent's education</i>												
Father's years of edn										-0.015	0.010	0.162
Father's edn missing										-0.021	0.135	0.873
Mother's years of edn										0.000	0.012	0.983
Mother's edn missing										-0.117	0.148	0.423
<i>Father's social class 1974</i>												
intermediate										0.071	0.047	0.145
skilled non-manual										0.135	0.054	0.027 **
skilled manual										0.012	0.041	0.777
semi-skilled non-man										0.267	0.067	0.023 **
semi-skilled manual										-0.008	0.053	0.886
Bad finances 1969 or 1974										-0.039	0.033	0.243
Number of observations	1323			310			1633			1619		
Pseudo R-squared	0.084			0.179			0.090			0.105		
Log-likelihood	-780.198			-172.996			-969.927			-948.155		

\*, \*\*, \*\*\* indicate that the variable is significant at the 10%, 5% and 1% level respectively.

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