Department for Business Innovation & Skills

ESTIMATING THE LABOUR MARKET RETURNS TO QUALIFICATIONS GAINED IN ENGLISH FURTHER EDUCATION USING THE INDIVIDUALISED LEARNER RECORD (ILR)

APRIL 2013

Franz Buscha and Peter Urwin

with Dave Thomson, David Bibby, Trevor Knight and Stefan Speckesser

The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Business, Innovation and Skills.

Department for Business, Innovation and Skills

1 Victoria Street

London SW1H 0ET

www.gov.uk/bis

April 2013

Contents

Contents **3**

List of tables **5**

List of figures **8**

Executive Summary **9**

Introduction 9

Estimated returns for aggregated qualification categories 10

Variation by sex and age 12

Age Differences 12

Incorporating the HE flag for a sample of learners 13

Estimated returns for disaggregated qualification categories 14

Premiums estimated separately for academic and vocational qualification categories 14

Estimated returns for Apprenticeships 15

The challenge of estimating returns from Skills for Life 16

Estimated returns to NVQ2 and NVQ3 qualifications 16

Conclusions 17

1. Introduction **18**

2. Data and Method **23**

2.1 Creation of a dataset containing learning spells 23

2.2 Econometric approach 25

3. Estimated returns for aggregated qualification categories **28**

3.1 Earnings 28

3.2 Employment 31

3.3 Job-search (or 'Active') and other Benefits 33

3.4 Variation by sex and age 36

Sex differences 36

Age differences (earnings) 41

Employment probability and Active benefit premiums by age group 44

3.5 Incorporating the HE flag for a sample of learners 44

4. Estimated returns for disaggregated qualification categories 48

4.1 Premiums estimated separately for academic and vocational qualification categories 48

Earnings 48

Employment Probability and Active Benefit Premiums 51

4.2 Estimated returns for Apprenticeships 54

4.3 The challenge of estimating returns from *Skills for Life* 58

5. Earnings Premiums for NVQ2 & NVQ3 Achievers 63

5.1 Estimated earnings premiums for NVQ2 & NVQ3 achievers 63

5.2 Comparison with estimated premiums in existing studies 68

Data Issues 69

Are we capturing the same 'Marginal' returns? 69

6. Conclusions and Recommendations 71

Unobserved heterogeneity and ability bias 71

Issues to consider 72

References 74

Appendix Table 75

List of tables

Table 1: Example of treatment (achievers) and control (non-achievers) 20

Table 2: Daily earnings premium of achievers relative to non-achievers 29

Table 3: Raw average daily earnings in year after the end of learning spell 31

Table 4: Return to employment probabilities 32

Table 5: Raw employment probabilities one year after spell end date 33

Table 6: Estimated probability of Achievers being on *Active Benefits*, compared to non-achievers 34

Table 7: Raw proportions on *Active Benefits* one year after the end of learning spell 35

Table 8: Daily earnings premium of female achievers relative to non-achievers 37

Table 9: Daily earnings premium of male achievers relative to non-achievers 37

Table 10: Raw average daily earnings one year after the end of learning spell for women 38

Table 11: Raw average daily earnings one year after the end of learning spell for men 39

Table 12: Estimated employment probability premium for female achievers over non-achievers .. 40

Table 13: Estimated employment probability premium for male achievers over non-achievers 40

Table 14: Raw employment probabilities one year after spell end date for women 41

Table 15: Raw employment probabilities one year after spell end date for men 41

Table 16: Daily earnings premium of 16-18 year old achievers relative to non-achievers 42

Table 17: Daily earnings premium of 19-24 year old achievers relative to non-achievers 43

Table 18: Daily earnings premium of 25+ year old achievers relative to non-achievers 43

Table 19: Daily earnings premium of learners born after 31/08/1980 and who experience FE learning spell between 2004/2005 and 2009/2010 [learners transiting to HE retained] 45

Table 20: Daily earnings premium of learners born after 31/08/1980 and who experience FE learning spell between 2004/2005 and 2009/2010 [learners transiting to HE dropped] 46

Table 21: Daily earnings premium for achievers V non-achievers in '*Academic'* qualification categories 49

Table 22: Daily earnings premium for achievers V non-achievers in '*Vocational & Provider'* qualification categories 49

Table 23: Daily earnings premium for achievers V non-achievers in '*Vocational & WBL'* qualification categories 49

Table 24: Estimated employment probability premium for achievers V non-achievers in '*Academic'* qualification category 51

Table 25: Estimated employment probability premium for achievers V non-achievers in '*Vocational & Provider'* qualification category 52

Table 26: Estimated employment probability premium for achievers V non-achievers in '*Vocational & WBL'* qualification category 52

Table 27: Raw employment probabilities one year after spell end date for '*Academic'* qualification category 53

Table 28: Raw employment probabilities one year after spell end date for '*Vocational & Provider'* qualification category 53

Table 29: Raw employment probabilities one year after spell end date for '*Vocational & WBL'* qualification category 54

Table 30: Estimated daily earnings premium for apprenticeship achievers V non-achievers 54

Table 31: Raw average daily earnings in year after the end of apprenticeship learning spell 55

Table 32: Estimated employment probability premium for achievers V non-achievers: apprenticeships 57

Table 33: Raw employment probabilities one year after spell end date for apprenticeships 57

Table 34: Estimated probability of achievers being on *Active Benefits* (job-seeking), compared to non-achievers: apprenticeships 58

Table 35: Proportion of apprentices on *Active Benefits* (job-seeking) one year after learning spell ends 58

Table 36: Return to daily earnings across *Skills for Life* aims [learners who aim and achieve a *Full Level 2* qualification] 60

Table 37: Return to daily earnings across *Skills for Life* aims [learners who aim and achieve a *Full Level 3* qualification] 61

Table 38: Achievers, intermediate achievers and non-achievers according to NVQ Level aim..... 63

Table 39: Average daily earnings in year after spell end (raw figures) 64

Table 40: Estimated log daily earnings premium for achievers V non-achievers in first tax year after spell end (OLS Regression of NVQ2) 65

Table 41: Estimated log daily earnings premium for achievers V non-achievers in first tax year after spell end (OLS Regression of NVQ3) 66

Table 42: Daily earnings premium of NVQ2 and NVQ3 achievers relative to non-achievers 66

List of figures

Figure 1: Qualification Aims, Completion of Studies and Achievement of Award 19

Figure 2: Average Daily Earnings Returns to Apprenticeship L2 and L3 qualifications 56

Figure 3: Example approach to capture returns from *Skills for Life* 59

Figure 4: Average Daily Earnings Returns to NVQ2 and NVQ3 qualifications 67

Executive Summary

Introduction

In this paper we estimate separately the (i) earnings, (ii) employment and (iii) benefit premiums secured by those who achieve their highest learning aim whilst studying at an English Further Education Institution (FEI), relative to those who have the same highest learning aim, but do not achieve. The work builds on the outcomes of an existing study by Patrignani and Conlon (2011).

We use a dataset containing FE learner information, benefit and PAYE employment histories constructed from the Individualised learner Record (ILR), which contains over 54 million instances of individuals engaged in 114 million separate FE learning aims, together with the Work and Pensions Longitudinal Study (WPLS).

In comparing the returns of those who select into a qualification and achieve, with the returns of those who select into the same qualification and do not achieve, we have the potential to overcome some of the problems of selection experienced elsewhere in the literature. Many studies that utilise data from the Labour Force Survey identify negligible returns to some level 1 and level 2 vocational qualifications. However, this may be partly driven by the possibility that control groups in these studies contain many individuals who are not a realistic comparison group for those with particular level 1 and 2 vocational qualifications.

If individuals who would gain a lower wage (independent of their level of learning) are more likely to select into certain vocational qualifications, then estimated returns may be falsely deflated if we compare them to a control group who do not select into this qualification (and do not manage to control for the implied differences within a multivariate framework). This study may arguably provide a better comparison group because it overcomes some of the biases arising from these selection effects. However, there are weaknesses in comparing those who pass, with those who fail, if we do not effectively control for ability and this is discussed at various points in our analysis.

Our categories of qualification are as follows,

- In the *Full level 2* category we include all highest aims that are equivalent to 5 GCSEs at grade A* to C.
- In the *Full level 3* category we include all highest aims that are equivalent to two A levels
- *Level 2* and *Level 3* include learners with highest aims at these levels of study, but which fall below the equivalence required to be considered ‘Full’.
- *Level 4+* and *Below Level 2* are self-explanatory.

Estimated returns for aggregated qualification categories

Earnings (percentage premiums): we estimate a positive and statistically significant earnings premium for all achievers over non-achievers in all categories of learning aim, across a 4 year period after the end of learning spell. Achievers at *Level 2* and *Level 3* secure the lowest return relative to non-achievers.

The estimated earnings premium for achievers in our category of *Level 2* qualification ranges from 2.1% in the first year after the end of learning, to only 1.6% by the fourth year. This is in stark contrast to the estimated premium for achievers V non-achievers whose highest aim is a *full level 2* qualification, which goes from 18.5% in year 1 to 14.3% in year 4.

The estimated earnings premium for *Full level 3* qualifications varies from 11% in the first year after the learning spell to 11.1% in the fourth year. This compares to an earnings premium for *Level 3* that starts at 2.9% in the first year and rises to 5.4% in the fourth year.

Those achieving a qualification *Below Level 2* earn, on average, 5.6% more than those who do not achieve this stated highest aim in the first year after the learning spell ends. There is an estimated earnings premium of between 6% and 6.7% for achievers in the *Level 4+* qualification category.

From the raw earnings data we see that Full Level 2 and Full Level 3 learners have lower earnings after learning, on average, than those in the Full Level categories – whether they are achievers or non-achievers.

Employment (percentage point premiums): Our estimates of the employment premiums accruing to achievers V non-achievers in different categories of highest-qualification-aim mirror our estimates of the earnings premiums. We observe the highest percentage point returns to those who achieve *Full level 2/3*, relative to non-achievers in these groups.

4 weeks after the end of a learning spell, FE learners who aim and achieve a qualification *below level 2* receive a 3.6 percentage point employment premium over those who have a highest qualification aim of *below level 2* but do not achieve this. This estimated employment probability premium remains relatively stable up to a point four years on from the end of learning spell, when it reaches 4.1 percentage points.

Four weeks after the end of a learning spell, *Level 2* achievers are 3.7 percentage points more likely to be observed in employment, compared to non-achievers and this rises to a maximum of 4.3 percentage points over our period of analysis.

Analysis of achievers and non-achievers whose highest aim is *full level 2* suggests that the former are 8.3 percentage points more likely to be in employment 4 weeks after the completion of a learning spell and 7.1 percentage points more likely 4 years later.

Considering the raw data, it would seem that the differing employment probability premiums observed across our qualification-aim categories of *Level 2* and *Full level 2*, are driven more by differences in the employment probabilities of achievers, as non-achievers in these categories have similar employment levels of 61% and 62% respectively. In

contrast, at *Level 3* and *Full level 3*, achievers (67% and 68% respectively) and non-achievers (63% and 64% respectively) have similar premiums suggested by the raw employment probabilities, and the greater premium only arises for *Full Level 3* when we control for differences in the characteristics of achievers and non-achievers.

Active Job-search Benefit percentage point premiums: our category of *Active Benefits* associated with job-search activity includes Job Seekers Allowance (JSA), Job Training Allowance (JTA) and Employment and Support Allowance (ESA).

The estimated *Active Benefit* premiums are all negative and significant from a point 4 weeks after the end of learning spell. Across all categories of learning aim, achievers have [statistically] significantly lower probabilities of being on *Active Benefits* at points in the first four years after learning, when compared to those who aim for the same qualification but do not achieve.

Full level 2 and *Full level 3* achievers have larger estimated percentage point premiums over non-achievers and this is consistent with our findings of more favourable relative earnings and employment outcomes for these learners (a finding that remains even when we turn percentage point into percentage differences).

Whilst these differences are highly statistically significant, the magnitude of any difference at first seems small in some categories. For instance, at *Level 2* the highest gap we observe is between one and two years after the end of learning spell, when achievers are only 1 percentage point less likely to be on job-seeker benefits than non-achievers. However, in this category of highest learning aim, only 5% of achievers and 6% of non-achievers are on *Active Benefits* one year after end of learning spell – in this instance a 1 percentage point difference amounts to an approximate 18 per cent difference.

The percentage point benefit premium of achievers V non-achievers at *Full level 2* and *Full level 3* is much higher than that seen in other categories of learning outcome and in both cases follows a similar trajectory. Six months from the end of learning spell *Full level 2* achievers are 3.5 percentage points less likely to be on *Active Benefits* than non-achievers and the equivalent figure for *Full Level 3* achievers is 3.2 percentage points. In both cases this premium falls to 1.6 percentage points three years after the end of learning. At all points in the four years after the end of learning spell, the benefit premium for *Level 3* and *Level 4+* achievers is very similar.

Considering the raw data, it would seem that all intermediate qualifiers (i.e. those who have a highest aim of Level X across all learning spells, but achieve level X-1 or X-2 etc.) have relatively poor outcomes compared to our counterfactual group of non-achievers. For instance, 5% of those who aim for *Full level 3* but achieve nothing are on job-seeker benefits a year after learning ends – compared to 9% amongst those who have the same highest aim, but achieve *Full Level 2* and 7% who achieve *Level 3*.

These are raw figures and no attempt has been made to control for characteristics across these groups. It is quite possible that the characteristics of these intermediate achievers are so different from our categories of non-achievers that in a regression framework these differences would disappear – i.e. for these intermediate achievers it is quite possible that there is still a significant return to learning, compared to a situation where they secure nothing from their studies.

Variation by sex and age

The earnings, employment and benefit premiums for achievers V non-achievers are almost always higher for men than for women.

Earnings: for most categories of learning the estimated premiums described above are roughly half way between a higher average premium for males, and a lower average premium for women.

This still leaves us with a positive and significant estimated return for women achievers whose highest aim is *full level 2*; *full level 3* or *level 4+*. Unfortunately this is not the case for *Level 2* and *Level 3* female achievers, whose premium over non-achievers is less than 1% at *level 2* from years 2 to 4; and is almost wholly insignificant in the first three years after learning ends at *Level 3* (though it does jump to 3.7% in the fourth year after learning). These poor returns at *Level 2* are worrying, given that we have between 1.1 and 0.8 million women in our *Level 2* equations. At *Level 3* they are not as worrying, given that the lack of an HE flag is probably leading to under-estimates of any earnings return.

Employment: the employment probability of women achievers over non-achievers runs from 2.9 to 3.5 percentage points for those whose highest aim in any spell is *Below Level 2*. This compares to figures of between 4.6 and 5 percentage points for male achievers and in this instance we have a similar picture to that of earnings, where average returns are a combination of lower female and higher male returns.

However, for other categories of qualification aim, female achievers earn a percentage point employment probability premium that is at least of a similar magnitude to that of male achievers; and in the case of *Full Level 2* and *Full Level 3* it is substantially larger from year 1 onwards. For instance, at *Full Level 2* women Achievers are 9.5 percentage points more likely to be in employment one year after the end of learning compared to non-achievers, whilst the comparable figure for men is only 7 percentage points.

Considering our estimated employment probability premiums we seem to have more evidence of a return to qualifications, when compared to some of the poorer earnings returns that women achievers secure, relative to men. This impression is confirmed when we check the raw employment figures, as the percentages of men and women in employment is roughly equivalent.

Age Differences

Earnings: achievers *Below Level 2* aged 16-18 have a negligible earnings premium over non-achievers of the same age; but in the 19 to 24 age group the premium starts at 4.4% in year one and rises to 7% in year four. For achievers aged 25+ there is a premium that falls from 5.8% to 4.5% over the four years, compared to non-achievers of the same age.

In contrast, when considering *Level 2* qualifications it is the 25+ age group where returns move from less than 1% to become negligible between two and four years after the end of learning. Level 2 achievers amongst the 85,000 to 66,000 learners who are aged 16 to 18 earn a premium that falls from 5.3% to 2.5% and amongst the 260,000 to 167,000 learners aged 19 to 24 the premium for achievers rises from 3.7% to 6.3%.

For *Full Level 2* qualifications, premiums for achievers in the 16 to 18 age group range from 22.2% to 14.9%; for the 19-24 age group the comparable figures are 20.5% to 14.2% and amongst the 25+ age group premiums range from 13% to 10.3%. At *full level 2*, *Level 2* and *Below Level 2* these is no consistent picture emerging that implies any over-arching pattern to premiums, and there is potentially a lot more happening here than just age per se. It is clearly a concern that achievers amongst the one million to 1.5 million *Level 2* learners aged 25+ secure a negligible premium on average, but there is the potential for this average to hide an amount of heterogeneity.

Earnings premiums amongst achievers for our category of *Level 3* qualifications tend to be low and relatively unstable in the 16-18 year age group and move from being negligible to 7.7% over the four years of analysis for the 19-24 year age group. Amongst the 25+ year olds, the earnings premium at various points is between 1.6% and 3.9%. Similarly, our estimated premiums for achievers amongst the 590,000 to 320,000 *Full Level 3* learners in our 16-18 year age group are also unstable. In all these instances we are potentially suffering from the lack of an HE flag. This likely explains the dip for this latter group of learners, where we observe a premium that falls from a statistically significant 5.1% to -3%, to become negligible in the third year and positive 7.2% in year 4

Incorporating the HE flag for a sample of learners

It is recognised that our estimates of the earnings premium secured by achievers at *Level 3* and *Full Level 3* are likely to be lower than the true return to these qualifications, because we do not control for the potential that many of these learners will go on to Higher Education. A large proportion of achievers at *Level 3* and *Full Level 3* will enter Higher Education on completion of their studies and drop out of our earnings equations. However, a substantial proportion are likely to be working part-time during the period of HE studies and daily earnings from such part-time positions are unlikely to include a return to the qualifications they have gained at level 3. This will depress our estimated earnings premium during the first years following learning.

We are able to gain some idea of the magnitude of this effect for a subset of learners in our data born after 31/08/1980 and who experience an FE learning spell between 2004/2005 and 2009/2010. For this subset of learners an HE flag will exist if they have moved on to study at this level.

For this subset of learners, *Level 3* estimated premiums in the first three years after learning almost double (to between 6.6 and 5.5%, compared to 3.8 to 2.9 per cent), when we remove from our estimated equations those who move on to HE learning. At *Full Level 3* there is also a pronounced difference, with estimates that run from 13.4% to 8.5% in the first three years, increasing substantially to between 23.2% and 12.7% when we remove those transiting to HE.

Consideration of differences at other levels of education presents us with an interesting conundrum, as there would seem to be some increase in the estimated premium at most levels of study. Even our estimated premiums for achievers in the *Below Level 2* group rise by between 0.5 and 1.7 percentage points. However, it is the rise in returns at *Level 2* and *Full Level 2* that are particularly interesting, with estimated premiums in the former category of learners doubling from between 3% and 2.4%; to between 6.5% and 5.7%.

By dropping those who transit to HE, we also seem to be dropping those who have an 'FE highest-aim' of *Level 2* or *Full Level 2*, but who have achieved a higher level of learning elsewhere (for instance as part of their Secondary education) which then allows them to move to Higher Education. However, the subset of learners that we are able to identify as transiting to HE are on average younger and experience learning spells towards the end of our window of analysis. As a result, the effects we identify here are unlikely to be exactly replicated in our wider sample – even so, this remains an issue of concern.

Estimated returns for disaggregated qualification categories

Premiums estimated separately for academic and vocational qualification categories

Earnings: 98% of learners whose highest aim is *below level 2* are in our *Vocational and Provider* category, where we have between approximately 2.2 and 1.8 million observations. As a result, estimated earnings premiums of 5.6% to 4.7% are almost identical to the headline findings for this category of *Below Level 2*.

87% of learners at *Level 2* are in our *Vocational and Provider* category (between approx. 1.7 and 1.1 million). The estimated premium for *Level 2* achievers who fall within our category of *Vocational and Provider* moves from 1.9 to 1.3 per cent over the four years following the end of learning (Table 25).

Learners in our *Full Level 2* category are more evenly spread between the *Vocational and Provider* category and the *Vocational and WBL* category. We observe a much higher estimated premium (moving from 18.6% to 14.6%) for *Full level 2* vocational achievers who qualify in an FE environment; compared to the premium for *Full level 2* vocational achievers who study a form of Work Based Learning (14.4% to 10.5%).

This should not be taken as evidence that learners should be moved to an FE-Provider model from a WBL approach. It is quite possible that these two categories (of *WBL* and *FE-Provider*) contain very different types of learner. Achievers in the WBL environments are securing large statistically significant returns, relative to those who do not achieve in this environment - a move to an FE environment would not necessarily raise this return further, as the environment may be less appropriate for them.

Achievers whose highest aim is *Vocational Full level 3* and who are learning within an FE Institution secure substantial earnings premium that start at 12.6% in the first year after learning and by year 4 are 13.9%. For the learners who study *Full level 3* in a WBL context, we observe substantial returns that start at 13% in year one and by year four are still 9.2%.

At *Level 4+* the large majority of learners (between 266,000 and 153,000) fall within our category of *Vocational and Provider* and estimates suggest that achievers secure returns of between 6% and 6.8% at some point in the 4 years following the end of learning.

Employment Probability and Benefit Premiums: Estimated employment probability premiums for achievers over non-achievers in our *Academic Below Level 2* category start at 6.4 percentage points in year 1 and are 5 percentage points by the fourth year. This premium for achievers is higher than that seen amongst the 6.2 million learners who are in

our category of *Vocational and Provider Below Level 2* where premiums rise from 3.8 to 4 percentage points over the four-year period studied. The highest percentage point employment probability premiums at *Below Level 2* are estimated for achievers amongst the 81,000 learners in the *Vocational and WBL* category (ranging between 6.9 and 7.5 percentage points).

This pattern is also reflected at *Level 2*. The lowest [percentage point] employment probability premium of 4.1 is estimated for achievers amongst the 3.8 million learners in the *Vocational and Provider* category; the next highest premium is secured by achievers amongst the 1.9 million learners in the *Academic* category (where premiums rise from 3.8 to 5.4 over four years); and the highest premium (between 6.2 and 7) is estimated for the category of *Vocational and WBL* where we have only 47,000 learners. Considering premiums at *Level 3,* achievers amongst the 1.5 million *Vocational and Provider* learners secure similar returns (2.9 to 3.3 percentage points) to the 870,000 learners in our *Academic* category (2.6 to 4.4 percentage points).

For *Full Level 2* qualifications, estimated premiums for the 1.6m learners in our *Vocational and Provider* category rise from 8.2 to 8 percentage points over the period of analysis; compared to a range of between 7.7 and 7.5 percentage points for those who achieve their qualification aim amongst the 1.4m learners in our *Academic* category. At *Full Level 2* the lowest premium for achievers over non-achievers is seen amongst the 1.6m *Vocational and WBL* learners, where premiums rise from 6.5 to 5.5 over the four years. Similarly, *Full Level 3* premiums for achievers amongst the 1.3m learners in the *Vocational and WBL* category are lower (at between 5.2 and 4.7 percentage points); compared to our category of *Vocational & Provider* (445,000) where estimated returns are between of 7.4 to 7.8 percentage points.

Finally, at *Level 4+* the majority of learners (approximate 520,000) fall within the *Vocational & Provider* category, where employment probability premiums vary between 3.8 and 4.1 percentage points.

Considering raw employment percentages, when we move above our category of *Below Level 2* (where employment rates for the 16-18 year age group are particularly low) we observe employment rates of similar magnitude for each Level of qualification, but with a slight increase as we move from *Academic*; to *Vocational and Provider* and then to *Vocational and WBL*. However, the magnitudes of difference are relatively small and do not alter our general finding that *Vocational and Provider* returns tend to be more pronounced than those for *Vocational and WBL.*

Estimated returns for Apprenticeships

Our regressions contain between 355,000 and 310,000 learners who study for a *Level 2 apprenticeship* and between 146,000 and 91,000 who study a *Level 3 apprenticeship*. The premium for those who achieve a *Level 3 apprenticeship* (a.k.a. Advanced apprenticeships), compared to those who do not achieve, falls from 20.6 per cent in the year directly after the end of learning, to 17 per cent in the fourth year after learning. For achievers of *Level 2 apprenticeships* (a.k.a. Intermediate or Foundation apprenticeships) starts at a similar level (20 per cent) a year after learning and but falls more drastically over the four years, ending on 12.6 per cent.

As we would expect, both achievers and non-achievers amongst our Level 3 learners have higher raw employment rates than those whose highest aim is a Level 2 apprenticeship. However, the returns of Level 2 achievers relative to non-achievers are higher than the premium for achievers at Level 3. One year after learning, Level 2 achievers secure an estimated 7.4 percentage point employment premium, compared to 5.2 percentage points for achievers at Level 3. These percentage points translate into 11.5% and 7.2%, for Level 2 and Level 3 respectively.

The challenge of estimating returns from Skills for Life

In addition to any return from achieving their highest aim of a *Full Level 2* or *Full Level 3* qualification, our analysis initially suggests that learners are securing good returns from the additional SfL learning they are undertaking. Particularly, the returns to *SfL Level 2 literacy* and *SfL Level 2 numeracy* seem positive, statistically significant and substantial.

However, this is more than likely reflecting the way that we implement our framework for analysis, as we also observe some very large negative returns at some levels to GCSEs. We are attempting to reduce unwanted heterogeneity by focusing, for instance, on all learners who achieve *Full Level 2*. However, within this framework, our *Skills for Life* achievement is likely acting as a proxy for the specific type of qualification within the wider group of learners who achieve *Full Level 2*.

For instance, within our category of *Full Level 2* we have a variety of qualifications, ranging from NVQ2 to City & Guilds, BTEC and RSA. The latter categories of qualification have been found to secure significant returns of a much higher magnitude than NVQ2. In our framework, if SfL achievement is much more common amongst those who achieve a *Full Level 2* BTEC, RSA or City & Guilds; and much less common amongst those who achieve NVQ2, our estimated premiums will simply capture some of the differential returns within our wider categories of *Full Level 2* and *Full Level 3* – rather than the actual returns to SfL.

Estimated returns to NVQ2 and NVQ3 qualifications

Analysis of more specific qualification categories (in this cases NVQ2 and NVQ3) allows us to compare our findings with those identified in studies utilising survey data, as they investigate returns to similar qualification categories. We estimate an earnings premium of 24.1% for NVQ2 achievers in year one, which drops to 19%, and by year 4 is just above 18%. In contrast, even having taken into account the HE flag, we find a dip in returns in years 2 and 3 for NVQ3 after the end of learning spell (from 21.5%), with a recovery to 21.8% in the fourth year.

This section confirms the general trend for our estimated premiums to be higher than those obtained in the previous study of ILR data (Patrignani and Conlon, 2011), and those from studies that estimate returns using survey data.

We provide some idea of why our results using ILR data differ from those of P&C, perhaps most importantly the more ‘inclusive’ approach to creation of the dataset, and underline that a separate technical note investigating this issue is available on request.

We discuss why our estimated returns to NVQ2 and NVQ3 qualifications may be substantially higher than those obtained from studies that utilise survey data (for instance,

Greenwood, Jenkins and Vignoles, 2007; McIntosh, 2009). It would seem likely that the nature and extent of any unobserved differences between treatment and control groups, across different specific qualification types, accounts for much of the gap between our estimates and those obtained from survey-based studies.

Conclusions

We continue the discussion from Section 5 and consider the issue of ***Unobserved heterogeneity and ability bias*** in more detail. Whilst it is not wholly clear that the potential for bias in our analysis is any more acute than that seen in survey-based studies, it would seem sensible to suggest that our estimates are likely to be close to the upper-bound of possible estimates. Therefore, when we identify qualifications for which there are zero or negative estimated returns in this study, we can be confident that these are truly worrying.

In this respect we draw attention to the premium secured by women achievers at *Level 2*, whose premium over non-achievers is less than 1% at *level 2* from years 2 to 4; and is almost wholly insignificant in the first three years after learning ends. These poor returns at *Level 2* are worrying, given that we have between 1.1 and 0.8 million women in our *Level 2* equations.

There are a number of issues that this paper flags up which could usefully form the focus of research going forward. It would be important to focus on one or two types of educational qualification to allow a more detailed investigation of returns. The creation of this dataset is a genuinely exciting development in the measuring of returns to FE learning in England. It presents a unique opportunity to better understand where both our estimates and those from survey-based studies are wide of the mark. The reality is that the answer may lie somewhere in-between.

1. Introduction

In this paper we estimate separately the (i) earnings, (ii) employment and (iii) benefit premiums secured by those who achieve their highest learning aim whilst studying at an English Further Education Institution (FEI), relative to those who have the same highest learning aim, but do not achieve. This approach to estimation of the returns gained at English FEIs is made possible by the construction of a database linking FE learner information, with benefit and PAYE employment histories. Our categories of educational attainment relate to the National Qualifications Framework (NQF) and run from *Below Level 2* to a highest category of *Level 4+*, with estimated returns covering the period 1st August 2002 to 1st August 2011, for those aged 16+.

This work builds on the outcomes of an existing study by Patrignani and Conlon (2011) [from here referred to as P&C], also commissioned by the *Department for Business Innovation and Skills*. P&C use similar sources of information, but adopt a very different approach to construction of the dataset. In the following *Data and Method* section we give some idea of the 'spells-based' approach that we have taken and how this contrasts to the 'aims-based' data utilised by P&C. The report accompanying this paper[1] also details a very 'inclusive' approach to creation of the data, with learner records retained in the data wherever possible. This contrasts with the more 'exclusive' approach adopted in creating the data utilised by [P&C], which leads them to include approximately 6.9 million learners in their analysis, where we would include closer to 9 million for analysis of the same period[2].

Both the dataset of P&C and our data have been constructed using the Individualised learner Record (ILR), which contains over 54 million instances of individuals engaged in 114 million separate FE learning aims; the Work and Pensions Longitudinal Study (WPLS), which contains the benefit histories of over 9 million individuals, P45 records relating to 15 million individuals and P14 earnings relating to 14 million individuals. However in contrast to P&C, we are also able to incorporate some measures of prior achievement from a component of the National Pupil Database (NPD) for all learners born after 31st August 1985; together with an HE flag, for a subset of learners progressing to Higher Education taken from the Higher Education Statistical Agency's (HESA) student record; and a file of data on Job Training Allowance (JTA) payments which are not included in the WPLS.

The use of a spells-based approach to estimation, an inclusive approach to learner records, the addition of prior-achievement and HE outcome data, together with an expansion of the period for analysis by approximately 5 years, leads us to estimates that differ from those of P&C. The next section of this paper provides detail on data and econometric method. First, Figure 1 and Table 1 provide schematic overviews of our

---

[1] Bibby, D., Knight, T., Speckesser, S. and Thomson, D. (2012), "Measuring Further Education Outcomes Using Matched Administrative Data: Constructing a Research Database", *RM Data Solutions* and *Institute for Employment Studies.*

[2] A separate technical note is available on request, investigating the differences between the approach to data creation adopted here and that of P&C (London Economics), when the time period for analysis in both cases is learning spells between 1st August 2002 and 31st July 2006.

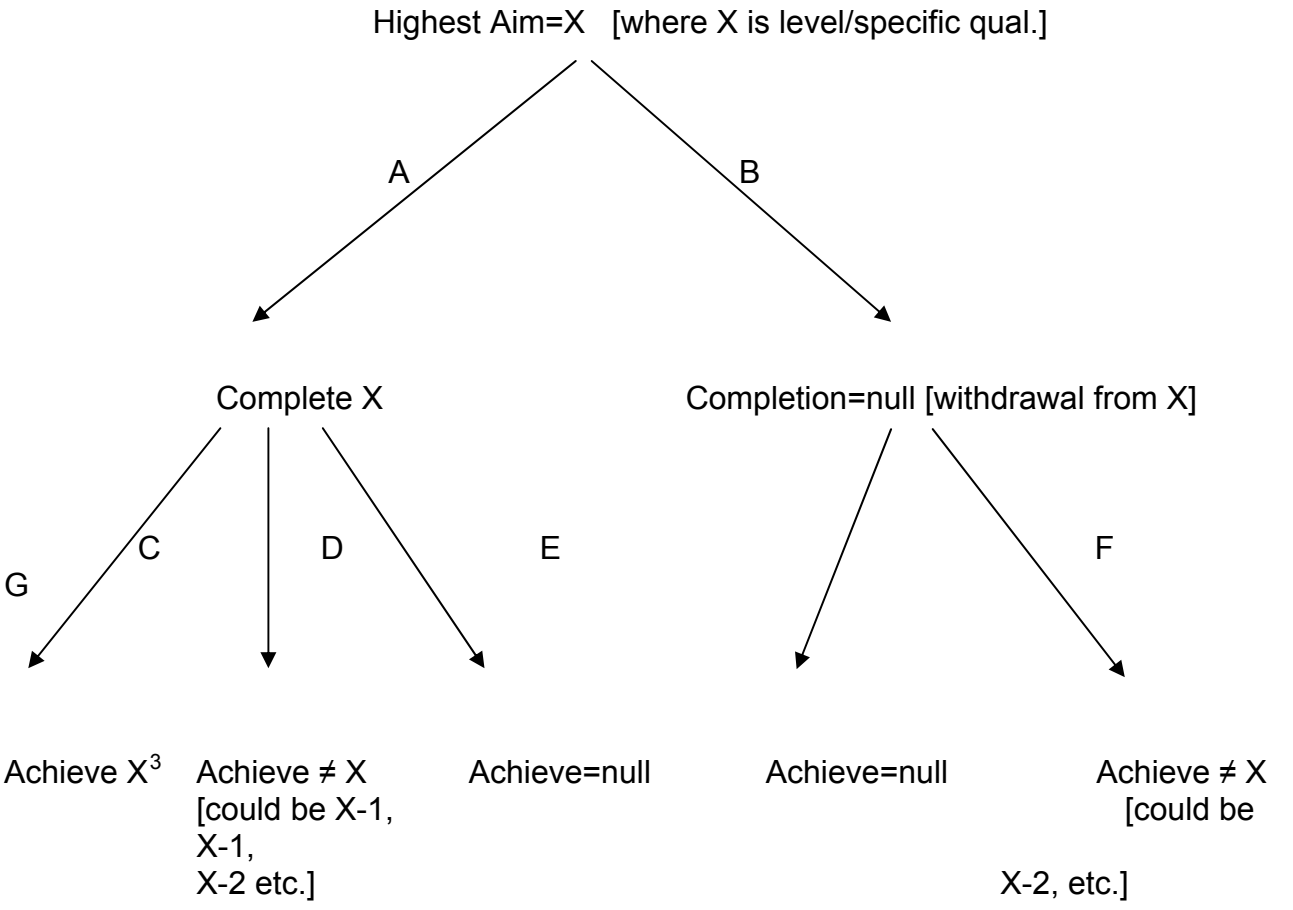
approach to creation of treatment and control groups, and also clarify some of the terminology used.

Figure 1: For each individual FE learner, across all of their learning spells, we identify the highest qualification that they aim for [*Highest Aim=X*]. We can then think of these learners as branching off into either [A] those who complete their studies [*Complete X*] or [B] those who withdraw from X [*Completion=null*]. Completion of studies for an award does not necessarily imply that they gain the award (i.e. they do not necessarily pass or 'achieve').

- The group of learners who Complete X have three potential outcomes: they can [C] gain the award and Achieve X; they can [D] achieve a qualification at a level lower than X [Achieve ≠ X but could be Achieve=X-1] or they can fail to achieve any certified outcome from their studies [Achieve=null].

- The group of learners who withdraw from their studies [Completion=null] can either [F] fail to achieve any certified outcome [Achieve=null] or [G] they can achieve a qualification at a level lower than X (Achieve ≠ X but could be Achieve=X-1).

Figure 1: Qualification Aims, Completion of Studies and Achievement of Award



[3] Strictly speaking this category may be further disaggregated into (i) those who *Achieve X* at a Further Education Institution (FEI), and in the process also achieve an intermediate [X-1, X-2] qualification and (ii) those who only *Achieve X* at an FEI.

Not all combinations of C, D, E, F and G are uniquely identifiable from the data, but this is a schematic that helps to clarify terminology. We now describe our empirical approach using the example of an analysis which estimates the premium that achievers have over non-achievers, when both have as their highest learning aim a *Full Level 3* qualification. Detail of the qualifications included in the category of *Full Level 3* and other categories in Table 1 are provided in the following *Data and Method* section.

Table 1 details all possible combinations of *Highest Aim* and qualification *Achievement*. For instance, the cell marked 'X' contains all learners whose *Highest Aim* across all learning spells is *Full Level 2*, but whose *Highest level of Achievement* is recorded as *Below Level 2*. Referring back to Figure 1, this cell includes all completions and withdrawals who have Achieve ≠ X (in this case *Achieve* = *X-2*). In contrast, we should not observe any observations in the cell marked 'Z' as one cannot have a highest aim of *Full Level 2* and Highest Achievement of *Full Level 3.*

Table 1: Example of treatment (achievers) and control (non-achievers)

Highest Aim	**Highest level of Achievement**						
	Null	Below L2	Level 2	Full Level 2	Level 3	Full Level 3	Level 4+
Below Level 2							
Level 2							
Full Level 2		X				Z	
Level 3							
Full Level 3	**Control**					**Treatment**	
Level 4+							

All cells to the right of the grey diagonal should be empty and the grey diagonal represents our treatment groups for each level of qualification. For instance, if we wish to identify the raw earnings premium that achievers secure over non-achievers at *Full Level 3*; we simply compare average earnings of those in the cell marked **Treatment** (which contains those who aim and achieve *Full Level 3*) with those in the cell marked **Control** (which contains those who have a highest aim of *Full Level 3*, but who achieve no qualification). For each of the treatment groups represented by our grey diagonal, the relevant control is the cell in the (yellow) Null column of the same row.

In our regression analysis we attempt to control for additional differences in characteristics between the treatment (achiever) and control (non-achiever) groups; rather than simply comparing average earnings, employment or benefit rates amongst the treatment and control groups using raw data.

Our approach raises a number of issues to which we return in the conclusion.

1. In adopting this approach, we rule out all intermediate qualifiers (the Blue cells) from our control group. The reason we adopt this approach is that inclusion of these intermediate qualifiers in the control would seem to push us towards consideration of relative, rather than absolute, returns. In the example given if we included in our control, learners who aim for *Full Level 3* but achieve *Full Level 2*, then an element

of our estimated returns would be the premium for Full Level 3 relative to Full Level 2[4].

2. The approach set out in Table 1 makes no distinction between those who are completers and non-completers (as identified in Figure 1) amongst our control group of non-achievers. In the regression analysis we use a [piecewise] control for spell length (as non-achievers have, on average, shorter spell durations) and this moves us towards an analysis that is comparing the premium gained by **achievers**, relative to **non-achieving completers**.

In comparing the returns of those who select into a qualification and achieve, with the returns of those who select into the same qualification and do not achieve, we have the potential to overcome some of the problems of selection experienced elsewhere in the literature. For instance in Section 5, we analyse the returns to NVQ2 and NVQ3 qualifications, which are widely held and also a focus of much of the existing academic literature (for instance, Dearden et al., 2004; Greenwood et al., 2007; McIntosh, 2007; Dickerson and Vignoles, 2007; P&C, 2011). These studies, which tend to utilise data from the Labour Force Survey, often identify negligible returns to some NVQ qualifications at Levels 1 and 2. However, this may partly be driven by the possibility that control groups in these studies contain many individuals who are not a realistic comparison group for those with vocational qualifications.

If individuals who would gain a lower wage (independent of their level of learning) are more likely to select into certain vocational qualifications, then estimated returns may be falsely deflated if we compare them to a control group who do not select into this qualification (and do not manage to control for the implied differences within a multivariate framework). We must be careful in making comparisons between our study, which uses administrative data, and studies that utilise survey data (such as the LFS). However, the analysis of NVQ2 and NVQ3 qualification categories in Section 5 allows a more detailed comparison of estimates, as we have broadly comparable qualification categories. The discussion also helps to clarify a number of additional issues, such as, whether we are estimating 'marginal' returns in the same way as envisaged in the existing literature[5].

Generally therefore, the strength of our approach is that we have the potential to overcome the sort of selection effects that may possibly explain low and negative estimated returns in some of these survey-based studies. When estimating returns to academic HE qualifications there is a concern that estimates are biased upwards, because the more able select into HE, and if we do not fully control for this then any earnings premium for

[4] It is important to note the distinction here between qualifications gained at FE during the period under study and those obtained elsewhere, possibly in a different time period. It is quite possible that in this example our control group, of those who aim but do not achieve *Full Level 3*, do not pick up other intermediate qualifications at FE because they already possess them at the start of their learning spell. In this instance our regression equation would likely control for any such qualifications, whereas this would not be the case for those who achieve such qualifications at FE whilst studying for a higher aim.

[5] It is recognised that the term 'marginal' return is something of a misnomer in the academic literature, as it is an approach that attempts to capture the return to highest qualification held. This is in contrast to estimated 'average' returns (which are calculated for qualifications, whether held as an individual's highest or otherwise).

those with a degree contains an upward bias[6]. In contrast, when considering vocational qualifications below level 3 it is thought that the opposite effect may occur.

However, there are weaknesses in comparing those who pass, with those who fail, if we do not effectively control for ability and this is discussed at various points in our analysis. The challenge is to identify the differing returns to **skills acquired** by those who achieve, relative to an otherwise identical group who do not achieve, their highest learning aim. We use regression analysis to control for any differences between the characteristics of achievers and non-achievers, so that we are more likely to be comparing 'like-with-like'.

If we do not fully control for the possible higher ability of achievers relative to non-achievers, then our returns will be over-estimated. The question is whether our estimated returns are biased because they reflect an achiever's **greater ability to acquire skills**, relative to a non-achiever. At lower levels of educational attainment this is perhaps less of a problem, as ability is less likely to be the main differentiator of achievers and non-achievers, but it is still a concern as we are not able to control for factors such as motivation etc.

Generally it would seem that if we identify qualifications for which there are zero or negative estimated returns, then we can be more confident that these are truly worrying. In contrast, it is quite possible that premiums in some areas may be over-estimated. However, this is an issue open for debate and we return to discuss some of the arguments in *Section 5* and in the *Conclusion*.

[6] The bias may actually arise from a variety of related issues, not just ability, but it invariably arises because those who are more likely to gain a higher wage (independent of their level of learning) are also more likely to select into HE.

2. Data and Method

Here we provide some detail in Section 2.1 on the creation of a spells-based dataset and in Section 2.2 we detail our approach to modelling returns in a multivariate framework.

2.1 Creation of a dataset containing learning spells

The first step in compiling the data for analysis was the creation of a unique identifier linking an individual's records across the constituent databases and data files. Each constituent data source has its own unique individual identifier which may not be internally unique, and which (before transfer to the project team) may incorrectly ascribe records to the same individual; and conversely not match records correctly to the same individual. We used the 3 identifiers from the ILR, National Benefits Database (CCORCID) and the HMRC person-instance-ID (PID) to construct an over-arching Person-key to link records in the data sources reliably to the same individual.

The identification of distinct ILR learners starts to take place where there is at least one other referencing identifier – here CCORCID and PID (noting that not all individuals have both of these records). We used the three identifiers in a process of 'record chaining' to show the relationships between them, accepting that we had insufficient information to indubitably decide which linkages were correct and which were not. As a consequence, we developed a set of procedures to arbitrate between competing matching possibilities according to circumstances but without rejecting the possibility of the same individual having more than one CCORCID or PID. These procedures led to the creation of our Person-Key, which identifies the same individual in the various data sources within our database.

Our work resulted in just over 25 million Person-Keys, which reduced to almost 22 million once individuals found only in European Social Fund (ESF) and Adult and Community Learning (ACL) ILR files were disregarded for analysis. Of this latter total, some 0.5 million Person-Keys (2.5%) were associated with more than one PID (and a few with more than one CCORCID). A majority of Person-Keys did not have a CCORCID and although this will be associated with younger FE learners not having been in receipt of benefits when first matched (and never being matched subsequently), many of the absent matches will be related to under-matching as a result of the fields used in the matching routines.

We have confidence that for the most part the matches in our database are secure, but there remain undoubted questions about a small minority. For example, just over 30% of Person-Keys do not have either a CCORCID or PID and we have no information which would tell us how many duplicate sets of ILR identifiers still remain. Because we cannot distinguish learners under-matched to WPLS from those not contained within it, we omit unmatched learners from our analysis of FE learners' employment, earnings and benefits dependency with the result that reports we present may be biased upwards.

The construction of Person-Keys within the database allowed us to group overlapping and adjacent learning aims, and to do the same for periods of employment and benefit spells.

This allowed us to analyse any of the 3 activities individually and collectively between any two dates or for any specified time period.

We identified the highest level of study within a learner's aims (if there was more than one) undertaken within a single learning spell (of which there could be more than one), together with its characteristics (such as length of the aim and whether the aim was completed or achieved). Almost 29 million learning spells (55% at NQF Level 2 or above) were created for nearly 22 million Person-Keys.

We created analogous spells for benefit periods, primarily to identify continuous periods (spans) when individuals were in receipt of out-of-work benefits (OWB). Partially overlapping periods of JSA, JTA and ESA could extend a continuous OWB span but, unlike learning spells, breaks of more than one day in a continuous spell resulted in a separate OWB span.

Benefit start and end dates are not measured to the day: regular scans of the databases are taken so the accuracy of these dates depends on the frequency of the scans. JSA scans, for example, are taken every 14 days. Employment spells (from P45 data) should be accurate to the day – since employers should in principle know when an employee begins and finishes a period of PAYE employment. However, 34% of spells appeared to have start or end dates that were missing or had been assigned an HMRC default.

The data and information available for the project was insufficient to permit unambiguous procedures to replace missing or default data so that we could calculate the length of employment spells. The volume of default data was such that we necessarily created an extensive decision rule process to, firstly, establish the possible range of start and end dates and, secondly, develop a structure to assign specific dates within the ranges. The proportion of learners with imputed start or end dates varied over the 8 years for which we had P45 data, and between the two illustrative dates in the year we chose to interpret what our processes had achieved. The rate for all but the latest two years (tax years 2010 and 2011) was generally between 3.5% and 5%, and higher in April at the start of the tax year. We observed that rates were higher in April 2008 (9.5%) and January 2009 (7%) following an HMRC reconciliation of P45 and P14 systems during 2008/9.

Readers should refer to the accompanying report (see footnote 1) for more detail of these processes.

The Appendix Table sets out a number of descriptive statistics, which have been created from the entire available dataset. In the following analysis, the exact set of records used depends on the analysis being conducted.

Our categories of qualification are as follows,

- In the *Full level 2* category we include all highest aims that are equivalent to 5 GCSEs at grade A* to C.
- In the *Full level 3* category we include all highest aims that are equivalent to two A levels
- *Level 2* and *Level 3* include learners with highest aims at these levels of study, but which fall below the equivalence required to be considered 'Full'.

- *Level 4+* and *Below Level 2* are self-explanatory.

These '*Level of study'* categories are based on all aims undertaken by a learner within a spell (not just their single highest aim). For instance, an individual undertaking 5 GCSEs (and nothing else) will be categorised as '*Full Level 2*' even though the single highest aim would only be worth 20% of the Level 2 threshold. NVQs will always figure in our Full categories, as will the majority of BTECs, whereas RSA and City & Guilds qualifications could fit into either *Full* or *Other* depending on the level of commitment required of the learner.

2.2 Econometric approach

The econometric identification strategy builds upon work by [P&C] who use various counterfactual groupings to assess the long-term impacts of further education qualifications. In particular we make use of the achievers vs. non-achievers concept outlined in the previous discussion. The actual econometric models estimated take the following form and are all estimated using Ordinary Least Squares (OLS):

$$y_i = \alpha + Qual_i'\beta + \mathbf{x}_i'\gamma_x + \varepsilon_i$$

where the dependant variable, y_i, takes one of the following forms (with those in bold forming the focus of this particular paper):

- **Log of deflated daily earnings (top and bottom 1% removed) in the whole financial tax years 1, 2, 3 and 4 after learning spell end.**
- **The probability of being employed (binary) exactly 4 weeks, 3 months, 6 months, 1 year, 2 years, 3 years and 4 years after spell end.**[7]
- The number of days employed [1,365] during the whole financial tax years 1, 2, 3 and 4 after learning spell end.
- **The probability of being on job-seeking ['Active'] benefits (binary) exactly 4 weeks, 3 months, 6 months, 1 year, 2 years, 3 years and 4 years after spell end.**
- The number of days on out of work benefit [1,365] during the whole financial tax years 1, 2, 3 and 4 after learning spell end.
- The probability of being on 'Other' benefits (binary) exactly 4 weeks, 3 months, 6 months, 1 year, 2 years, 3 years and 4 years after spell end.
- The number of days on other benefit [1,365] during the whole financial tax years 1, 2, 3 and 4 after learning spell end.

[7] Some regressions have binary variables on the left-hand side. These models are also estimated using OLS resulting in a linear probability model (LPM). Such models have the disadvantage that out-of-bound predictions can occur (probabilities greater than 1 or less than 0) and also suffer from heteroscedasticity. However, the sheer size of the data makes logit/probit modelling with marginal effects highly computationally intensive; particularly as our identification strategy requires each qualification level to be estimated in its own regression equation. LPM models generally performed well and we report robust standard errors.

The qualification variables, $Qual_i$, are inserted as dummies where a value of 1 represents those who achieved their highest spell aim, whilst a value of 0 represents those who had the same highest spell aim, but failed to achieve any qualification within that spell (achieve=null in Table 1). The coefficient β then represents an estimate of the return (or premium) to that qualification level.

It should be noted here the nature of our setup (achievers vs. non-achievers) requires each qualification level to be estimated in its own regression model. This makes the production and presentation of diagnostic statistics difficult within the context of this report – since each estimate is connected to its own regression equation with varying covariates, diagnostics, number of observations and predictions. These are available upon request. Care was taken throughout the modelling process to ensure that diagnostics contained sensible parameters and that regression controls displayed the correct signs.[8]

Referring to **Table 2a**, the vector $\mathbf{x}_i$ contains a series of control variables which include gender (*sex*), *age* dummies, *ethnicity* dummies, a *disability* indicator, dummies for *region*, funding type (*fundtype*) dummies (none, LCS, ESF, both), study mode (*stdymode*) dummies (full/part-time), *postcode* dummies (first three digits) and γ_x are parameters which present the estimated impact of those particular control variables on the dependent variable. To a large extent these controls mirror those used by P&C and Table 2a presents the impact of these controls on daily earnings returns to a *Full level 2* qualification (achievers V non-achievers) in a step-by-step framework. Results suggest that age and gender controls reduce the estimated return significantly whilst other controls do not significantly impact the estimated return to a *Full Level 2* qualification.[9] Section 5 of our report carries out a similarly detailed analysis for the estimation of NVQ2 and NVQ3 qualifications.

Table 2a: Returns to log daily earnings 1 year after spell end – the impact of simple controls in stepwise addition

	(1) null	(2) +sex	(3) +age	(4) +ethnicity	(5) +disability	(6) +region	(7) +fundtype	(8) +stdymode	(9) +postcode
level25	0.276***	0.266***	0.205***	0.204***	0.204***	0.205***	0.205***	0.211***	0.210***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
N	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000
r2	0.019	0.074	0.119	0.121	0.122	0.124	0.124	0.127	0.130
r2_a	0.019	0.074	0.119	0.121	0.122	0.124	0.124	0.127	0.129

Standard errors in parentheses * p<0.05 ** p<0.01 * p<0.001

However, in **Table 2b** we expand the controls in vector $\mathbf{x}_i$ to include additional variables such as offender status *(offe)* dummy, a difficult learner (*diff*) dummy, *year* dummies (to pick up any yearly effects not accounted for in the deflated earnings measure) and interactions (*intx*) between *gender* and *age*[10]. Moreover, we also include a prior qualification variable (*level*), which measures the highest qualification achieved to date at the *start* of an individual's learning spell. This educational control is comprised primarily of

[8] For example, R^2 generally ranged between 0.1 and 0.2 – a sensible range within a Mincerian framework.
[9] All controls are statistically significant.
[10] More interactions such as gender.age.ethnicity or gender.age.regions were tried but were found to drastically increase estimation time with little benefit.

information from the NPD. Prior education information is generally available for younger individuals (aged less than 25) whilst older individuals will have missing education dummies. The inclusion of this variable is an important addition to the work by [P&C] as we now enter a 'value added' framework where we estimate the additional value of achieving an FE qualification (compared to those who fail to achieve) controlling for prior qualifications already obtained.

Finally, we also include two spell-based variables, which control for the spell duration in months (*dura*) and the spell *count* (number of spells for each individual). The inclusion of spell duration makes a difference, because the control group (those who fail to achieve within their spell aim) generally exit their learning early. It would seem sensible to control for this differential spell attrition, as it is usually important to create 'otherwise identical' treatment and control groups. However, as *Bullet Point 2* on page 15 of the *Introduction* suggests, this moves us towards an analysis that is comparing the premium gained by **achievers**, relative to **non-achieving completers**. Depending on how we view non-completers, as either 'drop-outs' or those who are offered attractive job opportunities whilst learning, we may wish to consider variations on this approach in future work. We return to consider the issue of completers and non-completers, but at this point it is worth noting that whilst the inclusion of spell-length as a control does effect estimated premiums, it's impact is not particularly large – in Table 2b, which presents the additional impact of these controls on daily earnings returns to a *Full level 2* qualification, the estimated premium only falls from 20.9% to 19.4%. In this particular example, the impact of controls is to reduce the estimated earnings return to a *Full Level 2* qualification by 9 percentage points from 27% to 18% (27% can be seen as the 'raw', univariate, difference whilst 18% should be seen as the multivariate earnings difference).

Table 2b: Returns to log daily earnings 1 year after spell end – the impact of further controls in stepwise addition

	(10) +offe	(11) +diff	(12) +dura	(13) +count	(14) +level	(15) +year	(16) +intx
level25	0.209***	0.209***	0.194***	0.193***	0.198***	0.191***	0.185***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
N	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000	1746643.000
r2	0.130	0.131	0.131	0.132	0.133	0.137	0.146
r2_a	0.130	0.130	0.131	0.131	0.132	0.137	0.145

Standard errors in parentheses * p<0.05 ** p<0.01 * p<0.001

Given the unique nature of this data and previous work by [P&C] a significant amount of time was spent explaining differences between our findings and those of [P&C], and a technical note to this effect is available on request. Whilst the results in this report build on those of P&C, it is very much a first attempt at creating information across a very wide range of educational qualifications, outcomes, and sub-categories of learner. The number of regressions estimated runs to approximately 700 and some equations underpinning a table can take more than a day to estimate.

3. Estimated returns for aggregated qualification categories

This section details the findings from an analysis of the earnings, employment and benefit premiums that achievers secure over non-achievers with the same learning aim, in each of the categories of learning detailed in Section 2.1. Section 3.1 details the estimated earnings premiums; Section 3.2 the employment probability premiums and Section 3.3 the *Active* (job-seeker-related) benefit premiums. Finally, Section 3.4 sets out the possible variation to these headline findings when we consider the returns to these categories of qualification separately for men and women; and for different age groups.

3.1 Earnings

The results in Table 3 are obtained from 24 separate regressions run for our aggregated categories of FE educational outcomes. For instance, the figure of 0.056 in the top left-hand corner of Table 3 is a coefficient obtained from a regression equation estimated for 6,295,057[11] individuals whose highest qualification aim, across all their learning spells, is *Below level 2*. Amongst this 6,295,057 whose highest qualification aim is below level 2, there are 4,553,416 who achieve, and 1,741,641 who fail to achieve, this stated aim. The coefficient of 0.056 is an estimate of the additional earnings that achievers receive in the first tax year after the learning spell ends, compared to the earnings of those who fail to achieve the aim[12], controlling for a variety of additional factors in our regression equation[13]. Those achieving a qualification *Below Level 2* earn, on average, 5.6% more than those who do not achieve this stated highest aim in the first year after the learning spell ends.

[11] In subsequent discussion these figures are rounded to aid exposition – this figure would be presented as approximately 6.3 million.

[12] These equations are pooled across time, with year dummies included as controls. We are comparing the earnings of achievers and non-achievers in the first year after a learning spell ends and in order to control for the fact that non-achievers (on average) have shorter learning spell durations, we control for spell-length.

[13] We control for age, gender, ethnicity, disability, region, IMD [mimicked via postcode dummies], type of funding, delivery mode, offender status, year dummies, length of spell and number of spells by individuals. Apart from age, gender and spell length, few of these controls significantly change the estimated coefficients.

Table 2: Daily earnings premium of achievers relative to non-achievers

	Log Daily Earnings in Tax Year after Spell End			
Achievement	First Year	2nd Year	3rd Year	4th Year
Below Level 2	0.056***	0.051***	0.051***	0.047***
	(0.002)	(0.002)	(0.002)	(0.002)
Level 2	0.021***	0.015***	0.015***	0.016***
	(0.002)	(0.002)	(0.002)	(0.002)
Full Level 2	0.185***	0.152***	0.143***	0.143***
	(0.002)	(0.002)	(0.002)	(0.003)
Level 3	0.029***	0.019***	0.027***	0.054***
	(0.002)	(0.002)	(0.003)	(0.003)
Full level 3	0.110***	0.053***	0.065***	0.111***
	(0.003)	(0.003)	(0.003)	(0.004)
Level 4+	0.062***	0.062***	0.067***	0.060***
	(0.004)	(0.004)	(0.004)	(0.005)

*** significant at the 0.1% level; ** 1% and * 5%

Moving along this first row of Table 3 the results of three more regression equations, estimated for this group of achievers and non-achievers, suggests that this earnings premium falls from 5.6% to 4.7% between the first and fourth year after the end of a learning spell. This could be due to the earnings of the non-achievers catching-up as they 'recover' from their failure to achieve their stated aim or some other form of selection of achievers and non-achievers into the equations for each time period[14].

All the results of Table 3 are statistically significant at the 0.1% level (i.e. 99.9% confidence interval) and this gives us some confidence that there is a strong correlation between achievement of a qualification aim and higher earnings. To aid exposition, the remaining discussions do not explicitly state the level of significance associated with each of our results, with the assumption being that if figures are cited they are highly significant. Most of our coefficients are significant, but we must still treat these estimates with some caution, as the equations they are derived from are typically explaining between 10 and 20 per cent of the variation in earnings. This is not unusual in the literature (see for instance, Greenwood, Jenkins and Vignoles, 2007), but we would ideally wish to improve our goodness-of-fit. The omission of relevant variables means that the estimated premiums are possibly capturing differences between our achievers and non-achievers, in addition to the obtaining of a qualification. For instance, it is quite possible that our achievers are more motivated and dedicated than our non-achievers. Motivation is likely to be something that secures an individual a higher wage, irrespective of their level of qualification, but we cannot control for this in our equations.

The estimated earnings premium for achievers in our category of *Level 2* qualification ranges from 2.1% in the first year after the end of learning, to only 1.6% by the fourth year.

[14] For each year after the learning spell-ends, our regression equations for earnings will include a (sometimes quite substantially) smaller subset of the 6,295,057 achievers and non-achievers whose highest stated aim across all learning spells is (in this case) *below level 2*. This is because, for each of the four regression equations contained in a row, we are including all observations where we have at least one day worked in the relevant tax year and therefore an earnings observation.

This is in stark contrast to the estimated premium for achievers V non-achievers whose highest aim is a *full level 2* qualification, which goes from 18.5% in year 1 to 14.3% in year 4. This splitting of Level 2 aims into two categories leaves us with almost identical sample sizes for achievers (approx. 3 million in both the *level 2* and *full level 2* categories) and non-achievers (1 million in both categories).

We must be careful in drawing comparisons with studies that use the Labour Force Survey, and we save this discussion until Section 5 when we analyse NVQ2 and NVQ3 qualifications. However, it is worth noting that within our category of full level 2 we have individuals who are aiming for BTEC, RSA, City and Guilds qualifications that are equivalent to 5 GCSEs at grades A* to C. Existing studies estimate the earnings premium to these sorts of qualification as being between 13 and 20 per cent, when compared to those with no qualifications (Dearden et al., 2004; Jenkins et al., 2007; McIntosh, 2007). In contrast, the returns to some level 2 NVQ qualifications have been estimated as zero or negative, when compared to those with no qualifications (ibid.) and these are also likely to be within our *Full Level 2* category.

In the existing literature there is a similar amount of heterogeneity in the estimated returns for qualifications gained at NQF Level 3 and we attempt to capture some of this in differentiating 'full' and other level 3 aims. In the *Full Level 3* category we have approximately 2.3 million achievers and 500 thousand non-achievers; compared to 1.5 million achievers and 500 thousand non-achievers in the *Level 3* category. The estimated earnings premium for *Full level 3* qualifications varies from 11% in the first year after the learning spell to 11.1% in the fourth year. This compares to an earnings premium for *Level 3* that starts at 2.9% in the first year and rises to 5.4% in the fourth year. At this point in our analysis we do not attach particular weight to the estimates obtained for *Level 3* and *Full Level 3* at points two and three years after learning, because they are likely to be lower than the true values. This is an issue to which we return in Section 3.5, where we obtain more reliable estimates of the daily earnings returns to *Level 3* and *Full Level 3* for a subset of learners.

Table 4 sets out the average daily earnings across our achiever and non-achiever groups from the 'raw' data[15]. This helps to contextualise the findings from Table 3. Generally, we find that those attempting *Full-level 2* or *Full Level 3* qualifications have lower average post-learning wages (whether they are achievers or non-achievers) compared to those in our *Level 2* and *Level 3* qualification categories. We might speculate that a larger proportion of *Level 2/3* learners are in full-time employment before, during and after learning, as they have highest learning aims that demand less of their time; in contrast to *Full level 2/3* learners who are perhaps taking qualifications at a point before they have entered the labour market for the first time. However, the picture seems to be more complicated. Whilst *Level 3* learners have a 57% employment rate one year before learning, compared to 45% amongst *Full level 3* learners; the comparable figures for *Level 2* and *Full level 2* are 58% and 63% respectively[16]. Also, we can see that intermediate achievers have raw average earnings that are almost everywhere lower than the corresponding control group (of non-achievers) – an issue to which we return.

[15] Figures that are simply observed in the 'raw' data, with no control for potential differences in characteristics between achievers and non-achievers.
[16] Though it should be remembered that all figures here include both part-time and full-time working.

Finally, Table 3 seems to suggest a relatively low return for the 412,853 individuals who aim and achieve *Level 4+* qualifications. The estimated earnings premium of between 6% and 6.7% for this group is obtained by comparison to a control group of 168,830 for whom this is the highest recorded qualification aim, but who do not achieve anything during that time. Both achievers and non-achievers are relatively well qualified and it would seem harder to achieve a substantial improvement in returns from such a high base. This seems to be supported by the fact that raw figures (Table 4) for average daily earnings amongst achievers (£59.93) and non-achievers (£59.15) who have a qualification aim of *Level 4+* are almost identical in the first year after spell end. Even by the fourth year the figures have only diverged slightly between non-achievers (£66.18) and achievers (£67.75). As table 4 suggests, this level of daily earnings is substantially higher than those observed in any other category of qualification aim (whether achievers or non-achievers).

Table 3: Raw average daily earnings in year after the end of learning spell

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full Level 2	Level 3	Full Level 3	Level 4
No achievement	47.85							
No level	53.35	60.53						
Below Level 2	47.07	45.23	50.15					
Level 2	50.10	47.49	44.69	48.11				
Full Level 2	39.94	37.40	34.79	34.87	46.60			
Level 3	50.24	44.46	41.74	44.19	38.52	53.83		
Full level 3	38.79	34.41	36.14	34.22	34.16	31.23	36.92	
Level 4+	59.15	57.10	53.52	49.50	64.62	51.98	44.17	59.93

3.2 Employment

Table 5 reports the employment probability premiums for our categories of educational achievement obtained from estimation of 42 separate regression equations. As one would expect, our estimates of the employment premiums accruing to achievers V non-achievers in different categories of highest-qualification-aim mirror our estimates of the earnings premiums presented in Table 3. We observe the highest returns to those who achieve *Full level 2/3*, relative to non-achievers in these groups. However, in contrast to the coefficient estimates presented in Table 3, the figures in Table 5 represent percentage-point, rather than percentage, differences and therefore we need to give even more consideration to raw average figures (in this case average employment rates).

For instance, in the top-left-hand corner of Table 5 the suggestion is that 4 weeks after the end of a learning spell, FE learners who aim and achieve a qualification *below level 2* receive a 3.6 percentage point employment premium over those who have a highest qualification aim of *below level 2* but do not achieve this. This estimated employment probability premium remains relatively stable up to a point four years on from the end of learning spell, when it reaches 4.1 percentage points. Whilst this estimated premium is significant, it does not seem particularly large[17]. However, from Table 6 we can see that

[17] A finding that is highly statistically significant can be small in magnitude. There may be a strong correlation, with a large proportion of those achieving a qualification *Below Level 2* being observed with

the 'raw' average employment rates of achievers and non-achievers within this qualification aim, one year after the end of a learning spell, are 55% and 51% respectively. From such a relatively low base, a 3.6 percentage point premium implies a percentage premium of approximately 6.8%[18].

Table 4: Return to employment probabilities

	Return to employment probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Below Level 2	0.036***	0.038***	0.039***	0.040***	0.041***	0.041***	0.041***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 2	0.037***	0.041***	0.043***	0.044***	0.044***	0.043***	0.043***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full Level 2	0.083***	0.087***	0.084***	0.079***	0.074***	0.072***	0.071***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 3	0.034***	0.029***	0.030***	0.031***	0.031***	0.032***	0.037***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full level 3	0.070***	0.056***	0.054***	0.056***	0.053***	0.053***	0.062***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 4+	0.032***	0.037***	0.038***	0.039***	0.041***	0.039***	0.039***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

*** significant at the 0.1% level; ** 1% and * 5%

Table 5 shows an employment probability premium of similar magnitude estimated for *Level 2* achievers V non-achievers. Four weeks after the end of a learning spell, achievers are 3.7 percentage points more likely to be observed in employment, compared to non-achievers and this rises to a maximum of 4.3 percentage points over our period of analysis. The raw employment probabilities (Table 6) amongst individuals whose highest-aim is *Level 2*, is 66% for achievers and 61% for non-achievers one year after the end of a learning spell.

Analysis of achievers and non-achievers whose highest aim is *full level 2* in Table 5, suggests that the former are 8.3 percentage points more likely to be in employment 4 weeks after the completion of a learning spell and 7.1 percentage points more likely 4 years later. This is from a raw base of 73% of achievers in employment four weeks after spell end date and 62% for non-achievers, taken from Table 6.

The raw employment probabilities/proportions cited in Table 6 are those that we observe one year after spell end date and strictly speaking we should consider how these change over the 4 year period (as it changes the base from which to consider percentage point changes). However, there is very little deviation from these averages as we move backwards or forwards through the four-year window of analysis for achievers/non-achievers in each of our categories of educational aim. For instance, *Level 3* is a category of qualification-aim where we observe the most change in average employment rates from

higher employment probabilities. However, the difference in employment probabilities does not have to be particularly large.

[18] A 3.6 percentage point premium from a base 53% employment probability (mid way between 51% and 55%) is a 6.8 percentage premium.

the start to the end of our period of analysis; and even here we only move from 66% [4 weeks] to 69% [4 years] for achievers and from 60% to 65% for non-achievers.

Table 5: Raw employment probabilities one year after spell end date

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achievement	0.52							
No level	0.50	0.64						
Below Level 2	0.51	0.47	0.55					
Level 2	**0.61**	0.57	0.53	0.66				
Full Level 2	**0.62**	0.53	0.51	0.56	0.73			
Level 3	**0.63**	0.58	0.55	0.59	0.59	0.67		
Full level 3	**0.64**	0.59	0.61	0.61	0.60	0.60	0.68	
Level 4+	0.73	0.72	0.70	0.71	0.72	0.69	0.70	0.78

The implication from Table 6 is that the differing employment probability premiums observed across our qualification-aim categories of *Level 2* and *Full level 2*, seem to be driven more by differences in the employment probabilities of achievers, as non-achievers in these categories have similar employment levels of 61% and 62% respectively. In contrast, at *Level 3* and *Full level 3*, achievers (67% and 68% respectively) and non-achievers (63% and 64% respectively) have similar premiums suggested by the raw employment probabilities, and the greater premium only arises for *Full Level 3* when we control for differences in the characteristics of achievers and non-achievers. Having said this, each of our categories of non-achievers at levels 2 and 3 (highlighted in bold) have strikingly similar employment probabilities. Also, in all cases the employment probabilities of non-achievers are higher than those who aim for a particular qualification, but achieve an intermediate qualification (an issue to which we return).

3.3 Job-search (or 'Active') and other Benefits

We now consider the relative probability that achievers and non-achievers who finish an FE learning spell will be observed on some form of benefit. Table 7 sets out the findings for benefits that are associated with job-search activity (including Job Seekers Allowance (JSA), Job Training Allowance (JTA) and Employment and Support Allowance (ESA)). From this point we refer to these as *Active Benefits.*

As with our estimates of employment probability after learning spell, the coefficient estimates here approximate to percentage point changes and therefore it is important to consider raw average benefit probabilities. Table 8 presents raw figures one year after spell-end (figures change quite dramatically from 4 weeks to 1 year and then tend to be more stable up to a point 4 years after learning).

The first point to make about the coefficient estimates in Table 7 is that they are all negative and significant from a point 4 weeks after the end of learning spell. *Full level 2* and *Full level 3* achievers have larger percentage point differences over non-achievers and this seems consistent with our previous findings of more favourable relative earnings

and employment outcomes for these learners (a finding that remains even when we turn percentage point into percentage differences).

The coefficients presented in the first line of Table 7 identify the percentage point differences in benefit probability between achievers and non-achievers, for those whose highest recorded learning aim is *Below level 2*. Whilst these differences are highly statistically significant [at the 0.1% level], the magnitude of any difference seems small. The highest gap we observe is between one and two years after the end of learning spell, when achievers are only 1 percentage point less likely to be on job-seeker benefits than non-achievers. However, Table 8 shows that in this category of highest learning aim, 5% of achievers and 6% of non-achievers are on *Active Benefits* one year after end of learning spell – in this instance a 1 percentage point difference amounts to an approximate 18 per cent difference[19].

Table 6: Estimated probability of Achievers being on *Active Benefits*, compared to non-achievers

	Return to benefit [jsa] probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Below Level 2	-0.008***	-0.009***	-0.009***	-0.010***	-0.010***	-0.007***	-0.006***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Level 2	-0.004***	-0.007***	-0.009***	-0.010***	-0.010***	-0.009***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Full Level 2	-0.036***	-0.038***	-0.035***	-0.028***	-0.021***	-0.016***	-0.014***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Level 3	-0.007***	-0.010***	-0.012***	-0.013***	-0.013***	-0.011***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Full level 3	-0.021***	-0.030***	-0.032***	-0.029***	-0.023***	-0.016***	-0.012***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Level 4+	-0.005***	-0.010***	-0.014***	-0.013***	-0.011***	-0.009***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)

*** significant at the 0.1% level; ** 1% and * 5%

These magnitudes of difference are somewhat similar to those observed for achievers V non-achievers in our *Level 2* category of highest learning aim. The highest level of any benefit premium is between one and two years after the end of learning, when achievers are 1 percentage points less likely to be on benefits than non-achievers (which translates into an approximate 20% difference if we consider the base proportions on benefits in Table 8)[20]. The percentage point benefit premium of achievers V non-achievers at *Full level 2* and *Full level 3* is much higher than that seen in other categories of learning outcome and in both cases follows a similar trajectory. Six months from the end of learning spell *Full level 2* achievers are 3.5 percentage points less likely to be on *Active Benefits* than non-achievers and the equivalent figure for *Full Level 3* achievers is 3.2 percentage points. In both cases this premium falls to 1.6 percentage points three years after the end

[19] If we take a midpoint of 5.5% from the raw figures, a 1 percentage point difference amounts to an approximate 18 per cent difference.

[20] Again taking a midpoint between the proportions of 6% of non-achievers and 4% of achievers that we observe from the raw data, a 1 percentage point difference translates into a 20 per cent differential.

of learning. At all points in the four years after the end of learning spell, the benefit premium for *Level 3* and *Level 4+* achievers is very similar.

Table 7: Raw proportions on *Active Benefits* one year after the end of learning spell

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achievement	0.08							
No level	0.08	0.03						
Below Level 2	0.06	0.07	0.05					
Level 2	0.06	0.07	0.07	0.04				
Full Level 2	0.08	0.12	0.12	0.11	0.04			
Level 3	0.04	0.06	0.06	0.06	0.10	0.03		
Full level 3	0.05	0.07	0.06	0.07	0.09	0.07	0.03	
Level 4+	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.02

The proportion of non-achievers on *Active Benefits* falls steadily from 6% amongst those who aim, but do not achieve, *Below Level 2*; to 3% for those who aim for *Level 4+* but do not achieve any outcome in the relevant spell. However, the one exception to this general pattern is the category of learners who aim for *Full Level 2* but do not achieve, with the proportion on benefits amongst this group noticeably higher at 8%. Similarly, those who achieve an intermediate qualification (having aimed for *Full level 2*) have particularly high benefit rates of between 11% and 12%.

The benefit rates of these *Full level 2* intermediate achievers do raise particular concerns, but once again in Table 8 we see all intermediate qualifiers (i.e. those who have a highest aim of Level X across all learning spells, but achieve level X-1 or X-2 etc.) having relatively poor outcomes compared to our counterfactual group of non-achievers. For instance, 5% of those who aim for *Full level 3* but achieve nothing are on job-seeker benefits a year after learning ends – compared to 9% amongst those who have the same highest aim, but achieve *Full Level 2* and 7% who achieve *Level 3*.

We must remember that these are raw figures and no attempt has been made to control for characteristics across these groups. It is quite possible that the characteristics of these intermediate achievers are so different from our categories of non-achievers that in a regression framework these differences would disappear – i.e. for these intermediate achievers it is quite possible that there is still a significant return to learning, compared to a situation where they secure nothing from their studies. However, there would seem to be some potential for selection effects here, with less 'able' individuals following this route of aiming high and achieving low.

For instance, from Table 8 we observe 4% of those who aim and achieve *Level 2* on JSA benefits one year after learning. Those who aim for *Full level 2* but achieve *Level 2*, have a 11% JSA Benefit rate. It is quite possible that not all of the differences in these two groups of achievers and intermediate achievers would be captured (by controlling for observable characteristics) in existing studies that do not contain details of learning aim. If there are significant numbers of intermediate achievers, relative to achievers, there is the potential for the former group to depress estimated returns – the reasons why this group have apparently lower returns is a particularly interesting question for future research.

3.4 Variation by sex and age

In this section of the report we see whether the estimated premiums presented above differ for men and women; and whether they vary across different age groups. The regressions estimated to this point contain controls for gender and age, but this does not account for the possibility that our covariates impact differently for men and women, and across different age groups. For instance, when considering the impact of having dependent children on earnings, we often find that the coefficient on dependents is positive for men and negative for women. Whilst we do not have information on dependents in this study, running separate equations for men and women (or including a fully interacted model) is the only way to accommodate such a potential for differential impacts across our controls and main covariates of interest.

We present relevant tables when there is some difference between the average estimated premiums presented to this point and those estimated separately for disaggregated age and gender groups. When there is little difference across age and gender groups, Tables are not presented, but are available on request.

Sex differences

The earnings, employment and benefit premium for achievers V non-achievers is almost always higher for men than for women. Tables 9 and 10 present the earning premiums for women and men separately and in the majority of instances, the figures previously considered from Table 3 are roughly half way between a higher average premium for males, and a lower average premium for women[21]. For instance, in Table 3 the earnings premium of those who achieve their highest aim *Below Level 2* ranges from an initial 5.6% to 4.7%. Underpinning these averages, the premium for women who achieve at this level is only 2.8% to 2.3%, whilst for men it is 9.1% to 7.7%.

[21] It is of some interest that the male equations are a much better fit (in terms of R-square) than the female equations [see Appendix].

Table 8: Daily earnings premium of female achievers relative to non-achievers

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.028***	0.025***	0.026***	0.023***
	(0.002)	(0.002)	(0.002)	(0.002)
Level 2	0.082***	0.008***	0.007**	0.007**
	(0.007)	(0.002)	(0.002)	(0.002)
Full Level 2	0.166***	0.131***	0.128***	0.134***
	(0.002)	(0.003)	(0.003)	(0.004)
Level 3	0.002	-0.001	0.008*	0.037***
	(0.003)	(0.003)	(0.003)	(0.004)
Full level 3	0.083***	0.036***	0.058***	0.108***
	(0.003)	(0.004)	(0.004)	(0.005)
Level 4+	0.037***	0.038***	0.046***	0.032***
	(0.005)	(0.005)	(0.006)	(0.006)

*** significant at the 0.1% level; ** 1% and * 5%

Whilst a similar picture is evident across most of our categories of learning aim, there is at least a positive and significant return in Table 9 for female achievers whose highest aim is *full level 2*; *full level 3* or *level 4+*. Unfortunately this is not the case for *Level 2* and *Level 3* female achievers, whose premium over non-achievers is less than 1% at *level 2* from years 2 to 4; and is almost wholly insignificant in the first three years after learning ends at *Level 3* (but does jump to 3.7% in the fourth year after learning). These poor returns at *Level 2* are worrying, given that we have between 1.1 and 0.8 million women in our *Level 2* equations[22]. At *Level 3* they are not as worrying, given that the lack of an HE flag is probably leading to under-estimates of any earnings return – an issue to which we return.

Table 9: Daily earnings premium of male achievers relative to non-achievers

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.091***	0.083***	0.082***	0.077***
	(0.002)	(0.002)	(0.002)	(0.003)
Level 2	0.031***	0.030***	0.029***	0.031***
	(0.003)	(0.003)	(0.003)	(0.003)
Full Level 2	0.203***	0.172***	0.157***	0.152***
	(0.002)	(0.003)	(0.003)	(0.004)
Level 3	0.057***	0.038***	0.044***	0.066***
	(0.004)	(0.004)	(0.004)	(0.004)
Full level 3	0.135***	0.066***	0.068***	0.111***
	(0.004)	(0.005)	(0.005)	(0.006)
Level 4+	0.090***	0.090***	0.092***	0.096***
	(0.006)	(0.006)	(0.006)	(0.007)

[22] These figures relate to the numbers included in each of our four separate equations estimated for each year following learning aim, with year 1 always having more observations, relative to year 4, because of the nature of the data (we have fewer individuals with learning and earnings records over the full 4 years that we estimate earnings returns).

As we can see from Table 11, the earnings of female achievers and non-achievers in the *Level 2* and *Level 3* categories of learning aim are higher than those for *Full Level 2* and *Full Level 3*. It would seem that our control group in the former categories have 'relatively' high daily earnings and it seems harder to secure a further return from these additional qualifications. However, this still does not explain the relatively poor returns of women, as the same situation is apparent for men in table 12, where earnings of achievers and non-achievers are lower in our '*Full*' categories. The low estimated returns tom women at *Level 2* and *Level 3* in a framework where we expect (if anything) estimates to be biased upwards, is of concern.

Table 10: Raw average daily earnings one year after the end of learning spell for women

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achievement	43.12							
No level	47.93	50.31						
Below Level 2	41.14	39.21	41.79					
Level 2	42.83	42.83	39.41	41.65				
Full Level 2	33.63	30.09	29.46	29.91	36.27			
Level 3	42.86	38.27	36.83	39.88	30.83	43.96		
Full level 3	35	32.15	31.56	31.73	31.12	28.25	32.06	
Level 4+	52.96	51.28	47.71	45.26	44.04	50.4	43.87	53.9

Table 11: Raw average daily earnings one year after the end of learning spell for men

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achieve.	51.81							
No level	60.14	71.26						
Below Level 2	55.73	52.68	62.21					
Level 2	61.21	54.31	53.64	59.98				
Full Level 2	46.61	44.06	39.74	40.66	56.47			
Level 3	60.11	51.82	50.01	51.24	45.53	67.2		
Full level 3	44.07	36.92	43.1	37.65	37.99	34.76	44.44	
Level 4+	66.77	64.76	62.48	57.22	92.47	54.35	44.59	69.77

We present findings here for employment probabilities, because they provide a very different picture to the one we find when disaggregating earnings by gender. Average earnings returns (Table 3) tend to be somewhere between the higher male premium (Table 10) and a lower female premium (Table 9); with *Level 2* and *Level 3* women achievers securing little systematic and stable earnings return over non-achievers. This is what we find when considering the differences in earnings between achievers and non-achievers amongst women who are working. However, when we consider a wider sample of working and non-working women, we observe employment probability premiums that are more favourable in some categories of qualification aim.

The first row of Table 13 suggests that the employment probability of women achievers over non-achievers runs from 2.9 to 3.5 percentage points for those whose highest aim in any spell is *Below Level 2*. This compares to figures of between 4.6 and 5 percentage points for male achievers in Table 14 and in this instance we have a similar picture to that of earnings, where average returns are a combination of lower female and higher male returns. However, when considering other categories of qualification aim, female achievers earn a percentage point employment probability premium that is at least of a similar magnitude to that of male achievers; and in the case of *Full Level 2* and *Full Level 3* it is substantially larger from year 1 onwards. For instance, at *Full Level 2* women Achievers are 9.5 percentage points more likely to be in employment one year after the end of learning compared to non-achievers (Table 13), whilst the comparable figure for men is only 7 percentage points.

Table 12: Estimated employment probability premium for female achievers over non-achievers

	Return to employment probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Below Level 2	0.029***	0.031***	0.032***	0.032***	0.034***	0.034***	0.035***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 2	0.042***	0.045***	0.046***	0.047***	0.047***	0.046***	0.046***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full Level 2	0.092***	0.098***	0.097***	0.095***	0.093***	0.092***	0.090***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 3	0.031***	0.026***	0.026***	0.028***	0.029***	0.030***	0.037***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full level 3	0.068***	0.057***	0.056***	0.061***	0.060***	0.061***	0.070***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 4+	0.028***	0.035***	0.037***	0.039***	0.041***	0.041***	0.041***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

Generally there is not such a pronounced difference between male and female premiums at points early-on in the period after the end of learning spell. It is later in our periods of analysis that premiums tend to be higher for female achievers. For some qualification categories, female employment probability premiums are increasing or remaining stable over the period of analysis, whilst those for men are often decreasing. For instance, at *Full level 3* the premium for women starts at 6.8 percentage points and remains relatively stable until year 4 when it is 7 percentage points. The male premium starts just above on 7.3 percentage points four weeks after learning, but then from six months onwards it does not rise about 5 percentage points.

Table 13: Estimated employment probability premium for male achievers over non-achievers

	Return to employment probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Below Level 2	0.046***	0.048***	0.049***	0.050***	0.051***	0.050***	0.050***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 2	0.033***	0.037***	0.040***	0.041***	0.040***	0.040***	0.039***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full Level 2	0.080***	0.082***	0.078***	0.070***	0.061***	0.058***	0.057***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 3	0.036***	0.031***	0.033***	0.034***	0.033***	0.032***	0.036***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full level 3	0.073***	0.054***	0.049***	0.050***	0.043***	0.042***	0.049***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Level 4+	0.037***	0.040***	0.039***	0.038***	0.041***	0.038***	0.038***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

Considering our estimated employment probability premiums we seem to have more evidence of a return to qualifications, when compared to some of the poorer earnings

returns that women achievers secure, relative to men. This impression is confirmed when we check the raw employment figures, as the percentages of men and women in employment is roughly equivalent in both Tables 15 and 16. As a result comparison of differences in percentage point premiums between men and women in Tables 13 and 14 remain valid as they translate into similar differences in percentages. For instance, at *Level 2* the premium for women is 4.7 percentage points one year after learning, compared to 4.1 percentage points for men. Considering the relevant percentage employment rates from Tables 15 and 16, these percentage point premiums translate into 7.2 per cent for women and 6.7 per cent for men.

Table 14: Raw employment probabilities one year after spell end date for women

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achieve.	0.53							
No level	0.51	0.63						
Below Level 2	0.52	0.48	0.55					
Level 2	0.63	0.58	0.55	0.68				
Full Level 2	0.63	0.54	0.52	0.58	0.75			
Level 3	0.63	0.58	0.56	0.60	0.60	0.67		
Full level 3	0.66	0.61	0.63	0.62	0.61	0.62	0.70	
Level 4+	0.75	0.76	0.71	0.72	0.75	0.70	0.71	0.79

Table 15: Raw employment probabilities one year after spell end date for men

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achieve.	0.52							
No level	0.49	0.66						
Below Level 2	0.50	0.47	0.56					
Level 2	0.59	0.54	0.50	0.64				
Full Level 2	0.61	0.51	0.50	0.54	0.71			
Level 3	0.62	0.57	0.54	0.58	0.57	0.67		
Full level 3	0.63	0.57	0.58	0.59	0.58	0.58	0.66	
Level 4+	0.71	0.67	0.68	0.68	0.69	0.67	0.67	0.76

We have also estimated a separate set of equations for men and women to determine whether the estimated *Active Benefit* premiums presented in Table 7 differ by sex. There is little that an analysis of men and women separately adds to our understanding, and so the relevant table run separately for men and women is not presented here.

Age differences (earnings)

Considering our findings for daily earnings across Tables 17 to 19, we find that achievers *Below Level 2* who are aged 16-18 have a negligible earnings premium over non-achievers of the same age (Table 17); but in the 19 to 24 age group (Table 18) the premium starts at 4.4% in year one and rises to 7% in year four. For achievers aged 25+

(Table 19) there is a premium that falls from 5.8% to 4.5% over the four years, compared to non-achievers of the same age. The majority of learners are located within the 25+ age group (between 1.8 and 1.5 million) but this still leaves between 114,000 and 105,000 in our regressions for 16-18 year olds where negligible returns are identified.

In contrast, when considering *Level 2* qualifications it is the 25+ age group where returns move from less than 1% to become negligible between two and four years after the end of learning. Within this 25+ age group whose highest aim is *Level 2*, the regressions are run for between 1.5m and 1 million learners, so we have negligible returns for a substantial group of individuals. In contrast achievers amongst the 85,000 to 66,000 learners who are aged 16 to 18 earn a premium that falls from 5.3% to 2.5% and amongst the 260,000 to 167,000 learners aged 19 to 24 the premium for achievers rises from 3.7% to 6.3%.

For *Full Level 2* qualifications premiums for achievers in the 16 to 18 age group range from 22.2% to 14.9%; for the 19-24 age group the comparable figures are 20.5% to 14.2% and amongst the 25+ age group premiums range from 13% to 10.3%. At *full level 2*, *Level 2* and *Below Level 2* these is no consistent picture emerging that implies any over-arching pattern to premiums, and there is potentially a lot more happening here than just age per se. It is clearly a concern that achievers amongst the one million to 1.5 million *Level 2* learners aged 25+ secure a negligible premium on average, but there is the potential for this average to hide an amount of heterogeneity.

Table 16: Daily earnings premium of 16-18 year old achievers relative to non-achievers

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	-0.000	-0.007	-0.002	0.011
	(0.007)	(0.007)	(0.007)	(0.007)
Level 2	0.053***	0.028***	0.019*	0.025**
	(0.008)	(0.008)	(0.008)	(0.008)
Full Level 2	0.222***	0.177***	0.150***	0.149***
	(0.004)	(0.004)	(0.005)	(0.005)
Level 3	0.013	-0.051***	-0.025**	0.028**
	(0.009)	(0.009)	(0.009)	(0.010)
Full level 3	0.051***	-0.030***	0.003	0.072***
	(0.007)	(0.007)	(0.007)	(0.008)

Table 17: Daily earnings premium of 19-24 year old achievers relative to non-achievers

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.044***	0.047***	0.065***	0.070***
	(0.004)	(0.004)	(0.004)	(0.005)
Level 2	0.037***	0.044***	0.057***	0.063***
	(0.004)	(0.004)	(0.005)	(0.005)
Full Level 2	0.205***	0.161***	0.157***	0.142***
	(0.003)	(0.004)	(0.004)	(0.005)
Level 3	0.001	0.007	0.038***	0.077***
	(0.006)	(0.006)	(0.006)	(0.006)
Full level 3	0.090***	0.050***	0.073***	0.129***
	(0.005)	(0.005)	(0.006)	(0.007)
Level 4+	0.120***	0.116***	0.125***	0.139***
	(0.008)	(0.009)	(0.009)	(0.010)

Table 18: Daily earnings premium of 25+ year old achievers relative to non-achievers

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.058***	0.053***	0.051***	0.045***
	(0.002)	(0.002)	(0.002)	(0.002)
Level 2	0.013***	0.007***	0.004*	0.004
	(0.002)	(0.002)	(0.002)	(0.002)
Full Level 2	0.130***	0.105***	0.097***	0.103***
	(0.002)	(0.003)	(0.003)	(0.004)
Level 3	0.021***	0.016***	0.020***	0.039***
	(0.003)	(0.003)	(0.003)	(0.003)
Full level 3	0.109***	0.077***	0.087***	0.100***
	(0.004)	(0.004)	(0.005)	(0.006)
Level 4+	0.038***	0.039***	0.043***	0.032***
	(0.004)	(0.004)	(0.005)	(0.005)

Earnings premiums amongst achievers for our category of *Level 3* qualifications tend to be low and relatively unstable in the 16-18 year age group and move from being negligible to 7.7% over the four years of analysis for the 19-24 year age group. Amongst the 25+ year olds, the earnings premium at various points is between 1.6% and 3.9%. Similarly, our estimated premiums for achievers amongst the 590,000 to 320,000 *Full Level 3* learners in our 16-18 year age group are also unstable. In all these instances we are potentially suffering from the lack of an HE flag, which we rectify in the next section for a subset of learners. This likely explains the dip for this latter group of learners, where we observe a

premium that falls from a statistically significant 5.1% to -3%, to become negligible in the third year and positive 7.2% in year 4[23].

Finally, we can see from Table 18 that amongst the 19 to 24 age group achievers at *Level 4+* secure a particularly high premium, ranging from 12% to 13.9% over the four years. This is a relatively small group of learners [61,000 to 37,000], when compared to the 226,000 to 130,000 *Level 4+* learners in our equation for the 25+ year age group; where we see achievers securing returns of between 3.8% and 4.3% at various points during the four years after the end of learning.

Employment probability and Active benefit premiums by age group

Considering differences in percentage point employment and Benefit probability premiums across our three age groups, there is less variation than might first be anticipated. We can tease out some general patterns,

- For learners whose highest recorded aim is *Below Level 2*, *Level 3*, *Full Level 3* or (for our older two groups) *Level 4+*, achievers in each one of our age categories secure estimated percentage point employment premiums that deviate little from the headline figures of Table 5.
- However, at *Level 2*, and *Full Level 2*, the disaggregation of employment probability returns by age groups suggests that the youngest secure higher premiums in both cases. At *Level 2* the 16-18 year old achievers secure an employment premium of between 6 and 6.5 percentage points, compared to between 4.2 and 4.3 percentage points in the older two groups. Achievers aged 16-18 at *Full Level 2* secure employment returns of 9.3 to 8.2 percentage points compared to the 19-24 age group (where the figure is between 7.4 and 6.5) and the 25+ age group where the estimates range from between 6.6 and 6.2 percentage points.
- Consideration of *Active Benefit* probability premiums by age group adds very little to the understanding gained from Table 7.

3.5 Incorporating the HE flag for a sample of learners

In the discussions around Tables 17-19 (and earlier tables) it is recognised that our estimates of the earnings premium secured by achievers at *Level 3* and *Full Level 3* are likely to be lower than the true return to these qualifications, because we do not control for the potential that many of these learners will go on to Higher Education. More specifically, we may expect a large proportion of achievers at *Level 3* and *Full Level 3* to enter Higher Education on completion of their studies, and many of these individuals will drop out of our earnings equations. However, a substantial proportion are likely to be working part-time during the period of HE studies and daily earnings from such part-time positions are unlikely to include a return to the qualifications they have gained at level 3.

[23] This is nowhere near the absolute magnitude of negative premiums that we see in the results from P&C (2011), but in the next section when we consider an Academic / Vocational split, premiums in the former category do approach the magnitude of negative impact at *Full Level* 3 and *Level 3*.

We would expect this to depress our estimated earnings premium during the first years following learning, as achievers who move on to HE and work part-time have daily earnings that are lower than the control of those who do not achieve, but have the opportunity to move into full-time employment. Given the timing of HE study, we would expect some recovery in our estimated premium from the fourth year after HE learning [at *Level 3* and *Full Level 3*], as graduates enter the labour market[24]. Here we perform a brief analysis to see if this expectation is born out, using an HE flag that we have for a subset of the data.

Table 20 begins by setting out the results of an analysis that does not take into account this potentially depressing impact of HE learners working part-time, for all learners in our data born after 31/08/1980 and who experience an FE learning spell between 2004/2005 and 2009/2010. For this subset of learners (for whom an HE flag will exist if they have moved on to study at this level), we see the sort of dip in returns from year 2 onwards that we expected (and which was first commented upon in the discussions around Table 3). Table 20 shows that at *Level 3*, returns fall from 3.8 per cent in year one, to 2.8 and 2.9 per cent in years two and three; before recovering in year four to 5 per cent. At *Full Level 3*, first year returns are 13.4 per cent, falling to 7.9 and 8.5, before recovering to 13.3 per cent in year four.

Table 19: Daily earnings premium of learners born after 31/08/1980 and who experience FE learning spell between 2004/2005 and 2009/2010 [learners transiting to HE retained]

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.056***	0.054***	0.055***	0.049***
	(0.002)	(0.002)	(0.002)	(0.002)
Level 2	0.030***	0.026***	0.026***	0.024***
	(0.002)	(0.002)	(0.002)	(0.003)
Full Level 2	0.182***	0.148***	0.146***	0.151***
	(0.002)	(0.002)	(0.003)	(0.004)
Level 3	0.038***	0.028***	0.029***	0.050***
	(0.003)	(0.003)	(0.004)	(0.004)
Full level 3	0.134***	0.079***	0.085***	0.133***
	(0.003)	(0.004)	(0.004)	(0.006)
Level 4+	0.080***	0.084***	0.089***	0.090***
	(0.005)	(0.005)	(0.006)	(0.007)

The results of Table 21 are calculated for the same subset of learners, but in this case we also drop those who transit to Higher Education at the end of the learning spell. Concentrating first on the change in estimated returns at *Level 3* and *Full Level 3* in Tables 20 and 21, we can see that our hypothesis is born out. At *Level 3* our estimated premium in the first three years after learning is almost double in Table 21 (6.6 to 5.5 per cent), what it was in Table 20 (3.8 to 2.9 per cent), with some convergence by year 4 between a figure

[24] An estimate that is then likely to be falsely inflated, as these individuals enter the labour market and gain a return to their degree-level qualifications.

of 5% in Table 20 and 7% in Table 21. At *Full Level 3* there is also a pronounced difference, with estimates in Table 20 which run from 13.4% to 8.5% in the first three years, increasing substantially to between 23.2% and 12.7% in Table 21; before there is some convergence to a figure of 13.3% in Table 20 and 15.1% in Table 21.

Table 20: Daily earnings premium of learners born after 31/08/1980 and who experience FE learning spell between 2004/2005 and 2009/2010 [learners transiting to HE dropped]

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.061***	0.060***	0.066***	0.066***
	(0.004)	(0.004)	(0.005)	(0.005)
Level 2	0.065***	0.057***	0.058***	0.064***
	(0.004)	(0.005)	(0.005)	(0.006)
Full Level 2	0.232***	0.185***	0.169***	0.167***
	(0.003)	(0.003)	(0.004)	(0.005)
Level 3	0.066***	0.060***	0.055***	0.070***
	(0.006)	(0.006)	(0.007)	(0.008)
Full level 3	0.232***	0.155***	0.127***	0.151***
	(0.005)	(0.005)	(0.007)	(0.008)
Level 4+	0.151***	0.143***	0.150***	0.159***
	(0.010)	(0.012)	(0.014)	(0.016)

Consideration of the other differences between Table 20 and Table 21 presents us with an interesting conundrum, as there would seem to be some increase in the estimated premium at most levels of study. Even our estimated premiums for achievers in the *Below Level 2* group have risen by between 0.5 and 1.7 percentage points across the period of analysis. However, it is the rise in returns at *Level 2* and *Full Level 2* that are particularly interesting, with estimated premiums in the former category of learners doubling from between 3% and 2.4% (Table 20); to between 6.5% and 5.7% (Table 21). By dropping those who transit to HE, we also seem to be dropping those who have an 'FE highest-aim' of *Level 2* or *Full Level 2*, but who have achieved a higher level of learning elsewhere (for instance as part of their Secondary education) which then allows them to move to Higher Education.

At first glance, we may be tempted to suggest that some adjustment is made to our estimated premiums (Table 3) at levels of learning below level 3, with the magnitude determined by comparing Table 20 and Table 21. However, comparing Table 20 with table 3, we can also see that our subset of learners have estimated returns that sometimes differ from the full sample even when we do not accommodate the HE Flag. For instance, in Table 20 the figures for achievers in the *Level 2* category are approximately one percentage point higher than the figures in Table 3 across all years[25]. We need to remember that our subset of learners has a lower average age than the full sample of learners and as a result we may expect a different magnitude of impact of the HE flag at levels of learning below Level 3.

[25] Though these differences at Level 2 are some of the only pronounced ones we observe.

Furthermore, in January 2003 the Labour government set out its ideas for change in the White Paper, *The Future of Higher Education*. Together with the raising of the cap on tuition fees, the White Paper heralded the introduction of two-year foundation degrees and began a further expansion of institutions granted degree-awarding powers (many of whom retain an element of FE provision). We need to remember that our 'HE Flag' is not necessarily a flag of '*degree-level study in a university*' and it could be that this is driving our findings at levels below Level 3. However this remains an issue to consider as, even with the incorporation of the HE flag, there is still an evident dip in the earnings premium in the second year after learning. This is much less pronounced, but is evident in many of our analyses and is possibly an issue for future research.

4. Estimated returns for disaggregated qualification categories

In this section of the report we set out the variation in estimated premiums when we begin to disaggregate our categories of learning aim. In Section 4.1 we begin by setting out the results for categories of qualification, differentiated according to whether they can be considered as (i) academic, (ii) vocational and delivered mainly in an FE setting [*Vocational & Provider*] or (iii) vocational and delivered within a work-based learning setting (*Vocational & WBL*]. In Section 4.2 we focus on the premiums secured by achievers amongst *Apprentices* and in Section 4.3 we describe an analysis that helps identify the relevant premiums for those who achieve *Skills for Life* qualifications.

4.1 Premiums estimated separately for academic and vocational qualification categories

Earnings

The figures in Table 22 do not include *Academic below level 2* because numbers are too small. We find that 98% of learners whose highest aim is *below level 2* are in our *Vocational and Provider* category (Table 23), where we have between approximately 2.2 and 1.8 million observations. As a result, the estimated earnings premiums of 5.6% to 4.7% in Table 23 are almost identical to the headline findings in Table 3 for this category of *Below Level 2*. The remaining two per cent of learners whose highest aim is *below level 2* are in the *Vocational and Work Based Learning [WBL]* category (between 47,000 and 37,000) and in most years after learning this group has slightly higher estimated returns than those studying within an FE institution.

We observe a similar spread of observations within our category of *Level 2* qualifications, with 87% of learners in our *Vocational and Provider* category (between approx. 1.7 and 1.1 million); compared to approximately 125,000-95,000 who have highest aims related to *Academic Level 2* qualifications. The estimated premium for *Level 2* achievers who fall within our category of *Vocational and Provider* moves from 1.9 to 1.3 per cent over the four years following the end of learning (Table 23). In contrast the estimated premium for those who achieve a highest aim of *Academic Level 2*, moves from -2.7% in the first year after learning to 3.6% by the fourth year. By the third and fourth year after learning the number of learners in our *Vocational and WBL* category drops too far to make estimation reliable, and the estimated returns in the first two years are only just significant (at the 5% sig. level).

Table 21: Daily earnings premium for achievers V non-achievers in '*Academic*' qualification categories

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Full Level 2	0.192***	0.156***	0.153***	0.145***
	(0.018)	(0.020)	(0.021)	(0.021)
Level 3	-0.035***	-0.046***	-0.006	0.066***
	(0.006)	(0.006)	(0.006)	(0.006)
Full level 3	-0.183***	-0.218***	-0.085***	0.042***
	(0.010)	(0.010)	(0.010)	(0.011)

Table 22: Daily earnings premium for achievers V non-achievers in '*Vocational & Provider*' qualification categories

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.056***	0.051***	0.051***	0.047***
	(0.002)	(0.002)	(0.002)	(0.002)
Level 2	0.019***	0.014***	0.012***	0.013***
	(0.002)	(0.002)	(0.002)	(0.002)
Full Level 2	0.186***	0.157***	0.152***	0.146***
	(0.003)	(0.003)	(0.003)	(0.003)
Level 3	0.044***	0.034***	0.035***	0.044***
	(0.003)	(0.003)	(0.003)	(0.003)
Full level 3	0.126***	0.096***	0.112***	0.139***
	(0.004)	(0.004)	(0.004)	(0.005)
Level 4+	0.060***	0.062***	0.068***	0.062***
	(0.004)	(0.004)	(0.004)	(0.005)

Table 23: Daily earnings premium for achievers V non-achievers in '*Vocational & WBL*' qualification categories

	Log Daily Earnings inTax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Below Level 2	0.078***	0.047***	0.062***	0.057***
	(0.010)	(0.011)	(0.011)	(0.011)
Level 2	0.047*	0.059*	NA	NA
	(0.019)	(0.025)	NA	NA
Full Level 2	0.144***	0.111***	0.099***	0.105***
	(0.003)	(0.003)	(0.004)	(0.005)
Level 3	NA	NA	NA	NA
	NA	NA	NA	NA
Full level 3	0.130***	0.103***	0.094***	0.092***
	(0.004)	(0.005)	(0.006)	(0.007)
Level 4+	0.085***	0.093***	0.083***	0.074***
	(0.010)	(0.010)	(0.011)	(0.012)

Learners in our *Full Level 2* category are more evenly spread between the *Vocational and Provider* category (where we have between approximately 650,000 and 360,000) and the *Vocational and WBL* category (782,000 to 176,000[26]). We observe a much higher estimated premium (moving from 18.6% to 14.6% in Table 25) for *Full level 2* vocational achievers who qualify in an FE environment; compared to the premium for *Full level 2* vocational achievers who study a form of Work Based Learning (14.4% to 10.5% in Table 24). This is interesting partly because it serves to underline the caution with which we must treat these findings. This should not be taken as evidence that learners should be moved to an FE-Provider model from a WBL approach.

It is quite possible that these two categories (of *WBL* and *FE-Provider*) contain very different types of learner. Achievers in the WBL environments are securing large statistically significant returns, relative to those who do not achieve in this environment - a move to an FE environment would not necessarily raise this return further, as the environment may be less appropriate for them. We would not necessarily see them secure the same higher returns as those estimated in Table 23 for a [potentially very different] group of achievers and non-achievers. This is an issue to which we return, but it is worth noting here that survey-based studies would utilise the same comparison group when calculating WBL and FE-Provider returns (i.e. all those at the qualification level below).

At *full level 2* we have between 28,000 and 17,000 in our *Academic* category (Table 22) and achievers in this smaller group secure returns that are almost identical to those in the *Vocational and Provider* category. At *Level 3* we observe a similar trajectory for our premiums in the *Academic* category as at *Level 2*, with an initial negative first year premium for achievers (-3.5% in Table 22) increasing to positive 6.6% by the fourth year. There are between 201,000 and 180,000 learners in this category of *Academic Level 3*, but the majority of *Level 3* learners are in the *Vocational and Provider* category (714,000 to 456,000). For this latter group Table 23 suggests a more stable positive premium for achievers, of between 3.5% and 4.4% at some point over the four years.

At *Full level 3* we observe a very different level and trajectory of estimated returns for the [311,000 to 201,000] learners in our *Academic* category; with a first year premium for achievers of -18.3 (Table 22) dropping even further in year 2 (-21.8), but estimated at positive 4.2% by the fourth year after learning. This is certainly driven by the large number of students in this category who achieve and immediately move on to study at Higher Education (HE). The socio-demographic composition of FE learners (see for instance, Howard, 2009) is such that we may expect them to be much more likely to take on part-time working when studying at HE.

There are 519,000 to 252,000 learners whose highest aim is *Vocational Full level 3* and who are learning within an FE Institution (Table 23). For achievers in this group we estimate substantial earnings premium that start at 12.6% in the first year after learning and by year 4 is 13.9% (with a very minor dip in the middle-two-years possibly reflecting a similar effect as that discussed for the Academic category). For the 225,000 to 72,000[27]

[26] This pronounced fall in sample size from year one to year four is a function of the relatively recent growth in this category of learning aim, leaving us with fewer observations over an entire four year period.
[27] Again, we have a particularly steep fall in sample size due to the recent growth in this category of learning aim.

learners who study *Full level 3* in a WBL context, we observe substantial returns that start at 13% in year one and by year four are still 9.2%.

At *Level 4+* the large majority of learners (between 266,000 and 153,000) fall within our category of *Vocational and Provider* and from Table 23 estimates suggest that achievers secure returns of between 6% and 6.8% at some point in the 4 years following the end of learning. There are between approximately 34,000 and 19,000 learners in the regressions we estimate to obtain premiums for achievers at *Level 4+* who are studying vocational qualifications in a WBL context (Table 24). Here the estimated returns start at 8.5% in year 1 and are 7.4% by the fourth year after learning ends.

Employment Probability and Active Benefit Premiums

Tables 25 to 27 set out the estimated employment probability premiums for achievers over non-achievers in each of our categories of *Academic*, *Vocational & Provider* and *Vocational & WBL*. For the 2.4 million learners whose highest aim is *Academic Below Level 2* (Table 25), achievers secure returns which start at 6.4 percentage points in year 1 and are 5 percentage points by the fourth year. This premium for achievers is higher than that seen amongst the 6.2 million learners who are in our category of *Vocational and Provider Below Level 2* (Table 26) where premiums rise from 3.8 to 4 percentage points over the four-year period studied. The highest percentage point employment probability premiums at *Below Level 2* are estimated for achievers amongst the 81,000 learners in the *Vocational and WBL* category (ranging between 6.9 and 7.5 percentage points in Table 27).

Table 24: Estimated employment probability premium for achievers V non-achievers in '*Academic*' qualification category

	Return to employment probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Below Level 2	0.044*	0.061**	0.064**	0.064**	0.066**	0.065**	0.050*
	(0.018)	(0.019)	(0.020)	(0.020)	(0.020)	(0.021)	(0.021)
Level 2	0.028***	0.030***	0.036***	0.038***	0.046***	0.052***	0.054***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Full Level 2	0.034***	0.056***	0.069***	0.077***	0.075***	0.077***	0.075***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Level 3	0.033***	0.018***	0.020***	0.027***	0.026***	0.027***	0.044***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Full level 3	0.030***	-0.014***	-0.013***	-0.002	-0.003	0.001	0.025***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Level 4+	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a

This pattern is also reflected at *Level 2*. The lowest [percentage point] employment probability premium of 4.1 is estimated for achievers amongst the 3.8 million learners in the *Vocational and Provider* category; the next highest premium is secured by achievers amongst the 1.9 million learners in the *Academic* category (where premiums rise from 3.8 to 5.4 over four years); and finally, the highest premium (between 6.2 and 7) is estimated for the category of *Vocational and WBL* where we have only 47,000 learners. Considering premiums at *Level 3,* achievers amongst the 1.5 million *Vocational and Provider* learners

secure similar returns (2.9 to 3.3 percentage points) to the 870,000 learners in our *Academic* category (2.6 to 4.4 percentage points).

Table 25: Estimated employment probability premium for achievers V non-achievers in '*Vocational & Provider*' qualification category

	Return to employment probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Below Level 2	0.034***	0.036***	0.037***	0.038***	0.039***	0.039***	0.040***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 2	0.035***	0.039***	0.041***	0.041***	0.041***	0.041***	0.040***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full Level 2	0.068***	0.078***	0.082***	0.082***	0.081***	0.081***	0.080***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 3	0.029***	0.029***	0.030***	0.029***	0.031***	0.031***	0.033***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Full level 3	0.093***	0.075***	0.075***	0.078***	0.074***	0.074***	0.078***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Level 4+	0.031***	0.037***	0.038***	0.038***	0.041***	0.039***	0.039***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

Table 26: Estimated employment probability premium for achievers V non-achievers in '*Vocational & WBL*' qualification category

	Return to employment probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Below Level 2	0.076***	0.080***	0.079***	0.075***	0.073***	0.069***	0.071***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Level 2	0.051***	0.059***	0.059***	0.062***	0.070***	0.068***	0.068***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Full Level 2	0.071***	0.073***	0.070***	0.065***	0.059***	0.057***	0.055***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 3	0.073***	0.065***	0.056***	0.031*	0.023	0.032*	0.045**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Full level 3	0.051***	0.054***	0.052***	0.052***	0.049***	0.047***	0.048***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Level 4+	0.033***	0.037***	0.035***	0.034***	0.034***	0.034***	0.032***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)

Considering *Full Level 2* qualifications, estimated premiums for the 1.6m learners in our *Vocational and Provider* category rise from 8.2 to 8 percentage points over the period of analysis; compared to a range of between 7.7 and 7.5 percentage points for those who achieve their qualification aim amongst the 1.4m learners in our *Academic* category. At *Full Level 2* the lowest premium for achievers over non-achievers is seen amongst the 1.6m *Vocational and WBL* learners, where premiums rise from 6.5 to 5.5 over the four years. Similarly, *Full Level 3* premiums for achievers amongst the 1.3m learners in the *Vocational and WBL* category are lower (at between 5.2 and 4.7 percentage points); compared to our category of *Vocational & Provider* (445,000) where estimated returns are

between of 7.4 to 7.8 percentage points. The figures for *Full Level 3 Academic* are likely to be particularly unreliable because of the issues around HE Flag.
Finally, at *Level 4+* the majority of learners (approximate 520,000) fall within the *Vocational & Provider* category, where employment probability premiums vary between 3.8 and 4.1 percentage points. For the approximate 55,000 learners in the *Vocational & WBL* category, returns vary between a slightly higher 3.2 and 3.4 percentage points.

Tables 28 to 30 provide baseline raw employment percentages to contextualise the discussions of percentage point differences from Tables 25 to 27. Generally, when we move above our category of *Below Level 2* (where employment rates for the 16-18 year age group are particularly low) we observe employment rates of similar magnitude for each Level of qualification, but with a slight increase as we move from *Academic*; to *Vocational and Provider* and then to *Vocational and WBL*.

Table 27: Raw employment probabilities one year after spell end date for '*Academic*' qualification category

Spell Participation	Spell Achievement						
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3
No achieve.	0.74						
No level	0.79	0.83					
Below Level 2	0.29	0.26	0.36				
Level 2	0.57	0.50	0.48	0.64			
Full Level 2	0.41	0.39	0.40	0.45	0.51		
Level 3	0.57	0.53	0.52	0.57	0.56	0.60	
Full level 3	0.54	0.54	0.55	0.55	0.55	0.59	0.57

Table 28: Raw employment probabilities one year after spell end date for '*Vocational & Provider*' qualification category

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achieve.	0.53							
No level	0.54	0.65						
Below Level 2	0.51	0.46	0.54					
Level 2	0.61	0.56	0.52	0.66				
Full Level 2	0.51	0.46	0.45	0.50	0.60			
Level 3	0.64	0.60	0.56	0.59	0.57	0.68		
Full level 3	0.56	0.55	0.55	0.57	0.54	0.57	0.63	
Level 4+	0.72	0.71	0.68	0.69	0.70	0.68	0.68	0.77

Table 29: Raw employment probabilities one year after spell end date for '*Vocational & WBL'* qualification category

Spell Participation	Spell Achievement							
	No achieve	No level	Below Level 2	Level 2	Full level 2	Level 3	Full level 3	Level 4+
No achieve.	0.54							
No level	0.27	0.42						
Below Level 2	0.51	0.53	0.66					
Level 2	0.60	0.55	0.42	0.72				
Full Level 2	0.67	0.61	0.61	0.69	0.76			
Level 3	0.72	0.79	0.70	0.63	0.71	0.78		
Full level 3	0.74	0.74	0.71	0.75	0.70	0.74	0.80	
Level 4+	0.79	0.77	0.75	0.79	0.81	0.79	0.79	0.84

4.2 Estimated returns for Apprenticeships

Here we consider the earnings, employment and active benefit premiums secured by those who achieve an apprenticeship qualification, compared to those who aim to do so, but do not achieve. Table 31 sets out the earnings premium estimated from regressions containing between 355,000 and 310,000 learners who study for a *Level 2 apprenticeship* and between 146,000 and 91,000 who study a *Level 3 apprenticeship*. The premium for those who achieve a *Level 3 apprenticeship* (a.k.a. Advanced apprenticeships), compared to those who do not achieve, falls from 20.6 per cent in the year directly after the end of learning, to 17 per cent in the fourth year after learning. For achievers of *Level 2 apprenticeships* (a.k.a. Intermediate or Foundation apprenticeships) starts at a similar level (20 per cent) a year after learning and but falls more drastically over the four years, ending on 12.6 per cent. Table 32 provides figures on average daily earnings from the raw data.

Table 30: Estimated daily earnings premium for apprenticeship achievers V non-achievers

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Level 2	0.200***	0.166***	0.148***	0.126***
	(0.004)	(0.004)	(0.004)	(0.004)
Level 3	0.206***	0.174***	0.165***	0.170***
	(0.006)	(0.006)	(0.006)	(0.007)

Table 31: Raw average daily earnings in year after the end of apprenticeship learning spell

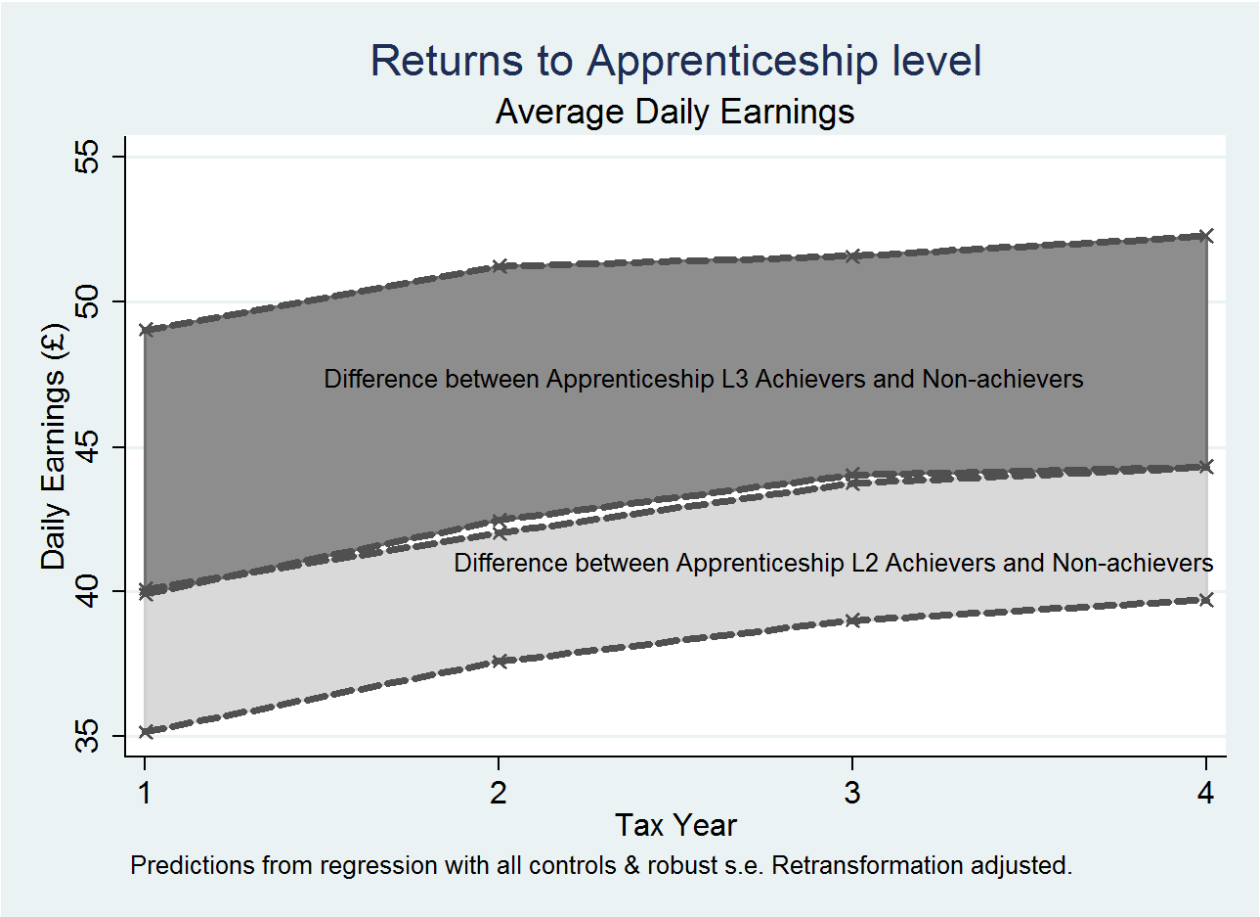
Spell Participation	Spell Achievement		
	No achieve	Level 2	Level 3
Level 2 Apprentice.	35.93	42.1	
Level 3 Apprentice.	40.99	42.82	54.32

In Figure 2 we take the results of these regression equations and present them in a way that gives some indication of what the premiums mean for the daily earnings of achievers [on average], compared to non-achievers who have the same apprenticeship aim. For instance, the darker shaded area in Figure 2 is bounded below by the predicted daily earnings that L3 non-achievers can expect, between one [approx. £40] and four years [just under £45] after the end of learning spell. Those who achieve a L3 apprenticeship qualification can expect a premium that is 20.6 per cent higher in the year directly after the end of learning (just under £9 a day more than the £40 gained by non-achievers), and 17 per cent in the fourth year after learning (approx. £7.50 a day more than the premium earned by non-achievers four years after the end of learning spell)[28].

As the text in Figure 2 suggests, these are predictions gained from regression analysis with a full set of controls, estimated for data between 2002 and 2011. We can therefore be more confident that the differences in these daily earnings are a result of the gaining of an apprenticeship qualification, rather than other confounding factors; but must also remember that the actual estimated level of daily earnings are averaged across many years and may have been subject to change over the last few years. They are presented only to provide some indication of how our regression results might translate into real world gains for those achieving these qualifications.

[28] As we will see in the discussions around Figure 4, it is not always the case that we get such a close correspondence between the premiums implied in our Figures and the premiums implied by the econometric results. This is due to a problem associated with the re-transformation of log daily earnings, and is dealt with in more detail in the discussions around Figure 4. In addition, whilst all of our premiums are significant, the premiums represented in the Figures are estimates and they have standard errors attached to them, which are not visible and could add an additional degree of difference.

Figure 2: Average Daily Earnings Returns to Apprenticeship L2 and L3 qualifications



Once again, we must be careful in comparing these results to those obtained from investigation of datasets such as the Labour Force Survey. However, it is interesting to note that the range of estimates here are in line with those obtained in such studies. For instance, Conlon, Patrignani and Chapman (2011) estimate earnings returns to *Level 3 apprenticeships* of between 22.4% and 13.3%; depending on whether (respectively) weekly or hourly earnings are used as the dependent variable. McIntosh (2007) arrives at an estimate of 17.7% for *Level 3 apprenticeships* using weekly earnings and 15.6% for those with Level 2 apprenticeship qualifications. The National Audit Office (2012) replicate the approach of McIntosh with more up-to-date LFS data and arrive at estimates of 13.1% for *Level 2 apprentices* and 21.5% for *Level 3*.

Readers of these studies will note the differences in approaches to estimation, the exact definition of treatment and control, together with a variety of other factors. However, the ultimate aim is the same. We wish to compare the average earnings of those who secure an apprenticeship qualification with the earnings of a group who do not have the qualification, but are otherwise identical. Over the four years that we observe learners, our estimates move from the top to the bottom of the distribution of existing estimates.

Moving on, Table 33 presents the estimated employment probability premium for apprenticeship achievers over non-achievers; with Table 34 providing raw employment rates as a context for our discussions. As we would expect, Table 34 suggests that both

achievers and non-achievers amongst our Level 3 learners have higher employment rates than those whose highest aim is a Level 2 apprenticeship. However, the returns of Level 2 achievers relative to non-achievers are higher than the premium for achievers at Level 3. One year after learning, Level 2 achievers secure an estimated 7.4 percentage point employment premium, compared to 5.2 percentage points for achievers at Level 3. These percentage points translate into 11.5% and 7.2%, for Level 2 and Level 3 respectively. This is perhaps as we would expect, given that our method better captures the potential for decreasing marginal returns at higher levels of educational attainment.

Table 32: Estimated employment probability premium for achievers V non-achievers: apprenticeships

	Return to employment probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Level 2	0.097***	0.091***	0.083***	0.074***	0.066***	0.061***	0.057***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 3	0.069***	0.065***	0.056***	0.052***	0.047***	0.042***	0.046***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)

Table 33: Raw employment probabilities one year after spell end date for apprenticeships

Spell Participation	Spell Achievement		
	No achieve	Level 2	Level 3
Level 2 Apprentice.	0.57	0.72	
Level 3 Apprentice.	0.67	0.65	0.77

Table 35 presents the *Active Benefit* percentage point probability premium for apprenticeship achievers over non-achievers; and Table 36 provides the raw benefit proportions for context. Here we see a picture of higher estimated percentage point returns at Level 2, but in this instance the raw proportions in Table 36 are such that these percentage point differences do not remain the same when we consider percentage differences. For instance, one year after learning, achievers at Level 2 are 3.3 percentage points less likely to be on benefits than non-achievers, compared to a figure at Level 3 of 1.8 percentage points. However, these figures translate into percentage differences of approximately 55% at Level 2 and 60% at Level 3, as the base for the former is approximately 6 percent (half way between 0.08 and 0.04) and the latter is only 3 percent (half way between 0.04 and 0.02).

Table 34: Estimated probability of achievers being on *Active Benefits* (job-seeking), compared to non-achievers: apprenticeships

	Return to benefit [jsa] probability in time period after spell end						
Achievement	4wks	3mths	6mths	1yr	2yr	3yr	4yr
Level 2	-0.034***	-0.040***	-0.035***	-0.033***	-0.028***	-0.024***	-0.018***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level 3	-0.022***	-0.024***	-0.022***	-0.018***	-0.016***	-0.014***	-0.013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Table 35: Proportion of apprentices on *Active Benefits* (job-seeking) one year after learning spell ends

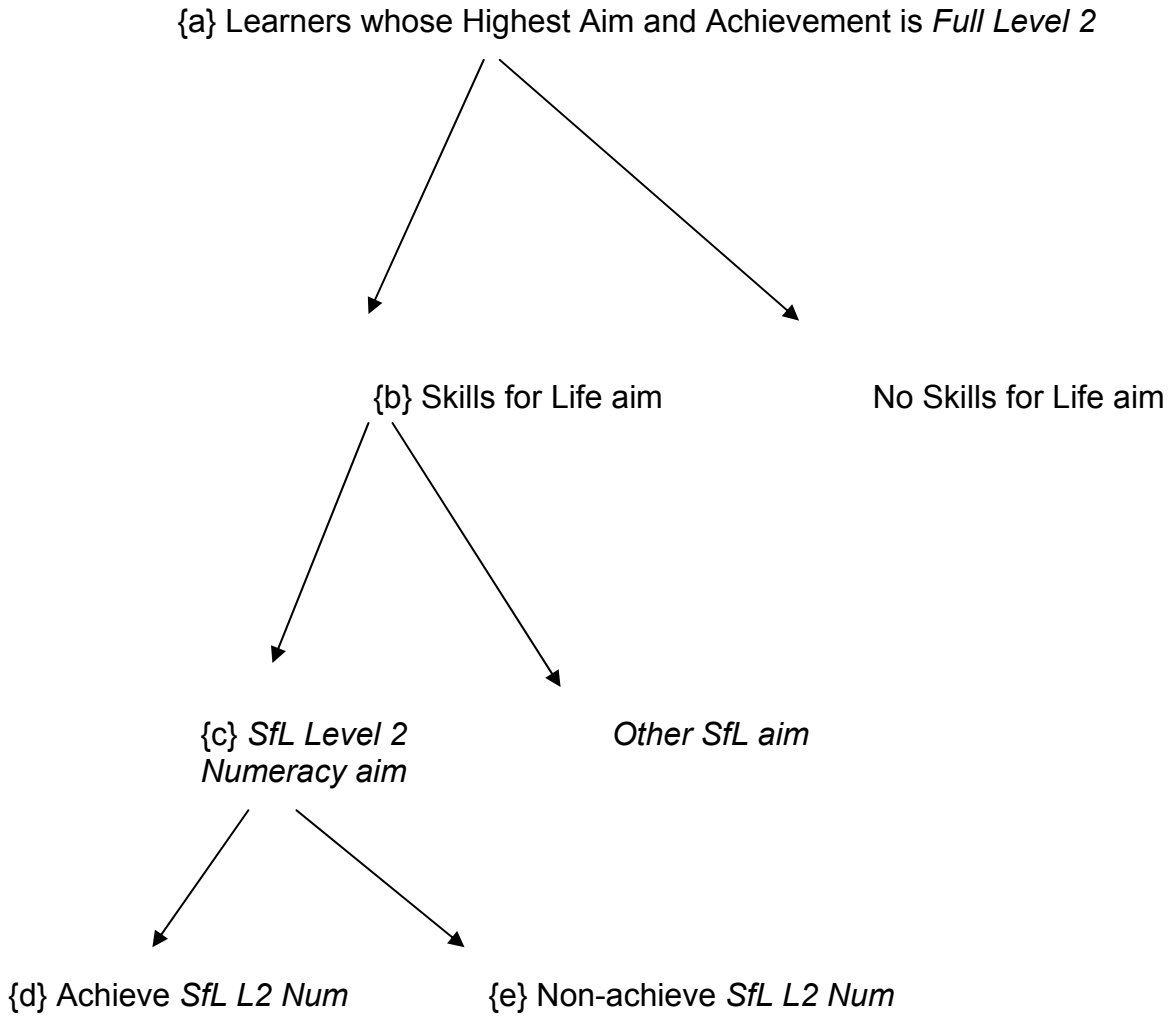
Spell Participation	Spell Achievement		
	No achieve	Level 2	Level 3
Level 2 Apprentice.	0.08	0.04	
Level 3 Apprentice.	0.04	0.05	0.02

4.3 The challenge of estimating returns from *Skills for Life*

In the previous sections we have not presented separate estimates for *Skills for Life* as a highest qualification aim, because we see *Skills for Life* (*SfL*) as a form of 'complementary learning'; in that it is usually taken alongside an existing (often higher) learning aim. In the following diagram we present an example of the sort of analysis that better suits this complementarity and has the potential to get at a truer estimate of the value of *Skills for life*.

Figure 3: First we select a group of achievers from the previous analysis – for instance, all those who have {a} Highest Aim and Achievement of *Full Level 2*. We then identify {b} all learners in this group of *Full Level 2 Achievers* who have a *Skills for life* learning aim (this will not be held as a highest learning aim). Within this group of {b} *Full Level 2 Achievers* who also have a *Skills for life* qualification aim, there are a number of separate categories of aim. For instance, we have {c} an '*SfL Level 2 numeracy'* indicator and we would wish to compare the premium for those who {d} achieve this aim, compared to {e} those who have this aim but do not achieve.

Figure 3: Example approach to capture returns from *Skills for Life*



The possible proliferation of results is quite substantial – we have 12 possible starting points for Figure 3, as each of our 6 qualification categories has a treatment and control group. Whilst this example is for a treatment group of achievers (*Full Level 2*), it would seem reasonable to perform the analysis for non-achievers, as we may expect the premium for SfL achievers to be even higher if no other qualification has been obtained.

Table 37 presents the estimated daily *Skills for Life* earnings premium for those who have aimed and achieved a *Full Level 2* qualification (following the example of *Figure 3*). For instance, in the first row of Table 37 we have an estimated premium of 9.3% for achievers over non-achievers in *SfL Level 2 literacy* one year after learning. The suggestion is that, amongst all those who achieve a highest qualification aim of *Full Level 2* there remains a 9.3% premium for those who also achieve a *SfL Level 2* literacy qualification, relative to those who have an aim of a *SfL Level 2 literacy*, but do not achieve it. This estimated premium remains relatively stable over the four year period, ending on a value of 8.6%.

Amongst those who achieve a highest aim of *Full Level 2* qualification, the returns to a *SfL Level 2 numeracy*, *SfL Level 1 literacy* and *SfL Level 1 numeracy* are also positive, statistically significant and of a similar magnitude. In contrast, we see no significant return to those who achieve *GCSE English* or *GCSE Maths* when taken in conjunction by those who achieve a *Full Level 2* highest aim. This is very much a first attempt to capture returns

to this form of qualification and we consider the potential weaknesses of this approach at the end of this section.

Table 36: Return to daily earnings across *Skills for Life* aims [learners who aim and achieve a *Full Level 2* qualification]

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Level 2 literacy	0.093***	0.094***	0.070***	0.086***
	(0.006)	(0.006)	(0.007)	(0.007)
Level 2 numeracy	0.060***	0.069***	0.080***	0.077***
	(0.008)	(0.008)	(0.009)	(0.010)
Level 2 ESOL	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a
Level 1 literacy	0.059***	0.040***	0.070***	0.071***
	(0.007)	(0.008)	(0.010)	(0.016)
Level 1 numeracy	0.074***	0.073***	0.080***	0.079***
	(0.006)	(0.008)	(0.010)	(0.014)
Level 1 ESOL	n/a	n/a	n/a	n/a
	n/a	n/a	n/a	n/a
GCSE English	0.027	0.027	-0.016	0.006
	(0.018)	(0.019)	(0.021)	(0.024)
GCSE Maths	-0.005	-0.013	0.005	-0.029
	(0.019)	(0.022)	(0.023)	(0.028)

In Table 38 we perform the same analysis for our categories of SfL aim, but in this case we model for all learners who have taken these SfL qualifications in addition to achievement of a highest aim of *Full Level 3* qualification. Once again, the returns to *SfL Level 2 literacy* and *SfL Level 2 numeracy* are positive, statistically significant and of a similar magnitude. The figures for *SfL Level 1 numeracy* are only valid for the first two years, as our sample size drops below acceptable levels and there are not enough observations to estimate *SfL Level 1 literacy* in any year. What is particularly interesting here is that our returns to *GCSE Maths* and *GCSE English* are now negative and significant.

Table 37: Return to daily earnings across *Skills for Life* aims [learners who aim and achieve a *Full Level 3* qualification]

	Log Daily Earnings in Tax Year after Spell End			
Achievement	(1)	(2)	(3)	(4)
Level 2 literacy	0.050***	0.049***	0.048***	0.051***
	(0.004)	(0.005)	(0.005)	(0.006)
Level 2 numeracy	0.036***	0.034***	0.037***	0.053***
	(0.004)	(0.005)	(0.005)	(0.006)
Level 2 ESOL				
Level 1 literacy				
Level 1 numeracy	0.099***	0.084***	0.111***	0.167
	(0.015)	(0.020)	(0.033)	(0.120)
Level 1 ESOL				
GCSEEnglish	-0.098***	-0.084***	-0.046***	0.005
	(0.011)	(0.012)	(0.013)	(0.014)
GCSE Maths	-0.070***	-0.084***	-0.058***	0.010
	(0.008)	(0.009)	(0.010)	(0.011)

The suggestion is that, in addition to any return from achieving their highest aim of a *Full Level 2* or *Full Level 3* qualification, learners are securing good returns from the additional SfL learning they are undertaking. In each case this is relative to learners with the same highest achievement of a *Full Level 2* or *Full Level 3* qualification who have the same SfL aim, but do not achieve it. Considering the nuance of this last sentence, we can see where the main potential weakness of our approach lies; and which is likely an important driver of both significant negative and significant positive findings.

In the framework above, we are attempting to reduce unwanted heterogeneity by focusing, for instance, on all learners who achieve *Full Level 2*. Within this group of learners we then consider the earnings premium secured by those achieving a certain Skills for Life aim, relative to those with the same aim who do not achieve. The problem we have is that, within this framework, our Skills for Life achievement is likely acting as a proxy for the specific type of qualification within the wider group of learners who achieve *Full Level 2*.

For instance, within our category of *Full Level 2* we have a variety of qualifications, ranging from NVQ2 to City & Guilds, BTEC and RSA. The latter categories of qualification have been found to secure significant returns of a much higher magnitude than NVQ2. In our framework, if SfL achievement is much more common amongst those who achieve a *Full Level 2* BTEC, RSA or City & Guilds; and much less common amongst those who achieve NVQ2, our regression coefficients above will capture some of the differential returns within our wider categories of *Full Level 2* and *Full Level 3* – rather than the actual returns to SfL. In a similar way, the highly negative returns to GCSEs for those achieving *Full Level 3* possibly reflect the fact that these achievers are more likely to be studying types of *Full Level 3* qualifications that secure lower returns; though at this level it is perhaps more likely that we are observing some effects from our omission of an HE flag.

Whatever the specific reasons, the solution is to dig down further into our highest aim categories and carry out the above analysis for more specific highest aim qualification categories – such as NVQ2. In contrast, moving to a higher level of disaggregation would further weaken the confidence we have in any results.

5. Earnings Premiums for NVQ2 & NVQ3 Achievers

In this section we present estimated returns for those achieving either NVQ2 or NVQ3 qualifications, relative to the relevant control of those who aim, but do not achieve these qualifications. These qualifications are widely held and have been the focus of a number of academic studies that attempt to estimate returns, using survey data. We are therefore better able to consider the possible reasons why we observe relatively high estimated premiums from analysis of the ILR, compared to those in the existing literature.

To help shed some light on the drivers of any difference, this section presents some of the more detailed econometric analysis that we would expect to see in academic studies, which focus on a more specific set of qualifications and estimated returns. For instance, we present Tables (similar to 2a and 2b in the *Data and Method* section) that show how the estimated earnings premium changes as we add controls to the regression specification. For each one of the approximate 700 regression equations estimated in this report we would ideally undertake this more detailed analysis, to ensure that the estimated premium we arrive at is the most robust we can achieve with the data available.

Section 5.1 describes our approach to estimation of earnings premiums for NVQ2 and NVQ3 achievers and then presents the results. Section 5.2 then sets out some detail on the magnitude of estimates in the existing literature from survey-based studies, and considers the possible reasons why these may differ to the estimates achieved here. We also include a brief note on why our estimates seem higher than those from a previous study of ILR data.

5.1 Estimated earnings premiums for NVQ2 & NVQ3 achievers

We have 1.38 million observations for learning spells between August 2004 and August 2010, where an NVQ level was the highest or main learning aim. As we can see from Table 39, the majority of these learning spells relate to NVQ2 and NVQ3 qualifications and out of 1.38 million NVQ aims, we observe 900,000 learning spells that end in achievement of the stated aim.

Table 38: Achievers, intermediate achievers and non-achievers according to NVQ Level aim

	No Achievement	Other Level 1	NVQ Level 1	Other Level 2	NVQ level 2	Other Level 3	NVQ Level 3	Other Level 4	NVQ Level 4
NVQ 1	14,882	1,391	15,964						
	46.16	*4.31*	*49.52*						
NVQ 2	275,916	13,130	3,369	52,747	622,144				
	28.40	*1.35*	*0.35*	*5.43*	*64.04*				
NVQ 3	66,022	1,651	51	6,103	16,050	19,024	233,343		
	19.29	*0.48*	*0.01*	*1.78*	*4.69*	*5.56*	*68.16*		
NVQ 4	2,643	54	0	164	225	190	1,828	37	8,846
	18.90	*0.39*	*0.00*	*1.17*	*1.61*	*1.36*	*13.07*	*0.26*	*63.24*

Row percentage in *italics*

Analysis of more specific qualification categories (i.e. NVQ2 and 3) adds another outcome category between achievers and non-achievers. For instance reading along the second

row of Table 38, which includes 967,306 spells with an NVQ2 highest aim, we have 622,144 who aim and achieve NVQ2; 275,916 who have no achievement; 16,499 intermediate achievers and a new group of 52,747 who aim for NVQ2, but achieve another Level 2 qualification.

There are clearly a large number (275,916) of spells with an NVQ2 highest aim that end in *no recorded achievement*. Taken together with the intermediate qualifiers, the suggestion is that approximately one-third of spells with an NVQ2 highest aim do not end with the individual securing that aim. This is roughly in line with the proportions seen at other levels, if we include intermediate qualifiers, but the absolute number with no achievement, who aim for NVQ2, seems particularly high.

The 1.38 million spell observations in Table 39 correspond to 1.22 million unique individuals and 70,000 of these individuals are dropped from our analysis as they have an HE flag. These 70,000 individuals mainly have an NVQ2 or 3 highest aim and whilst the incorporation of an HE flag limits our period of analysis, the main aim here is to gain as accurate a set of estimates as possible. Table 40 describes the (raw) average daily earnings in the years after spell end, for the remaining 1.15 million individuals who have an NVQ aim[29].

Table 39: Average daily earnings in year after spell end (raw figures)

1 Year	No Achievement	Level 1	NVQ Level 1	Level 2	NVQ level 2	Level 3	NVQ Level 3	Level 4	NVQ Level 4
NVQ 1	28.6	35.5	37.5						
NVQ 2	35.8	33.1	29.1	34.2	41.7				
NVQ 3	40.6	33.6	26.7	37.9	36.6	45.2	45.7		
NVQ 4	48.8	49.9	n/a	38.9	43.4	39.2	52.0	43.9	51.1
2 Years									
NVQ 1	33.6	32.6	38.2						
NVQ 2	37.7	35.2	37.9	39.1	42.6				
NVQ 3	42.6	35.2	26.6	39.1	36.3	46.7	47.9		
NVQ 4	50.5	45.5	n/a	53.2	42.4	39.4	47.8	50.6	55.4
3 Years									
NVQ 1	40.8	44.5	39.2						
NVQ 2	38.0	41.9	35.9	39.7	43.5				
NVQ 3	43.9	37.5	30.8	40.4	39.9	49.5	48.0		
NVQ 4	62.1	48.0	n/a	45.2	42.5	40.3	49.5	51.6	54.0
4 Years									
NVQ 1	31.9	33.5	38.1						
NVQ 2	39.1	37.2	30.7	39.5	43.7				
NVQ 3	45.3	40.5	36.0	42.5	36.6	48.4	49.4		
NVQ 4	55.8	41.8	n/a	44.3	39.2	51.0	53.1	42.6	56.1

As with the analyses performed elsewhere in this report, we tend to find that intermediate achievers often have lower average wages than either achievers or non-achievers, even when we consider returns four years on from the end of a learning spell. As Table 39 underlines, the numbers in any one cell of intermediate achievers are pretty small, but when we get to (for instance) NVQ3, there are 22,000 individuals who aim for this qualification, but achieve Level 2. Amongst this group, for whom we have earnings information, average earnings are lower than those who aim but do not achieve (across all four years after the end of learning).

Having considered some of the characteristics of our data, Tables 41 and 42 now present the results of estimated equations. In each case we give some idea of how the estimated premium for achievers over non-achievers (with the same highest aim) changes as

[29] The actual numbers in Table 40 will be lower than this 1.15 million, depending on whether we have an earnings observation for an individual and how this changes over the period that we track earnings.

additional controls are added to the regression equation. For instance, the first column of Table 41 suggests that, controlling for none of the possible differences between achievers over non-achievers (who also aim for NVQ2), we obtain an estimated earnings premium of 28.6%. If we then add in a control for sex only (second column), this estimated return falls slightly to 27.8% and the further addition of controls for *Age*, pushes the estimated return down to 26.4%.

As we move along the top row of Table 41, our estimated earnings premium slowly falls with the addition of further controls, particularly when we control for spell length, year dummies and prior qualifications. Having said this, we only move from an estimate of 28.6% from the naïve regression (with no controls), to 24% when a number of controls are included in our specification. The implication is that, on these characteristics, even where our treatment and control groups differ, any differences in their characteristics are not driving differences in returns. This may imply some degree of homogeneity between treatment and control (on these characteristics), though this is not necessarily the case[30]. It is important to note that whilst we use the usual controls found in studies of earnings returns, it is possible that we are simply not controlling for key characteristics that drive differences in the returns secured by achievers and non-achievers (for instance motivation or commitment) - an issue to which we return.

Table 40: Estimated log daily earnings premium for achievers V non-achievers in first tax year after spell end (OLS Regression of NVQ2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(13)	(14)
level2	0.286***	0.278***	0.264***	0.262***	0.262***	0.263***	0.267***	0.265***	0.256***	0.256***	0.244***	0.242***	0.240***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Controls													
Sex	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Age	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ethnicity	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Disability	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regions	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Funding mode	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Study mode	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Offender	no	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes
Learning Difficulty	no	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes
Spell Duration	no	no	no	no	no	no	no	no	yes	yes	yes	yes	yes
Spell Count	no	no	no	no	no	no	no	no	no	yes	yes	yes	yes
Prior Qualifications	no	no	no	no	no	no	no	no	no	no	yes	yes	yes
Year Dummies	no	no	no	no	no	no	no	no	no	no	yes	yes	yes
Postcode dummies	no	no	no	no	no	no	no	no	no	no	no	yes	yes
Interactions	no	no	no	no	no	no	no	no	no	no	no	no	yes
Constant	3.100***	2.957***	2.830***	2.836***	2.843***	2.882***	2.841***	2.851***	2.828***	2.837***	2.783***	2.756***	2.756***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)	(0.010)	(0.010)	(0.011)	(0.011)	(0.018)	(0.021)	(0.021)
N	498239	498239	498239	498239	498239	498239	498239	498239	498239	498239	498239	498239	498239
r2	0.024	0.057	0.079	0.081	0.081	0.085	0.088	0.090	0.091	0.091	0.099	0.103	0.104
r2_a	0.024	0.057	0.079	0.081	0.081	0.085	0.088	0.090	0.090	0.091	0.098	0.103	0.104

Robust standard errors. All controls are statistically significant

When we consider the results of Table 42, there is clearly some difference in the impact of our controls as they are added to the naïve regression in the first column. We begin with an estimated premium for NV2 achievers over non-achievers of 21.5% in the first column, but this rises slightly or remains effectively unchanged as we add demographic controls (sex, age, ethnicity, disability and region), resulting in an estimated premium of 24.9% in

[30] The relatively large numbers included in our regression equations mean that most variables will be recorded as having a statistically significant effect, even if there are not substantial differences in the characteristics of the treated and untreated groups.

column 6. Adding controls for *funding mode* and *study mode* then raises the estimated return to 26.1%, after which point it falls back to exactly 21.5% following the addition of controls for spell duration and other characteristics of learning.

Table 41: Estimated log daily earnings premium for achievers V non-achievers in first tax year after spell end (OLS Regression of NVQ3)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(13)	(14)
level3	0.215***	0.216***	0.250***	0.248***	0.248***	0.249***	0.261***	0.260***	0.225***	0.224***	0.218***	0.216***	0.215***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)
Controls													
Sex	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Age	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ethnicity	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Disability	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
Regions	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes
Funding mode	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Study mode	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes
Offender	no	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes
Learning Difficulty	no	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes
Spell Duration	no	no	no	no	no	no	no	no	yes	yes	yes	yes	yes
Spell Count	no	no	no	no	no	no	no	no	no	yes	yes	yes	yes
Prior Qualifications	no	no	no	no	no	no	no	no	no	no	yes	yes	yes
Year Dummies	no	no	no	no	no	no	no	no	no	no	yes	yes	yes
Postcode dummies	no	no	no	no	no	no	no	no	no	no	no	yes	yes
Interactions	no	no	no	no	no	no	no	no	no	no	no	no	yes
Constant	3.308***	3.165***	3.003***	3.011***	3.016***	3.059***	3.138***	3.145***	3.112***	3.129***	3.052***	3.030***	3.035***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.014)	(0.014)	(0.016)	(0.017)	(0.038)	(0.040)	(0.040)
N	171714	171714	171714	171714	171714	171714	171714	171714	171714	171714	171714	171714	171714
r2	0.014	0.066	0.084	0.086	0.086	0.090	0.097	0.098	0.104	0.104	0.110	0.116	0.117
r2_a	0.014	0.066	0.084	0.086	0.086	0.090	0.097	0.097	0.104	0.104	0.110	0.115	0.115

Robust standard errors. All controls are statistically significant

The results of estimation presented in the final columns of Tables 41 and 42 are included in the first column of Table 43, and results of estimation (with full sets of controls) for points 2, 3 and 4 years after learning are also included. As we can see, the suggested earnings premium of 24.1% for NVQ2 achievers in year one drops to 19%, and by year 4 it is only just above 18%. In contrast, even having taken into account the HE flag[31], we find a dip in returns in years 2 and 3 for NVQ3 after the end of learning spell, with a recovery to 21.8% in the fourth year.

Table 42: Daily earnings premium of NVQ2 and NVQ3 achievers relative to non-achievers

	Tax year 1	Tax year 2	Tax year 3	Tax year 4
level2	0.241***	0.190***	0.180***	0.183***
	(0.003)	(0.004)	(0.004)	(0.006)
level3	0.215***	0.185***	0.184***	0.218***
	(0.006)	(0.007)	(0.008)	(0.011)

Figure 4 takes the results of these regression equations and present them in a way that gives some indication of what the premiums mean for the daily earnings of achievers [on average], compared to non-achievers who have the same apprenticeship aim. However, in contrast to the discussion of findings for Apprenticeship qualifications, where we observe a

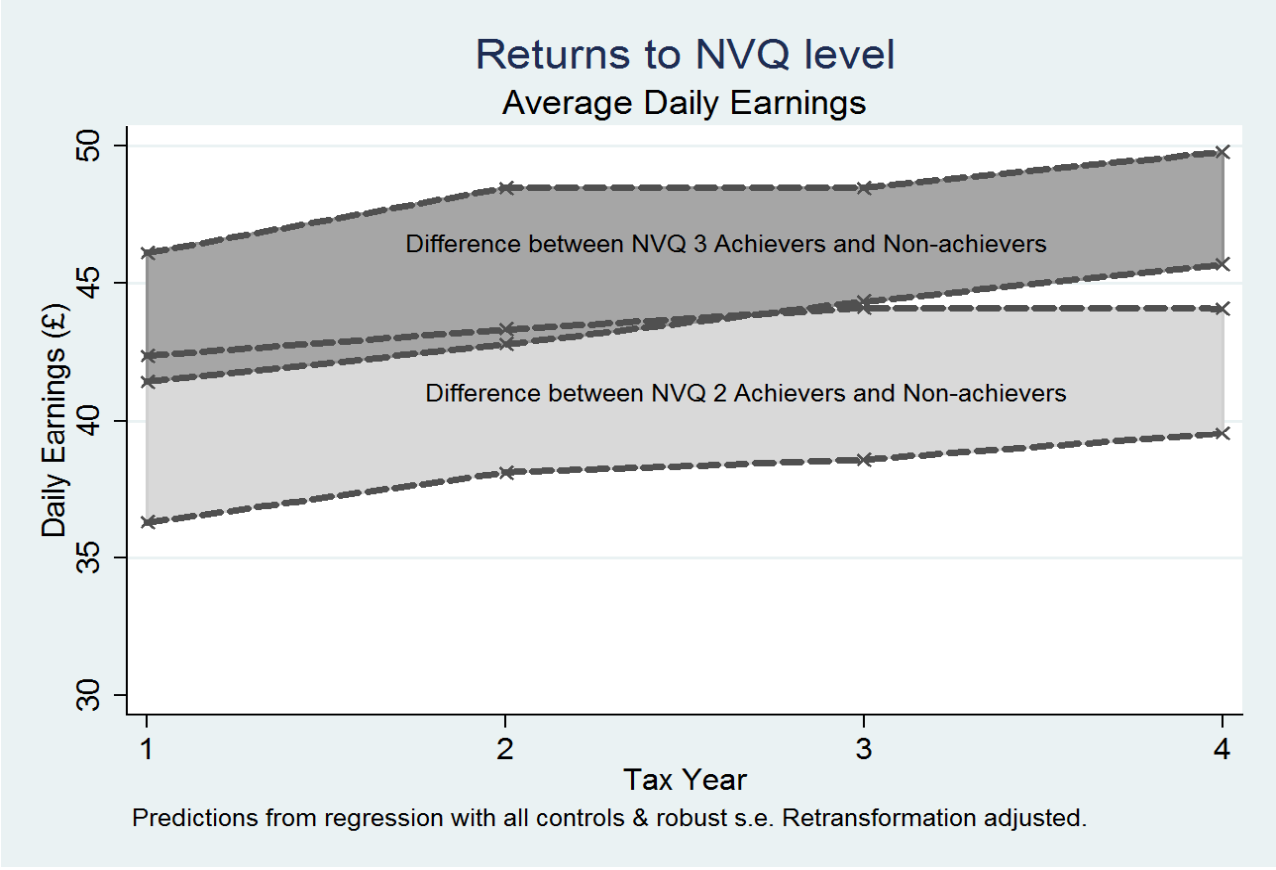
[31] I.e. removing those who move on to HE (following 'achievement') and possibly depress estimated returns because they take on part-time jobs.

close correspondence between our estimated premiums gained from econometric techniques and the implied premium represented in our Figures, when considering NVQs we have some divergence between the two. This is a result of the problems one experiences when re-transforming econometric estimation results that consider log daily earnings, to the daily earnings estimates in Figure 4.

In the discussions around Figure 2 we outline a number of caveats that must be applied when considering this pictorial representation of our findings, and here we add another. Readers wishing to understand in detail the reasons why both sets of estimates in Figure 4 and Table 43 are, strictly speaking, correct should read Duan (1983). However, we would underline that the premiums in Table 43 are those that should be cited in wider discussions, with the representation in Figure 4 only used as a descriptive tool to aid understanding.

The darker shaded area in Figure 4 is bounded below by the predicted daily earnings that NVQ3 non-achievers can expect, between one [approx. £42] and four years [just over £45] after the end of learning spell. Those who achieve an NVQ3 qualification can expect a premium that is higher in the year directly after the end of learning, through to the fourth year after learning, with the premium implied by Figure 4 somewhat less than that implied by the results of Table 43; due to the confounding nature of re-transformation of log daily earnings estimates and the fact that earnings in Figure 4 are estimates and have standard errors associated with them.

Figure 4: Average Daily Earnings Returns to NVQ2 and NVQ3 qualifications



5.2 Comparison with estimated premiums in existing studies

Generally the estimates we obtain across most learning aims are higher than those obtained in the previous study of ILR data (Patrignani and Conlon, 2011), and those from studies that estimate returns using survey data. A significant amount of time was spent in the present project pursuing the possible reasons for differences with the previous study of ILR data. As suggested in the introduction, in contrast to P&C, we are able to incorporate some measures of prior achievement; for a period we have an HE flag; a file of data on Job Training Allowance (JTA) payments and we expand the period of analysis by approximately 5 years. However, from our investigation[32], it is the different approaches to creation of learner records that seems to drive differences. For instance,

- The P&C study does not appear to include apprenticeships or other work-based learners in their high-level analysis. We include work-based learners in our main data structure, whilst apprenticeships are estimated separately.
- P&C use log yearly earnings (deflated by 2010 retail prices) or employment defined as the proportion of the year spent in employment We use log daily earnings (also adjusted for inflation) and employment probabilities at specific points after spell end. We also cut the top 1% and bottom 1% from our data.
- However, it is the inclusive approach to the creation of learner records, which leads us to include approximately 2 million more learners in our investigation than P&C, that is likely one of the main drivers of difference.

We would argue that the present study represents a move forward in the process of development of both the ILR (and related) data and the use of this for estimation of earnings, employment and benefit premiums. However, if this is the case, we must consider why our estimates seem so much higher than those in existing studies. In this section of the report we obtain estimated returns to NVQ2 and NVQ3 qualifications that are significantly higher than those obtained from studies that utilise survey data (for instance, Greenwood, Jenkins and Vignoles, 2007; McIntosh, 2009). In these studies average returns are negative or zero and 'marginal' returns to NVQ2s are negligible.

However, there is a question of whether our findings are really a factor of ten greater. For instance, Greenwood et. al. (2007) identify positive returns to an NVQ2 as a highest qualification, when compared to a (i) sample of individuals with highest academic Level 1 and/or vocational level 2 and (ii) unqualified sample including only Level 2 vocational or no qualifications. Whilst average returns remain nil, for women with an NVQ2 as a highest qualification the estimated returns are between 3% and 5%. Similarly, males in construction with an NVQ2 achieve a return of 11%. For those who hold an NVQ3 as their highest qualification, the return is estimated at 10% for women and 13% for men.

This brief discussion underlines the importance of our control group – when we calculate returns to a particular qualification, the magnitude of our estimate varies as we vary the nature of the control. Variation in estimated returns across sectors and occupations may

[32] A separate technical note is available on request, investigating the differences between the approach to data creation adopted here and that of P&C (London Economics), when the time period for analysis in both cases is learning spells between 1st August 2002 and 31st July 2006.

be due to true variation in returns, but could also reflect variation in the nature and extent of any unobserved differences between our treatment and control groups. For instance, in sectors where an NVQ2 is not such a prestigious qualification, survey-based studies may underestimate returns if those who choose to study for this qualification are on average less productive (prior to achievement of the qualification) than those who choose not to study for the qualification. In these instances, the comparison of achievers V non-achievers with the same qualification aim has the potential to overcome this downward bias. In contrast, as we have suggested in the introduction to this study, the approach adopted here may potentially over-estimate returns.

We return to this important issue in the concluding section of our report, but for now it is worth noting some other factors that could be driving the gap between results.

Data Issues

- Survey-based studies deal with samples that are representative of the UK population. Individuals in the ILR data are on average younger, as they include the population of English FEs. We are measuring the returns to qualifications on completion of Further Education, and as such we are measuring returns for a younger age group and at a very early point in their careers. Survey-based studies tend to have either a wider age range and/or will consider returns measured at more points across the age-earnings profile.

- More generally, there will be greater heterogeneity amongst control groups in survey-based studies. Greater homogeneity amongst our control groups is one possible reason why our control variables have little impact on our estimated earnings premiums.

- The majority of studies that attempt survey-based analyses, utilise the Labour Force Survey, which unfortunately only records highest vocational qualification.

- Studies that model Log hourly real wages tend to arrive at lower returns, when compared to those that estimate returns using weekly (McIntosh, 2007; Conlon et. al. 2011; National Audit Office, 2012), monthly or annual earnings – we model daily earnings and are therefore possibly somewhere in-between. The reason for these differences seems to be that having completed a qualification, individuals receive both a higher wage and have access to more hours of work. As the NAO (2012) study suggests, there is no right or wrong way to approach this – whilst employers may be interested in hourly pay because of its closer links to measures of productivity, employees are likely to value the impact of a qualification on the overall ability to earn (both in terms of a higher wage and possible access to additional hours of work).

Are we capturing the same 'Marginal' returns?

In the analysis presented here we are able to control for some prior qualifications. However, even in instances where we do not explicitly control for previous qualification in our regression specification, we are effectively doing so through our choice of comparison

group. By definition our control group of non-achievers have been given access to NVQ2/3 study and this implies that they have sufficient qualifications to be registered. There is a potential for individuals to have higher-level qualifications than the one we observe them studying for, but in many cases this would result in their inclusion in analysis of a higher aim[33].

The suggestion must be that the returns we are capturing are closer to what we would consider as *marginal* (hence we identify a tendency for decreasing marginal returns). It is recognised that the conceptualisation of marginal in the existing literature is not wholly accurate, for instance Greenwood and others capture 'marginal' returns by comparing those with a highest qualification at NVQ2, to a control of those with no vocational highest qualification. In the analysis here, the control group contains individuals who have achievements that are at least at the level below, allowing them to register for NVQ2 as their highest qualification aim. Our approach to estimation of marginal returns should depress estimated returns, because we are in theory comparing to a control group who have achieved a higher level of qualification.

[33] Though this would depend on where and when they achieved the higher-level qualification.

6. Conclusions and Recommendations

As suggested in the introduction, our analysis has the potential to overcome the sort of selection effects that may possibly explain low and negative estimated returns at some levels of vocational qualification in other studies; but the potential weakness is that we are comparing those who pass, with those who fail. Further econometric investigation of this issue is beyond the scope of this study, but it is hoped that the following discussion clarifies some of the main issues for research going forward and helps in interpretation of the results presented here.

Unobserved heterogeneity and ability bias

First, it is useful to consider the question of what we are ideally capturing when calculating the estimated earnings, employment or benefit premiums in this report; and compare this to what we may actually be identifying. The aim is to identify the differing returns to **skills acquired** by those who achieve, relative to an otherwise identical group who do not achieve. One particular challenge is the removal of any differences in returns that reflect an achiever's **greater ability to acquire those skills**, relative to a non-achiever.

Let us consider an example. Assessing a sample of individuals using Standard Assessment Tests (SATs), we would expect those who achieve a higher score, to secure a higher earnings return on average in the labour market. If we assume that SATs are effective as measures of ability, then this premium would be a return to innate ***ability*** – we have not given individuals a certificate they can use to ***signal*** their greater ability and those who achieve higher scores have not been given a new set of ***skills*** from which they can secure an earnings premium.

The estimated premiums presented in this report, comparing the returns of achievers with non-achievers, likely include a return to ***skills*** acquired, the ***signal*** that a formal qualification may provide to employers and also a return to ***ability*** (irrespective of qualifications gained). If there is a big difference between the ability of achievers over non-achievers, which we do not control for, it will be reflected in our estimated premiums, and our estimates will be biased upwards.

However, it is not wholly clear that the potential for ability bias in our analysis is any more acute than that seen in survey-based studies. For instance, our control group contains those who were 'good enough' to start a qualification, rather than all individuals achieving the qualification level below, who would be included in the control of survey-based studies. Similarly, survey-based studies will have achievers in the treatment group; non-achievers will be a subset of the control group; and these studies have access to similar controls for ability. Given this, any ability bias in our results is arguably no more acute than that seen in survey-based studies.

These arguments can go back and forth. However, ultimately we must ask whether ability bias is really the main potential problem with our results, especially when considering the differences between achievement and non-achievement at Level 2. A more credible culprit for potential bias is the more general issue of unobserved individual heterogeneity, and the

fact that this could be driving differences in returns.

For instance, it may be that passing or failing an NVQ2 simply reflects the greater commitment of the treated group, who manage their time better, turn up to classes, adopt a generally professional approach, as well as other character traits. This is not ability bias in the strictest sense, but it comes close and there are many other unobservables that could be partially responsible for the differing returns we observe. However, once again, if this were a problem for our study, it should be for the survey-based studies, which often have fewer controls than the ones we are able to draw on.

This brief discussion and the points made in Section 5 suggest that there are a number of possible explanations for the differences between the estimated returns we see in survey-based studies and those comparing achievers and non-achievers in the ILR. As a next step in this work, we would suggest pursuing specifications that will hopefully shed some light on these questions, for instance using difference-in-differences methodologies and varying the control groups used to calculate returns[34].

With these caveats in mind, any conclusions from the present study should focus on ways of improving accuracy and (unfortunately) we would highlight the estimated premiums that seem to remain low, even in such a framework where returns are possibly (though not certainly) inflated. In this respect we would draw attention to the premium secured by women achievers at *Level 2*, whose premium over non-achievers is less than 1% at *level 2* from years 2 to 4; and is almost wholly insignificant in the first three years after learning ends. These poor returns at *Level 2* are worrying, given that we have between 1.1 and 0.8 million women in our *Level 2* equations. Whilst our estimated employment probability premiums provide more evidence of a return to qualifications at this level for women, the low estimated earnings premium remains a concern.

Issues to consider

As we can see from Section 3.5 of our analysis, the omission of an HE flag is clearly reducing our estimated premiums across all categories of qualification aim; rather than just at Level 3 as previously hypothesised. Any research going forward needs to consider the incorporation of this flag into the main body of research, if the limiting aspects of this can be overcome.

One aspect of our analysis that is less likely to be influenced by the 'HE Flag' issue is the general finding that *Vocational and Provider* returns tend to be more pronounced than those for achievers who are learning in *Vocational and WBL* contexts. We engage in a discussion of why this finding must be read with care, as it does not imply a switch to vocational learning within FE institutions.

We describe a framework for the analysis of *Skills for Life* and present some initial findings, which should be treated with particular care and need further development – perhaps an entire study in itself.

[34] Though even this method suffers from limitations, if we have non-achievers securing poorer returns because they suffer some form of negative shock (for instance, the breakdown of relationships or the break-up of a family), which occurs at the time of treatment (learning).

Similarly, there is an interesting question over the distinction between those who are completers and non-completers, as we do not differentiate these amongst our control group of non-achievers. In the regression analysis we use a [piecewise] control for spell length, but the question of what 'drop-outs' look like, relative to completers, is one that is particularly interesting for policy analysis (see for instance Montmarquette, et. al. 2007, Warren and Lee, 2003; Capuccinello, 2012). Not least because we have some evidence that the range of 'intermediate achievers' (i.e. those who aim for X but achieve X-1, X-2 etc.) seem to have labour market outcomes that are invariably worse than either achievers or non-achievers. This may be due to the very different characteristics of this group and they may still be securing a return, but it is also quite possible that the financial incentives of the FE system result in these individuals obtaining qualifications that are not as valuable.

In a related point, there is the potential to alter the nature of our control group. In the main body of analysis we compare those who achieve (and therefore necessarily complete) with those who do not achieve, whether they complete the course or not. When we consider qualifications such as apprenticeships, it would be interesting to compare the premium secured by achievers, relative to those who do not achieve, but do complete. In this instance, we may gain some indication of the value of training (skills return) for those who do not manage to formally secure accreditation.

Study of FE qualifications is a complicated issue and in aggregation we always miss some nuance. For instance, we need to consider how to approach the issue of prior attainment. Here we consider whether someone already has full L2, full L3, etc., but in reality, learners are often part of the way there. In some cases, this makes no difference, as some qualifications cannot be "added up". But many individuals may only need a small number of additional modules and this will impact both what they study and our view of what they have already achieved.

Furthermore, for all qualifications considered here, it would be very useful to see how returns have varied over the last decade. For instance, analysis of LFS data suggests that returns to Level 2 vocational qualifications are declining over time.

There are a number of issues that this paper flags up which could usefully form the focus of research going forward. In the first instance, it would be important to focus on one or two types of educational qualification to allow a more detailed investigation of returns (similar to the analysis in Section 5). Such a focus would allow more depth of analysis and tease out some of the host of issues that could be confounding the results presented here and in survey-based studies. The creation of this dataset is a genuinely exciting development in the measuring of returns to FE learning in England. It presents a unique opportunity to better understand where both our estimates and the survey-based ones are wide of the mark. The reality is that the answer may lie somewhere in-between.

References

Bibby, D., Knight, T., Speckesser, S. and Thomson, D. (2012), "Measuring Further Education Outcomes Using Matched Administrative Data: Constructing a Research Database", *RM Data Solutions* and *Institute for Employment Studies*

Capuccinello, R. I. (2012), *Dropping out from Further Education in the UK: The effect of college and programme area size*, PhD Chapter, Lancaster University and Universitá Magna Graecia.

Conlon, G., Patrignani, P. and Chapman, J. (2011), "Returns to Intermediate and Low Level Vocational Qualifications", *BIS Research aper* No. 53.

Dearden, L., McGranahan, L. and Sianesi, B. (2004), "An in-depth analysis of the returns to national Vocational Qualifications obtained at level 2", Centre for the Economics of Education, *Discussion Paper* No. 46.

Dickerson, A. and Vignoles, A. (2007*), The Distribution and Returns to Qualifications in the Sector Skills Councils*, SSDA Research Report No. 21.

Greenwood, C., Jenkins, A. and Vignoles, A. (2007), "The returns to qualifications in England: Updating the evidence base on level 2 and level 3 vocational qualifications", Centre for the Economics of Education, *Discussion Paper* No. 89.

Howard, U. (2009), "FE Colleges in a New Culture of Adult and Lifelong Learning", *Inquiry in to the Future for Lifelong Learning Sector Paper 7*

McIntosh, S. (2007), "A cost benefit analysis of apprenticeships and other vocational qualifications", Department for Education and Skills *Research Report* RR834.

McIntosh, S., (2009), "The economic value of intermediate vocational education and qualifications", UK Commission for Employment and Skills, *Evidence Report 11*.

Montmarquette, C., Viennot-Briot, N. and Dagenais, M. (2007), Dropout, school performance, and working while in school", *The Review of Economics and Statistics,* Vol. 89(4); pp 752–760.

National Audit Office (2012), *Estimating economic benefits from apprenticeships – technical paper*, February.

Patrignani, P. and Conlon, G. (2011), The long-term effect of vocational qualifications on labour market outcomes, Department for Business, Innovation and Skills, Research Paper No. 47

Warren, J. R. and Lee, J.C. (2003), "The impact of adolescent employment on high school dropout: Differences by individual and labor-market characteristics", *Social Science Research,* Vol. 32; pp 98–128.

Appendix Table

Descriptives

Unique individuals	12,991,222
Number of learning spe	20,581,579

Controls	Number of spells	Freq	Outcomes	Number of spells	Freq	Std. Dev.	Min	Max
Gender			**Daily (deflated) earnings in tax year:**					
Female	11,575,250	56.24	2 years before spell start	5,245,310	49.67	225.53	0.30	51261
Male	9,006,329	43.76	1 year before spell start	6,932,418	50.05	223.39	0.28	51431
Academic Year			year of spell start	9,208,839	48.13	212.20	0.27	50521
2002/03	3,581,493	17.40	year of spell end	10,364,736	46.03	206.52	0.29	49263
2003/04	2,861,057	13.90	1 year after spell end	10,229,988	47.89	202.90	0.33	48639
2004/05	2,754,567	13.38	2 years after spell end	8,991,235	49.51	204.74	0.37	52645
2005/06	2,212,174	10.75	3 years after spell end	7,656,246	50.86	202.30	0.41	53608
2006/07	2,032,031	9.87	4 years after spell end	6,436,858	52.38	198.80	0.44	47477
2007/08	2,056,237	9.99	**Employment probability:**					
2008/09	2,309,397	11.22	24 mths before spell start	20,581,579	0.48	0.50	0	1
2009/10	1,903,705	9.25	12 mths before spell start	20,581,579	0.51	0.50	0	1
2010/11	870,918	4.23	6 mths before spell start	20,581,579	0.53	0.50	0	1
Ethnicity			3 mths before spell start	20,581,579	0.54	0.50	0	1
white	15,547,123	75.54	1 mth before spell start	20,581,579	0.55	0.50	0	1
white other	1,129,492	5.49	1 mth after spell end	20,581,579	0.60	0.49	0	1
asian	1,255,168	6.10	3 mths after spell end	20,581,579	0.61	0.49	0	1
black	1,038,523	5.05	6 mths after spell end	20,581,579	0.61	0.49	0	1
chinese	86,277	0.42	12 mths after spell end	20,581,579	0.62	0.49	0	1
mixed	338,364	1.64	24 mths after spell end	20,581,579	0.62	0.48	0	1
other	382,296	1.86	36 mths after spell end	20,581,579	0.63	0.48	0	1
unknown	804,336	3.91	48 mths after spell end	20,581,579	0.63	0.48	0	1
Offender			**Number of days worked in tax year:**					
No	20,288,741	98.58	2 years before spell start	11,774,442	306.84	103.40	1	366
Yes	292,838	1.42	1 year before spell start	12,710,298	303.49	105.94	1	366
Disability			year of spell start	13,970,214	301.30	106.59	1	366
No	18,954,671	92.10	year of spell end	14,643,672	307.11	103.20	1	366
Yes	1,626,908	7.90	1 year after spell end	14,530,503	319.77	94.88	1	366
Learning difficulty			2 years after spell end	14,221,055	329.71	86.10	1	366
No	16,487,563	80.11	3 years after spell end	13,983,574	336.28	78.87	1	366
Yes	1,877,011	9.12	4 years after spell end	13,775,494	342.20	71.35	1	366
Unknown	2,217,005	10.77	**Benefit (JSA) probability:**					
Age (banded)			24 mths before spell start	20,581,579	0.03	0.17	0	1
16	220,264	1.07	12 mths before spell start	20,581,579	0.04	0.20	0	1
16-18	3,601,025	17.50	6 mths before spell start	20,581,579	0.05	0.22	0	1
19-20	1,067,067	5.18	3 mths before spell start	20,581,579	0.06	0.24	0	1
21-24	2,055,587	9.99	1 mth before spell start	20,581,579	0.07	0.25	0	1
25-59	12,892,600	62.64	1 mth after spell end	20,581,579	0.06	0.24	0	1
60+	745,036	3.62	3 mths after spell end	20,581,579	0.06	0.24	0	1

Appendix Table [continued]

Qualifications at spell start			6 mths after spell end	20,581,579	0.06	0.23	0	1
None	2,180,856	10.60	12 mths after spell end	20,581,579	0.05	0.22	0	1
Below level 1	577,449	2.81	24 mths after spell end	20,581,579	0.04	0.20	0	1
Level 1	1,695,884	8.24	36 mths after spell end	20,581,579	0.03	0.18	0	1
Level 2	1,049,446	5.10	48 mths after spell end	20,581,579	0.03	0.17	0	1
Full Level 2	3,577,666	17.38	**Number of days on benefit (JSA) in tax year:**					
Level 3	697,008	3.39	2 years before spell start	1,513,355	141.54	113.36	1	366
Full Level 3	1,436,164	6.98	1 year before spell start	2,141,386	146.53	115.19	1	366
Level 4	779,531	3.79	year of spell start	2,608,822	163.91	117.26	1	366
Level 5	375,000	1.82	year of spell end	2,832,660	156.12	114.67	1	366
Unknown	8,212,575	39.90	1 year after spell end	2,209,631	154.12	115.23	1	366
Individual spellcount			2 years after spell end	1,639,579	156.55	115.39	1	366
1 FE spell	8,223,150	39.95	3 years after spell end	1,312,479	154.96	115.15	1	366
2 FE spells	6,044,344	29.37	4 years after spell end	1,058,842	154.69	115.39	1	366
3 FE spells	3,319,440	16.13	**Benefit (non-JSA) probability:**					
4 FE spells	1,587,812	7.71	24 mths before spell start	20,581,579	0.08	0.28	0	1
5 or more FE spells	1,406,833	6.84	12 mths before spell start	20,581,579	0.08	0.28	0	1
Spell duration (months)			6 mths before spell start	20,581,579	0.09	0.28	0	1
0	6,695,222	32.53	3 mths before spell start	20,581,579	0.08	0.28	0	1
3	4,100,045	19.92	1 mth before spell start	20,581,579	0.08	0.28	0	1
6	5,166,257	25.10	1 mth after spell end	20,581,579	0.08	0.28	0	1
12	1,438,362	6.99	3 mths after spell end	20,581,579	0.08	0.27	0	1
18	1,860,191	9.04	6 mths after spell end	20,581,579	0.08	0.27	0	1
24	921,975	4.48	12 mths after spell end	20,581,579	0.08	0.26	0	1
36	272,115	1.32	24 mths after spell end	20,581,579	0.07	0.26	0	1
48 or more	127,412	0.62	36 mths after spell end	20,581,579	0.07	0.25	0	1
Study mode			48 mths after spell end	20,581,579	0.06	0.24	0	1
Full-time Full Year	2015656	9.79	**Number of days on benefit (non-JSA) in tax year:**					
Full-time Part-year	813479	3.95	2 years before spell start	1,844,872	286.04	116.66	1	366
Part-time other	6735535	32.73	1 year before spell start	2,228,278	286.06	116.39	1	366
Part-time open	1020446	4.96	year of spell start	2,202,279	287.20	115.52	1	366
Part-time distance lear	574522	2.79	year of spell end	2,102,497	282.10	117.01	1	366
Part-time - evening	2477009	12.04	1 year after spell end	1,832,816	284.73	116.72	1	366
Unknown	6944932	33.74	2 years after spell end	1,557,199	290.00	114.35	1	366
			3 years after spell end	1,295,367	293.09	112.87	1	366
			4 years after spell end	1,037,328	296.33	111.19	1	366

Approximately 5.5 million observations were removed due to poor matching quality. DWP or HMRC match flag must == 1

This publication available from www.gov.uk/bis

Any enquiries regarding this publication should be sent to:

Department for Business, Innovation and Skills
1 Victoria Street
London SW1H 0ET
Tel: 020 7215 5000

If you require this publication in an alternative format, email enquiries@bis.gsi.gov.uk, or call 020 7215 5000.

BIS/13/849