BIS | Department for Business Innovation & Skills

BIS RESEARCH PAPER NO. 48

Reporting on Employment and Earnings using Experimental Matched Data

A report by Frontier Economics and the Institute for Fiscal Studies (IFS)

The views expressed in this report are that of the authors and not necessarily those of the Department for Business, Innovation and Skills or any other Government Department.

The Department for Business Innovation and Skills

1 Victoria Street

London, SW1H 0ET

www.BIS.gov.uk

BIS Research paper number 48

Key Points

A new data-set has been created that allows analysis of the impact of different types of education on labour market outcomes. The data set combines Individualised Learner Records for those in Further Education with benefits and employment data. This rich data set allows unprecedented detailed analysis of the impact of further education, vocational training and apprenticeships on employment, salary and benefits.

This report:

- Documents the creation of the data-set, its composition and assumptions that were required to put it together

- Describes a range of analysis of the data

- Discusses improvements that could be made to the data-set and analysis.

The preliminary analysis indicates that:

- Apprenticeship learners benefit the most from training in terms of employment and earnings

- FE learners' labour market performance also appears to improve following training but gains are more modest

- It is not clear that the labour market performance of Train to Gain learners improves after training.

The findings show some significant changes, but it is not possible, at this stage, to conclude that training caused the observed changes; and at least some of the changes arise from the different age profiles of Apprenticeship, TTG and FE learners.

Contents

Glossary

Table 1: Glossary of terms

Term	Definition
Achiever	All individuals achieving a learning aim
Adult	Learners aged 19+ at the start of course
Age	Age at start of course
BL2	Below Level 2
DWP	Department for Work and Pensions
ESF	European Social Fund
HMRC	Her Majesty's Revenue and Customs
FE	Further Education
FL2	Full Level 2
FL3	Full Level 3
ILR	Individualised Learner Record
BL1	Below Level 1
L1	Level 1
L2	Level 2
L3	Level 3
Learner	All individuals aged 16-59 and in learning
Learning aim	Qualification, course or learning event
LSC	Learning and Skills Council
NBD	National Benefits Database
TTG	Train to Gain
WBL	Work Based Learning
AA	Attendance Allowance
BB	Bereavement Benefit
DLA	Disability Living Allowance
ICA	Invalid Care Allowance
PC	Pension Credit
RP	Retirement Pensions
SDA	Severe Disablement Allowance
WB	Widow's Benefit
ESA	Employment and Support Allowance
IB	Incapacity Benefit
IS	Income Support
JSA	Jobseeker's Allowance
PIB	Passported Incapacity Benefit

Executive Summary

The rationale for this study

The Department for Business, Innovation and Skills (BIS) asked Frontier Economics and the Institute for Fiscal Studies (IFS) to assess the strengths and weaknesses of a newly matched Individualised Learner Record (ILR), Department for Work and Pensions (DWP) and Her Majesty's Revenue and Customs (HMRC) data set to advise on how it might be used to report on the employment and earnings outcomes of people who undertake training. In addition, Frontier and the IFS were asked to report on the changes in economic outcomes experienced by learners undertaking different types of training – in particular, differentiating by

- course   level

- subject   area

- measures of prior learner skills

- learning institution

We were asked to focus the analysis on the following three funding streams:

- Further Education (FE)

- Apprenticeships (in Work Based Learning)

- Train to Gain (TTG)

This work required four substantial components, each of which is described in the report:

- **Data processing:** these data sets are very large and complex, and have never been used before in this way. We have documented how we have "cleaned", reformatted and linked the data sets. We have kept the three funding streams separate, which resulted in three merged ILR-HMRC-DWP data sets.

- **Data description:** producing a series of tables describing contents of the merged ILR-HMRC-DWP data sets

- **Impact analysis:** using regression techniques to determine the effect of Further Education training on subsequent labour market outcomes, as an example of the sort of analysis which is possible with this data

- **Recommendations:** the best ways of using these data sets for estimating the labour market benefits of training, and the limitations in doing so, based on the analysis outlined above.

Analysis overview

As far as we are aware this is the first time that it has been possible to provide such a comprehensive picture of the labour market performance of learners both before and after learning on a large scale. The matched data sets we generated by merging together the ILR and HMRC/DWP data provide an exciting opportunity to undertake detailed analysis of the earnings, employment and benefits histories and outcomes of all learners achieving an aim in the 2005-06 and 2006-07 academic years.

The data sets are very large allowing analysis at a fine level of detail. We can disaggregate outcomes by funding stream and within that by level of study, subject area and in some case provider. The rich demographic aspect of the data means that we can further assess how outcomes vary by gender, age, location and ethnicity.

Throughout this report we present outcomes separately for adults (aged 19 or more) as this is the age group that falls under BIS' remit. Whenever we make comparisons between funding streams, we restrict these to age groups which are broadly comparable. This is necessary because the age characteristics of learners in the three funding streams are very different and age is a significant determinant of outcomes.

Our analysis starts by providing a brief description of the full FE sample. We then split the data by level of study, and for each level analyse the labour market histories and outcomes of learners of different demographic groups in different subject areas. We do the same for Apprenticeships and Train to Gain. We define labour market performance in terms of:

- Employment

    o   Time in employment before and after course

    o   Proportion of sample in employment at a given point in time before and after course

- Benefits

    o   Time on benefits before and after course

    o   Proportion of sample on benefits at a given point in time before and after course

- Earnings [1]

    o   Raw earnings (including all individuals[2])

---

[1] We use the retail price index (RPI) to obtain real-terms earnings in 2008-09 prices.

[2] Those not in employment are assigned zero earnings and retained.

    ○ Filtered earnings (including only individuals in continuous employment before and after training), earning between £4,800-£80,000 annually

The descriptive analysis provides comprehensive information on the characteristics and labour market performance of learners who achieve aims in different funding streams, at different levels, subject areas and providers. We note that learner characteristics vary enormously by funding stream, level and subject area. Hence differences in outcomes may be driven by learner composition as well as training itself. Therefore, comparisons between outcomes of different groups of learners must be interpreted in the context of their demographic composition.

General Findings

On the whole, all indicators show improvements in the economic performance of learners following achievement. The rates of change vary widely by funding stream, subject area and level of study. Our high level findings are summarised in Table 2. The results are split into adults (aged 19+) and the sample as a whole.

Focusing on adults pre-learning, Train to Gain (TTG) learners are significantly more likely to be employed than Apprenticeship and Further Education (FE) learners. Six months pre-learning 76% of TTG learners were employed compared with 65% FE and 55% Apprenticeship learners.

In the year pre-learning, earnings and benefit rates are highest in the FE group, followed by TTG and Apprenticeships. FE learners earn £19,273 compared with £18,530 for TTG and £12,543 for Apprenticeship learners. FE learners are significantly more likely to be on benefits pre-learning. One in seven of this group claimed benefits six months pre-learning compared with one in twenty TTG learners and one in thirty Apprentices.

Apprenticeship learners benefit the most from training in terms of employment and earnings. Their earnings grow by 35% compared with 4% for FE and a 2% decline for the TTG group. Employment increases by 41% for Apprenticeship learners, 7% for FE and 3% for TTG learners following achievement.

Benefit rates fall the most for TTG learners followed by Apprentices and FE.

Table 2: Key outcome indicators (All funding streams)

		Directly before training			Directly after training			% change		
		FE	App.	TTG	FE	App.	TTG	FE	App.	TTG
19+	Employment (months)	7.85	6.58	9.07	8.42	9.24	9.33	7%	41%	3%
	Employment rate (6 months)	65%	55%	76%	70%	77%	78%	7%	41%	3%
	Benefit (months)	1.87	0.40	0.59	1.63	0.31	0.45	-13%	-22%	-24%
	Benefit rate (6 months)	16%	3%	5%	14%	3%	4%	-13%	-26%	-27%

		Directly before training			Directly after training			% change		
		FE	App.	TTG	FE	App.	TTG	FE	App.	TTG
All	Earnings (filtered)	£19,273	£12,543	£18,530	£19,969	£16,956	£18,207	4%	35%	-2%
	Employment (months)	6.74	5.73	9.06	8.19	9.07	9.33	21%	58%	3%
	Employment rate (6 months)	56%	47%	76%	68%	76%	78%	22%	60%	3%
	Benefit (months)	1.47	0.30	0.59	1.34	0.28	0.45	-9%	-6%	-25%
	Benefit rate (6 months)	12%	3%	5%	11%	2%	4%	-10%	-11%	-27%
	Earnings (filtered)	£19,083	£12,412	£18,526	£19,681	£16,715	£18,208	3%	35%	-2%

Source: Frontier analysis of ILR-HMRC/DWP data

These results are not unexpected. Figure 1 shows the different age profiles of learners across the three funding streams. This shows that Apprenticeship learners are nearly all young and are at a point in their labour market journey where one would expect relatively rapid improvement in earnings and employment in any case. At the other end of the spectrum we see no improvement in the earnings of TTG learners following their period of training. Though in this case average ages are much higher, and there will be much less underlying improvement in earnings.

Figure 1: Age distribution by funding stream

Learner age distributions
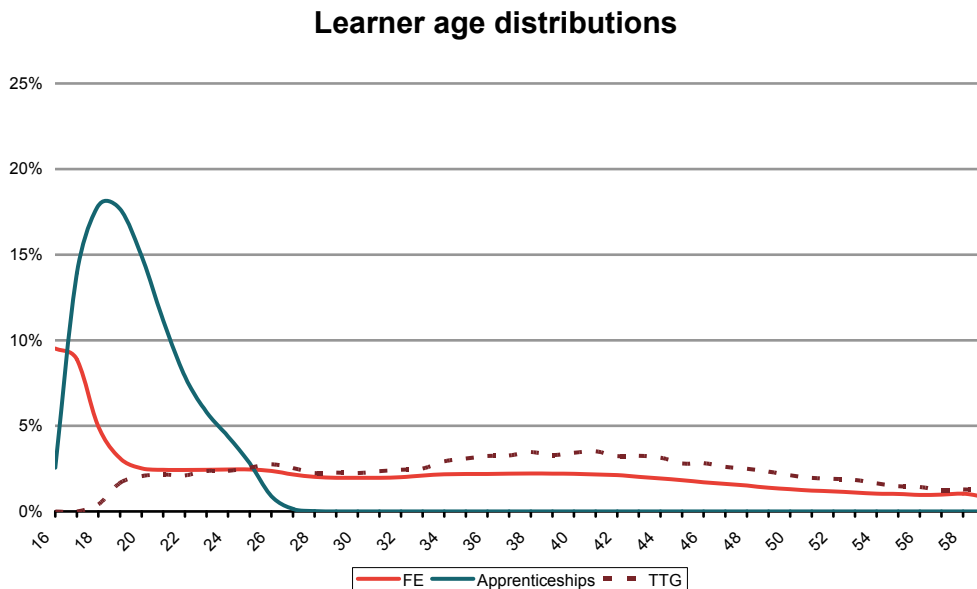
Source: Frontier analysis of ILR data

We note that the TTG data contains no learners aged between 16 and 17, and very few learners aged 18. Meanwhile the FE and Apprenticeship data have large numbers of learners in this age group. On the other hand, the TTG data has proportionately more learners aged over 30. This means that even comparisons based on adults (aged 19+)

may be misleading. A more focused comparison of learners in terms of age (restricted to those aged 20-24[3]) reveals that age at the start of the course is indeed an important determinant of labour market performance post-training. Aggregate outcomes remain poorest in the TTG group relative to the rest, but we now see very modest wage gains post-learning rather than wage losses. On the whole, benefits are still highest among Apprenticeship learners, followed by FE and TTG.

Table 3: Key outcome indicators (20-24 years of age)

	Directly before learning			% change post-learning		
	FE	**Appr.**	**TTG**	**FE**	**Appr.**	**TTG**
Earnings (filtered)	£14,331	£12,713	£16,199	+12.2%	+42.8%	+1.8%
Employment (months)	6.98	6.70	8.25	+13.3%	+38.5%	+3.9%
Benefits (months)	1.84	0.44	0.78	-13.3%	-28.6%	-25.8%

Source: Frontier analysis of ILR-HMRC/DWP data

Key findings for Further Education

FE achievers are a very heterogeneous group whose qualifications range from Certificate in Numeracy and Literacy to A-Levels. We found that the labour market histories and outcomes of FE achievers vary a great deal by level, subject area and demographic group. Our high-level findings are:

- **SFL:** Earnings grow by 5% for the sample as a whole. Growth is higher for learners from ethnic minorities than white British learners. Employment (working 11 months or more) increases by fourteen percentage points for the sample as a whole but growth is stronger for ethnic minorities than white British learners. Benefit rates do not change following training for any of the demographic groups.

- **BL2:** Earnings grow by 2% for the sample as a whole and there is little difference in the growth rates for the different demographic groups. Earnings growth is strongest in Social Sciences and Preparation for Life and Work. Employment (working 11 months or more) increases by nine percentage points for the sample as a whole. Growth is higher for young learners than adult learners. Employment increases most in Construction, Planning and Built Environment and Preparation for Life and Work. Benefit claims fall by three percentage points on average.

- **FL2:** Earnings grow by 4% for the sample as a whole and there is little difference in the growth rates for the different demographic groups. Earnings growth is strongest in Construction, Planning and Built Environment and Engineering and Manufacturing Technologies. Employment (working 11 months or more) increases by eighteen percentage points for the sample as a whole. Growth is significantly

---

[3] We have chosen this split as it is the only age group where there is sufficient overlap between the three funding streams

- higher for young learners than adult learners. Employment increases most in Languages, Literature and Culture and Preparation for Life and Work. Benefit claims fall by two percentage points on average but falls are higher for adults. Reductions are particularly large in Health, Public Services and Care and Education and Training.

- **FL3:** Earnings grow by 8% for the sample as a whole but male earnings grow twice as fast as female earnings. Earnings growth is significantly higher in Construction, Planning and Built Environment and Engineering and Manufacturing Technologies than the other subject areas. Employment (working 11 months or more) increases by twenty three percentage points for the sample as a whole. Growth is significantly higher for young learners than adult learners. Employment increases most in Information and Communication Technology and Leisure, Travel and Tourism. Benefit claims fall by one percentage point on average but falls are higher for adults, learners from ethnic minorities and deprived areas. Reductions in benefit claims are particularly large in Preparation for Life and Work.

Table 4: Key outcome indicators by level of study (FE)

		Directly before training				Directly after training				% change			
		SFL	BL2	FL2	FL3	SFL	BL2	FL2	FL3	SFL	BL2	FL2	FL3
19+	Employment (months)	6.07	7.97	8.15	7.86	7.40	8.31	8.76	8.46	22%	4%	7%	8%
	Employment rate (6 months)	50%	66%	68%	66%	62%	69%	73%	70%	24%	5%	7%	6%
	Benefit (months)	3.13	2.49	1.49	1.51	3.01	2.32	1.14	1.01	-4%	-7%	-23%	-33%
	Benefit rate (6 months)	26%	18%	13%	13%	25%	17%	9%	8%	-4%	-6%	-31	-38%
	Earnings (filtered)	£16,570	£21,084	£16,913	£15,088	£17,369	£21,506	£17,759	£16,597	5%	2%	5%	10%
All	Employment (months)	5.84	7.35	5.96	4.8	7.31	8.09	8.3	8.04	25%	10%	5%	68%
	Employment rate (6 months)	48%	57%	49%	39%	61%	65%	69%	67%	27%	14%	41%	72%
	Benefit (months)	2.9	2.24	0.94	0.64	2.83	2.15	0.79	0.48	-2%	-4%	-16%	-25%
	Benefit rate (6 months)	24%	19%	8%	5%	24%	18%	7%	4%	0%	-5%	-13%	-20%
	Earnings (filtered)	£16,494	£20,130	£16,677	£14,902	£17,292	£20,568	£17,398	£16,094	5%	2%	4%	8%

Source: Frontier analysis of ILR-HMRC/DWP data

Key findings Apprenticeships

Apprenticeship achievers follow courses at FL2 or FL3. They are significantly younger than FE and TTG learners with the majority of learners aged 20 or less. Apprenticeship learners gain significantly from training. Our high level findings are:

FL2: Earnings grow by 30% for the sample as a whole. Male earnings grow faster than female earnings. Earnings growth is strongest in Construction, Planning and

Built Environment. Employment (working 11 months or more) increases by 32 percentage points for the sample as a whole. Growth is significantly higher for young learners and men. Employment increases most in Information and Communication Technology. Benefit claims fall by 2 percentage points on average but falls are higher for adults. Reductions are particularly large in Health, Public Services and Care and Information and Communication Technology.

- **FL3:** Earnings grow by 43% for the sample as a whole but male earnings grow twice as fast as female earnings. Earnings growth is significantly higher in Construction, Planning and Built Environment and Engineering and Manufacturing Technologies than the other subject areas. Employment (working 11 months or more) increases by 38 percentage points for the sample as a whole. Growth is higher for males, white British learners and learners living in non-deprived areas. Employment increases most in Engineering and Manufacturing Technologies and Arts, Media and Publishing. Benefit claims fall by one percentage point on average but falls are higher for women than men. Reductions are greatest in Health, Public Services and Care and Preparation for Life and Work.

Table 5: Key outcome indicators by level of study (Apprenticeships)

		Directly before training		Directly after training		% change	
		FL2	FL3	FL2	FL3	FL2	FL3
19+	Employment (months)	7.28	5.69	9.04	9.5	24%	67%
	Employment rate (6 months)	61%	47%	75%	79%	24%	68%
	Benefit (months)	0.59	0.17	0.42	0.17	-28%	4%
	Benefit rate (6 months)	5%	1%	3%	1%	-32%	-1%
	Earnings (filtered)	£12,294	£12,903	£15,932	£18,397	30%	43%
All	Employment (months)	5.81	5.56	8.88	9.45	53%	70%
	Employment rate (6 months)	48%	46%	74%	79%	54%	72%
	Benefit (months)	0.38	0.15	0.34	0.16	-9%	7%
	Benefit rate (6 months)	3%	1%	3%	1%	-13%	3%
	Earnings (filtered)	£12,221	£12,735	£15,855	£18,189	30%	43%

Frontier analysis of WBL-HMRC/DWP data

Key findings TTG

TTG achievers follow courses at FL2 or FL3. They are significantly older than FE and Apprenticeship learners; average age in the TTG sample is 38 years. TTG learners' gains from training are more modest relative to the other funding streams.

Our high level findings for TTG achievers are:

- **FL2:** Earnings decline by 2% for the sample as a whole. However, while male earnings fall by 3%, female earnings actually increase by 1%. Earnings grow occurs in Health, Public Services and Care. Employment (working 11 months or more) increases by 5 percentage points for the sample as a whole. Growth is significantly higher for women than men and ethnic minorities relative to white British achievers. Employment increases most in Health, Public Services and Care. Benefit claims fall by 3 percentage points on average but falls are higher for women and learners living in deprived areas. Reductions are particularly large in Health, Public Services and Care and Information and Education and Training.

- **FL3:**[4] Earnings decline by 4% for the sample as a whole but there is an increase of 1% in Health, Public Services and Care. Employment (working 11 months or more) increases by 3 percentage points for the sample as a whole. Benefit claims fall by 2 percentage points on average.

Table 6: Key outcome indicators by level of study (TTG)

		Directly before training		Directly after training		% change	
		FL2	FL3	FL2	FL3	FL2	FL3
19+	Employment (months)	9.05	9.55	9.32	9.62	3%	1%
	Employment rate (6 months)	76%	80%	78%	81%	3%	1%
	Benefit (months)	0.60	0.39	0.45	0.37	-25%	-5%
	Benefit rate (6 months)	5%	3%	4%	3%	-20%	0%
	Earnings (filtered)	£18,497	£19,541	£18,186	£18,821	-2%	-4%
All	Employment (months)	9.05	9.55	9.32	9.62	3%	1%
	Employment rate (6 months)	75%	80%	78%	81%	3%	1%
	Benefit (months)	0.60	0.39	0.45	0.37	-25%	-5%
	Benefit rate (6 months)	5%	3%	4%	3%	-20%	0%
	Earnings (filtered)	£18,492	£19,541	£18,187	£18,821	-2%	-4%

Frontier analysis of TTG-HMRC/DWP data

---

[4] Note that there are only a handful of learners at this level of study which restricts the number of analyses possible- we do not present statistics disaggregated by demographic group for FL3 TTG achievers.

Interestingly average earnings decline for TTG learners as a whole, though this is not the case in all age groups. The table below reveals that earnings actually increased in the younger age groups, including those aged 20 to 24. However, the fall in earnings of the oldest age group, which is over represented in the TTG data, drives the fall in aggregate TTG earnings.

Table 7: Key outcome indicators: TTG FL2 with age breakdown

	Directly before learning			% change post-learning		
	16-19	20-24	25+	16-19	20-24	25+
Earnings (filtered)	£13,977	£16,199	£18,761	9.3%	1.8%	-3.7%
Employment (months)	7.88	8.25	9.19	11.0%	4.0%	2.6%
Benefits (months)	0.86	0.78	0.56	-27.9%	-25.6%	-23.2%

Source: Frontier analysis of ILR-HMRC/DWP data. Note that results for 16-19 age group are based on fewer than 1,000 observations

Findings from impact analysis (FE only)

We measure the impact of Further Education training as the estimated difference between pre-training and post-training outcomes for the same individuals. We use two alternative specifications: first, analysing the raw difference between outcomes before and after training; second, repeating the estimation controlling for changes in economic conditions over time, using yearly indicator variables (also referred to as "year dummies"). The latter approach should provide more reliable estimates.

The analysis presented is preliminary and does not provide a robust estimate of the true causal effect of training. If employment rates improve with age (which they do) and individuals' earnings tend to increase with experience (which they do), our estimates will ascribe all of this improvement to the impact of training. Econometric best practice would involve a credible control group who did not enter training, whose later outcomes would provide a proxy for the outcomes of those who did train had they not entered training. While we will use the word 'impact' throughout this report, as shorthand for 'the difference between pre- and post- training outcomes', the word should not be interpreted causally. Developing such a comparison group could be part of further work to help determine causal links.

Our general findings are:

- Having eliminated some of those outliers by assessing the impact on monthly earnings only for individuals in work for at least 11 months and earning between £4,800 and £80,000 before and after the course, we find greater consistency between results from the two specifications. We now see a positive impact on pay. Taking a weighted average across all individuals fitting this definition, there is an increase in earnings of around £32 per month, when estimated with year dummies (£67 per month when estimated without).

- The impact on the proportion of the year spent in employment is positive and significant. This is true under both specifications and true for the vast majority of study areas, levels and sex. The effects are not as large when the year dummies are used (3-4 percentage points with year dummies as opposed to 12-13 percentage points without).

- The impact of courses on the proportion of the year spent on benefits is negative (i.e. reduced probability). This is generally true across study areas, levels, specifications, for men and for women. The effect is almost always statistically significant. The weighted impact is a reduction in the benefit rate of around 1.4 percentage points.

Analysis by study area and qualification level gives the following results:

- **BL2:** Employment and earnings improve substantially for both men and women learners in Preparation for Life and Work. Drops in benefit rates are large and significant in Health, Public Services and Care.

- **FL2:** The largest earnings improvements are in Retail and Commercial Enterprise and Health, Public Services and Care while employment increases are highest in Science and Mathematics and Arts, Media and Publishing for both men and women.

- **FL3:** Our results on earnings are often statistically insignificant and do not reveal a clear pattern. On the other hand, there are large reductions in benefit rates for both men and women studying Health, Public Services and Care, Education and Training and Preparation for Life and Work. Employment increases are highest for both men and women in Information and Communication Technology.

Taking these results together, they raise several further points:

- The results seem most plausible for benefits and least plausible for monthly pay across all individuals. This is consistent with our observation that this data is the most accurate and needed the least cleaning, whereas the monthly pay variable is derived through lengthy calculations from three data sources that do not fully reconcile with each other. This will inevitably be a source of measurement error.

- When we focus only on individuals in work for at least 11 months and earning between £4,800 and £80,000 before and after the course, we remove a number of cases for which we have various data concerns (such as cases with earnings information in the P14 dataset, but no corresponding employment spells in the P45 dataset).

- The impact estimates vary to an appreciable extent with the use of the yearly indicator variables, but we consider the analyses that include them to be less sensitive to the specification chosen.

Introduction

Background

The Education and Skills Act 2008 allowed the sharing of data between the Department for Business, Innovation and Skills (BIS), Her Majesty's Revenue and Customs (HMRC) and the Department for Work and Pensions (DWP) in order to analyse how effective training is in improving the employment and earnings outcomes of learners. Consequently BIS received a dataset with personal information removed, containing the employment, earnings and benefit claim data on all those who have undertaken publicly-funded learning in the FE sector and therefore have an Individualised Learner Record (ILR). Once cleaned and properly constructed, this provides a unique data set that allows unprecedented analysis of the links between different types of learning and labour market outcomes.

Objectives and Scope

BIS have asked Frontier and the Institute for Fiscal Studies (IFS) to assess the strengths and weaknesses of the newly matched data set and to provide recommendations on the best ways of using it. This would support better reporting on the employment and earnings outcomes from education and training. We have been asked to focus on three funding streams:

- Further Education (FE)

- Work-Based Learning, WBL(Apprenticeships)

- Train to Gain (TTG)

Structure of the Report

This report is structured as follows:

- Chapter 3 provides a short description of the ILR data sets we received, how we processed them and what the resulting data set looked like;

- Chapter 4 provides a short description of the HMRC/DWP data sets we received, how we processed them and what the resulting data set looked like;

- Chapter 5 presents a descriptive analysis of the combined ILR-HMRC/DWP data set. A series of tables and figures are presented in this chapter;

- Chapter 6 presents a descriptive analysis of the combined Apprenticeships-HMRC/DWP and TTG-HMRC/DWP data sets. A series of tables and figures are presented in this chapter;

- Chapter 7 outlines our impact analysis methodology;

- Chapter 8 presents an example of this empirical analysis, showing the impact of training for Further Education learners according to their sex, qualification level and study area;

- Chapter 9 discusses the issues we encountered with the data and in undertaking the analysis presented in the report, and proposes potential improvements in how data is collected, what data is collected and additional analysis.

- Chapter 10 presents our conclusions

Data

The purpose of this Chapter is to describe the raw data we received and provide an overview of the data processing Frontier and IFS undertook in order to transform it into usable data sets. The ultimate goal of our data processing is to create a data set which allows us to track the labour market histories and outcomes of individuals who went through the education system at a level not previously possible. Crucially, we need to ensure that we can establish to what extent performance in the labour market depends on:

- Learner demographics (age, ethnicity, gender, others)

- Type of learning undertaken (in terms of level and subject area)

- Funding stream (Further Education, Work Based Learning, Train to Gain)

Our general approach is to generate three learner-level data sets (one for each funding stream). They each contain information about learner demographics and highest achievement in terms of level and subject area.

The HMRC/DWP data we received spans 6 financial years, from April 2003 to April 2009 while the ILR data covers the academic years 2005-06 and 2006-07. In principle the time period covered by the data is sufficiently long to allow the labour market histories and outcomes for most learners to be recorded.

Our analytical strategy is to focus on individuals for whom we can observe both pre-training histories (for employment, earnings and benefits) and post-training outcomes for at least 12 months before and 12 months after training. In the case of post-training outcomes, we first factor in a 3-month 'buffer period' to allow for time spent out of the labour force following the completion of education and training. This restricts us to a sample of students who entered the education system on or after 1 August 2004[5] and achieved an educational aim on or before 1 August 2007. Students whose learning spells fall outside the window are not included in subsequent analyses, since either their pre- or post-training outcomes are not observed for long enough for our analysis.

We describe our processing of the data sets in more detail in the subsections of this chapter.

---

[5] We relax this requirement when we analyse Apprenticeships learners as Apprenticeships tend to be much longer than other FE courses; moreover, restricting the analysis to those who started after 1 August 2004 would result in a significant number of learners being dropped.

Deriving achievers from the ILR data

The Individualised Learner Record (ILR) data spans two academic years (2005-06 and 2006-07) and covers all individuals in England who undertook publicly funded learning during the period in question. The data is prepared by providers of education who receive one or more of the following types of funding from the LSC:

- Further Education (FE)

- Work Based Learning (Apprenticeships)

- Adult and Community Learning (ACL)

- European Social Funding (ESF)

- University For Industry (UFI)

- Other LSC funding and have agreed to return ILR data

The data is collected annually by the LSC in order to monitor provider performance, inform national and local planning, and demonstrate outcomes. The ILR files we received from BIS contain two datasets for each year and funding stream:

- a learner dataset

- a learning aim dataset

The learner dataset contains a single record for each learner on a programme. This learner record contains basic information specific to the learner such as date of birth, ethnicity, gender, location etc. The learner datasets we received also contain information on learner level and achievement status.

A learner can have multiple learning aims and providers are required to report all learning aims undertaken by the learner. Hence the learning aim dataset may contain multiple records if learners have more than one aim. The information is at the learning aim level and covers start and end date, subject area of study, learning outcome, achievement, provider location and type etc.

In addition to the aims and learner files, we received Learning Aims Database (LAD) files covering 2005-06 and 2006-07. The LAD contains information about all LSC-recognised learning aims offered by providers who return ILR data to the Council. It includes learning aim information required to complete ILR data returns, as well as funding and statistical data.

In this section of the report we explain how the ILR datasets are used in order to derive the data on achievers whose labour market history and outcomes (before and after their period of learning) can be matched to the HMRC/DWP datasets. The focus of our analysis is on three funding streams: Further Education (FE), Work Based Learning (Apprenticeships) and Train to Gain (TTG). For each of these funding streams we describe

the process by which we define achievers while differentiating by achievement type, level and subject.

A short description of the datasets we received

The data covers two academic years (2005-06 and 2006-07). We received separate learner and aims files for each year and each of the following funding streams: Further Education (FE), Work Based Learning (Apprenticeships) and Train to Gain (TTG available only in 2006-07). In addition to these we also received two further (LAD) datasets containing additional information at the aims level with various categorisations. Finally, the identifiers matching the unique learner identifiers to their HMRC/DWP counterparts are contained in a lookup file: the lookup file provides the means by which we identify learners in the labour market before and after the period of study.

Our analysis focuses on FE, Apprenticeships and TTG learners who achieve their aims ("achievers"). The ultimate goal of the first stage of the project is to create a single usable learner- level dataset (for each funding stream) containing learner demographics, details on learning undertaken including highest achievement and highest ongoing qualification, as well as performance in the labour market prior to and after training.

We start by describing the way in which the achiever datasets are generated from the ILR data. The general steps applied to the datasets we focus on can be summarised in the figure below:

Figure 2: Method for transforming ILR data to learner level

1. Start with AIMS dataset	2. Merge in LAD variables and generate learner level	3. Generate learner achievement and keep one record per learner	4. Merge in employment history and earnings

Methodology based on BIS definitions of learner level and achievement

In addition to these steps, we perform intermediate checks to ensure that the learner characteristics in the dataset we derive from the aims file match those in the learner file. All steps are described in detail in the Further Education subsection below but also apply to TTG and Apprenticeships.

Further Education

The FE aims file contains a record for each aim a learner was following in a given year at a provider receiving FE funding from the Learning and Skills Council (LSC). The majority of

FE providers are General Further Education Colleges including Tertiary and Sixth Form Colleges, although there are other types of providers.[6]

The objective of the data manipulation described below is to move from a list of aims to a single learner record containing information on each learner's highest achievement, highest ongoing qualification, level and area of study as well as demographic characteristics.

The 2005-06 and 2006-07 datasets contain 8,396,503 and 7,153,867 aims records, respectively, corresponding to 3,998,792 learners in 2005-06 and 3,365,658 learners in 2006-07. On average an FE learner has around 2 learning aims. The large drop in learner numbers is caused, among other things, by a drop in the funding available for short courses[7]. Our derived dataset reveals that there were over 350,000 fewer learners taking short courses in 2006-07 than there were in 2005-06.

Basic data processing

We put in place a detail process for creating a dataset containing learners' highest achievements. The number of observations dropped at every stage of the process depends on the sequence in which the steps are performed[8]. ILR variable definitions are available at (http://www.theia.org.uk/ilr/ilrdocuments):

- Excluding learners aged under 16 and over 59 – 611,845 records deleted.

- Employer Training Pilot and Train to Gain records are identified using variables a10, a46a, a46b. These are excluded from the analysis - the number of aims dropped is 7,759.

- There are also a number of aims which are not live; these are identified using variable a_live_b which indicates the status of an aim for inclusion in analysis using 1 October as the first census date. The number of non-live aims omitted from the analysis is 363,585.

- Course start and end dates. In order to analyse the impact of learning on labour market outcomes we need to define a before and after period. We define the window of learning as 1 Aug 2004 to 1 Aug 2006 for learners observed in the 2005-06 FE data and a year later for those observed the following year. This means dropping learners who were in learning outside the window. An exception here is learners who ended an aim prematurely and where the actual end date falls within the window. There are 756,160 aims falling out of the window corresponding to

---

[6] FE provision also includes Art and Design Colleges, Agricultural and Horticultural Colleges, Specialist Colleges and External Institutions.

[7] Under 30 days duration.

[8] The numbers used here are from the FE 2005-06 dataset.

422,592 learners. We demonstrate how we define the learning window diagrammatically below. In our example, only Bob is not excluded from the analysis as he was not in learning before or after our cut-off dates of 1 Aug 2004 and 1 Aug 2006.

Figure 3: Learning window definition

Learning window for 2005-06 learners
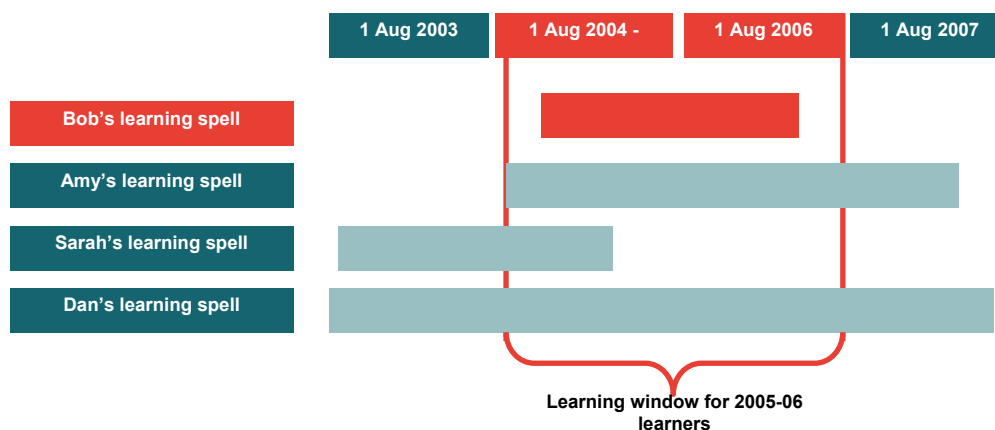
Stylised example

FE learners receiving either LSC funding only or a combination of LSC and European Social Fund (ESF) funding are classified as LSC funded (using l_fund variable). 85% of aims fall into this category. We have kept both funded and unfunded learners.

Generating learner level data

Using BIS definitions for the Statistical First Release publication, FE learners are split into SFL, BL2 (excluding SFL), L2, L3, L4+ as well as FL2 and FL3.

- SFL [9] – learners following an aim which counts towards the Skills for Life participation target. These include Certificates in Adult Literacy, Numeracy, Key Skills in communication and others.

- BL2 – learners whose notional NVQ level is 1 but are not following an aim which counts towards the skills for life participation target.

- L2 – learners whose notional NVQ level is 2. This includes learners doing a FL2 programmes as well as those doing other part L2 qualifications such as one GCSE for example.

---

[9] We use Skills for Life All as defined in the code we received from BIS.

- L3 – learners whose notional NVQ level is 3. This includes learners doing a FL3 programmes as well as those doing other part L3 qualifications such as one AS level for example.

- L4+ – learners whose notional NVQ level is 4 and above.

- FL2 – learners following aims totalling 100% or more of the L2 threshold. Learners taking 4 GCSEs are not included in this category.

- FL3 – learners following aims totalling 100% or more of the L3 threshold. Learners taking 2 AS levels are not included in this category.

Generating learner highest achievement

Achievement is differentiated by level using the variables defined above (i.e. SFL, L2, L3 etc.) in combination with variable a35. For all learners whose highest achievement is not FL2 or FL3, achievement is defined at the aim level first. If a learner is taking one GCSE and one AS level and achieves both, the corresponding aims will receive a L2 and L3 achievement flags. For FL2 and FL3 learners the total width of the aims and the grades achieved are considered too. Only FL2 and FL3 learners who achieved grades A*-C for GCSEs and A-E for A-Levels are flagged as FL2 and FL3 achievers.

Learners who have achieved one aim but are continuing their studies on a different aim are flagged as both achievers and continuing. In cases where there are multiple 'continuing' aims, the subject area of the continuing aim is defined taking the aim with the highest guided learning hours.

All learners who have achieved at any level are counted as an achiever. Learners who have not achieved anything are dropped from the dataset.

As the objective of this is to create a dataset at the individual level, we can only keep one record per learner. We have kept the aim corresponding to the highest achievement and used that to identify the area of study, i.e. if a learner has achieved at L2 in Science and Mathematics this is categorised as his or her area of study. In cases where a learner has two or more aims at the same level and has achieved both we keep the one that has the higher guided learning hours. If guided learning hours are equal too, we take either aim. For a simple illustration see Table 8.

Table 8: FE achievers aggregating highest achievement from aims to learner level

Individual	Aim	Level	Achieved	Continuing	Subject Area	Guided learning hours
Bob	1	2	Yes	-	Science and Maths	80
Bob	2	2	Yes	-	ICT	40
Bob	3	2	No	-	ICT	20
Bob	4	3	No	Yes	Engineering	20
Bob	5	3	No	Yes	Engineering	20

BECOMES

Individual	Highest achievement	Subject Area	Continuing Level	Continuing area
Bob	L2	Science and Maths	3	Engineering

Description of the resulting dataset

Once the dataset is reshaped to the individual level we merge information from the FE learner file to check if learner characteristics match. Among other criteria we use date of birth, ethnicity, postcode and gender to crosscheck that our reshaped dataset is consistent with the learner dataset. Our checks show no discrepancy between the two files.

When both years' aims data have been reshaped to the individual level we merge them together before merging in the DWP and HMRC identifiers from the lookup file. There are a number of learners in the lookup file who are not uniquely identified – the same learner can be matched to multiple tax individuals. We exclude these from the analysis. The impact of this process on our sample is described in the figures overleaf.

Figure 4: FE sample evolution

FE 2005-06 learners	FE 2006-07 learners
3,998,792	**3,365,658**

Merging the two we get

6,141,153

2,775,495	**1,223,297**	**2,142,361**
only in 2005-06	in both	only in 2006-07

unique match in lookup

4,200,929

Of which achievers matched in HMRC/DWP

2,434,599
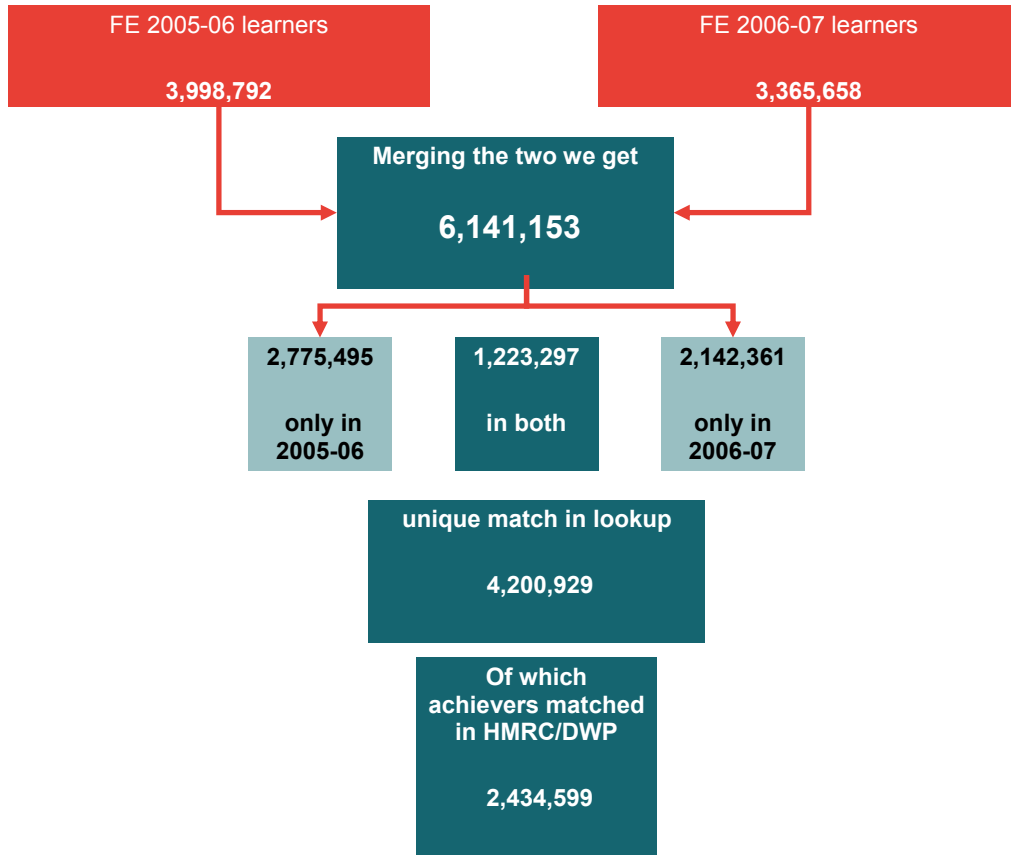
Frontier analysis of ILR-HMRC/DWP data

Figure 5: FE achievers distribution by sector subject area
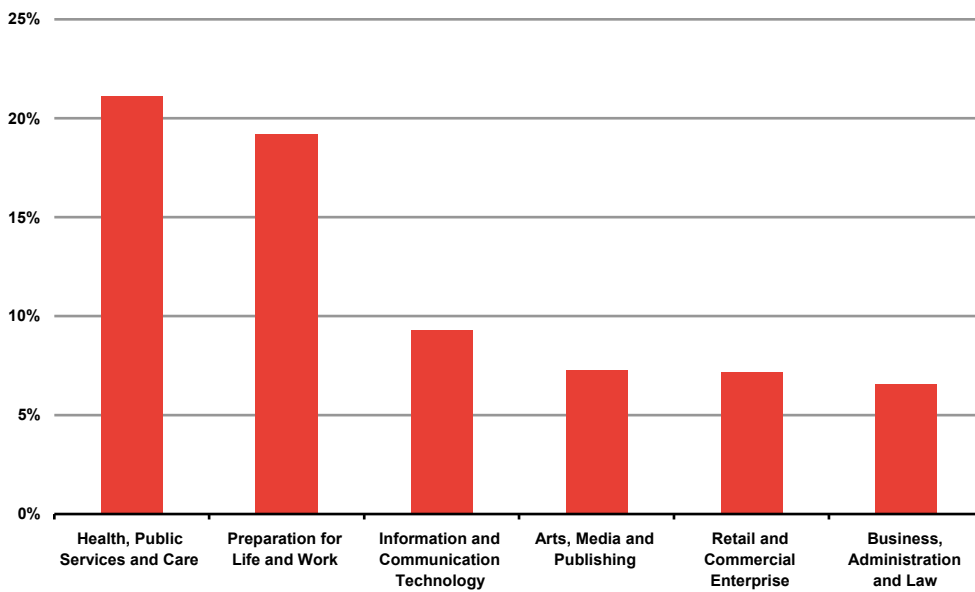
Frontier analysis of ILR data

Figure 6: FE achievers age distribution
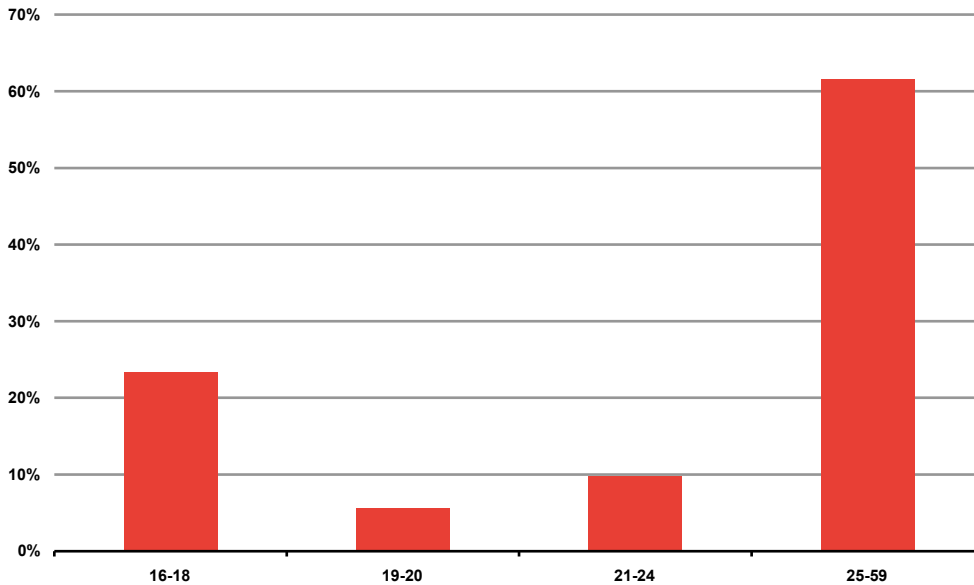
Frontier analysis of ILR data

Apprenticeships

The focus of our analysis of the WBL data is on Apprenticeship learners. These are identified using variable a10 in combination with a15. The Apprenticeships in the file are classified as Apprenticeship (equivalent to FL2), Advanced Apprenticeship (equivalent to FL3) and Higher Apprenticeship (equivalent to FL3). The 2005-06 and 2006-07 files contain 413,710 and 398,608 Apprenticeship records. In both years the ratio of Apprenticeships to advanced Apprenticeships is approximately 64% to 36%.

Learners who were in learning in the academic year and achieved a framework or an NVQ (identified using a_status) are classed as achievers.

Apprenticeships can take several years to complete a course so we have not applied a rule for dropping learners who started their aims prior to 1 August 2004 in the same way we did to FE learners. Applying such a rule to the Apprenticeship learner sample would result in a significant number of observations being lost (approximately a quarter of learners and a third of achievers). We have not dropped early starts in the Apprenticeships file.

Once the data is reshaped to the individual level and both years have been merged together, the HMRC and DWP identifiers are merged in from the lookup file. The latter has observations which are not uniquely identified by the ILR learner identifiers (l01 and l03). In other words these learners can be matched to multiple tax and earnings individuals. These learners are excluded from the analysis as we cannot be certain which of the tax and benefit records truly correspond to these individuals.

Ultimately we are able to match 520,995 Apprenticeship learners to the lookup file. Of those, 174,935 are achievers who can be matched with a unique HMRC/DWP individual.

32

We base our analysis on this group of learners. Apprenticeship achievers are very young compared to learners in the other funding streams we study: 97% of achievers are under 25 years old. 9 out of 10 Apprenticeship learners are concentrated in five sector subject areas described in detail in the figures below.

Figure 7: Apprenticeship achievers sector subject area distribution
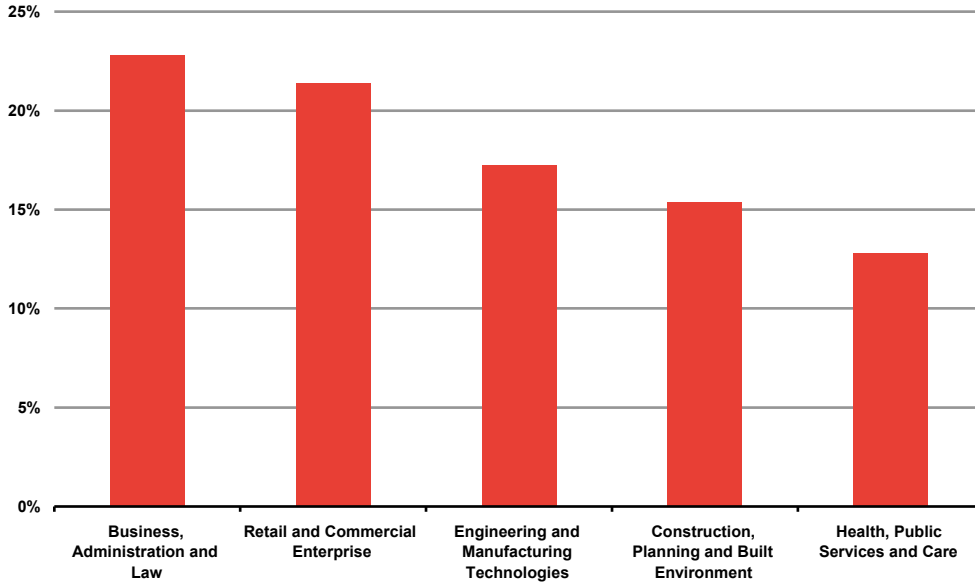
Frontier analysis of ILR data

Figure 8: Apprenticeship achievers age distribution
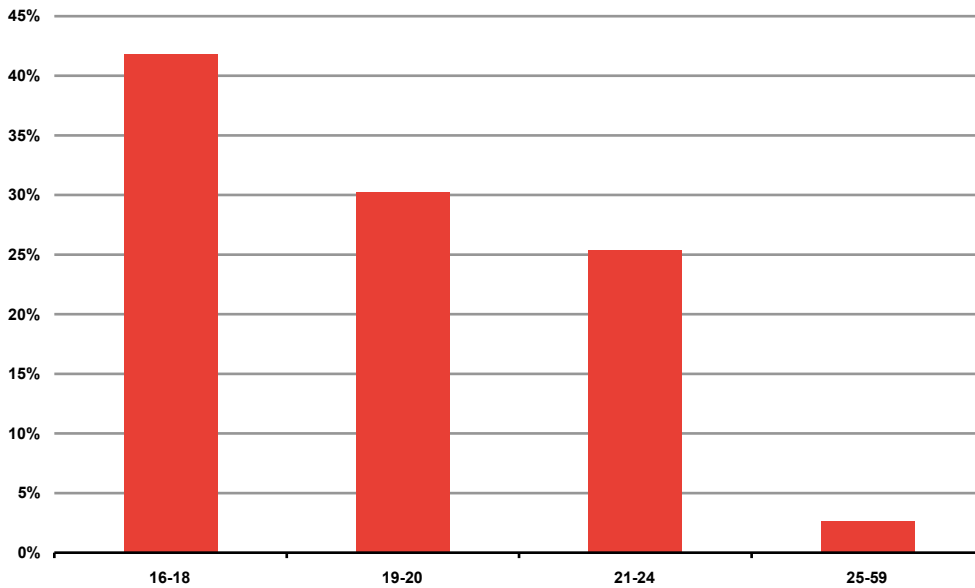
Frontier analysis of ILR data

Figure 9: Apprenticeships sample evolution

```
┌─────────────────────────────┐      ┌─────────────────────────────┐
│   Apprenticeships 2005-06   │      │   Apprenticeships 2006-07   │
│         413.710             │      │         398.608             │
└─────────────────────────────┘      └─────────────────────────────┘
               │                                    │
               ▼                                    ▼
              ┌──────────────────────────────┐
              │   Merging the two we get     │
              │      572,085 learners        │
              └──────────────────────────────┘
         │                  │                  │
         ▼                  ▼                  ▼
   ┌──────────┐      ┌──────────┐      ┌──────────┐
   │ 185,358  │      │ 201,771  │      │ 184,956  │
   │ only in  │      │ in both  │      │ only in  │
   │ 2005-06  │      │          │      │ 2006-07  │
   └──────────┘      └──────────┘      └──────────┘
                   ┌──────────────────┐
                   │ match in lookup  │
                   │     520,995      │
                   └──────────────────┘
                   ┌──────────────────┐
                   │ Of which         │
                   │ achievers matched│
                   │ in HMRC/DWP      │
                   │     174,935      │
                   └──────────────────┘
```
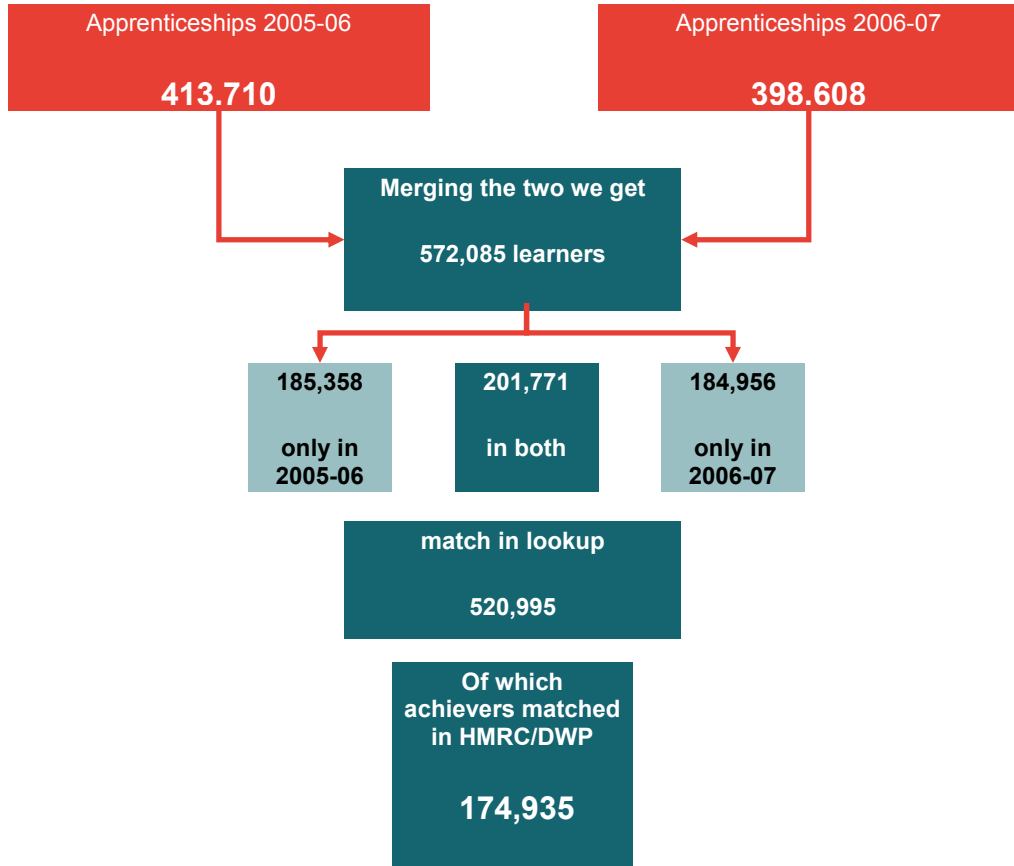
Frontier analysis of ILR-HMRC/DWP data

Train to Gain

The Train to Gain (TTG) aims dataset covers the year 2006-07 and contains 217,783 records. Splitting the data by funding stream reveals that 96% of records are Train to Gain, leaving 8,126 records which are classed as Further education.

Train to Gain aims to deliver vocational training to employed individuals in England, in particular those that do not already hold FL2 qualification. The programme was rolled out in August 2006. Virtually all TTG learners are studying at FL2 (90%) or FL3 (7%).

Participation and achievement are defined using the l_fulllevel2 and l_fulllevel3 variables in combination with a35, i.e. a learner who is classed as FL2, has left the programme in the academic year and has achieved a learning outcome is counted as an achiever. The aims dataset reveals that there were 59,354 FL2 and 1,931 FL3 achievements at the aims level.

Generating learner level data

For each TTG learner we take the highest achievement and highest ongoing qualification, keeping one line per learner. This results in 50,566 FL2 and 1,510 FL3 achievers with 129,446 learners also continuing towards another learning aim. As the TTG programme

was rolled out recently there are no aims start dates before 1 Aug 2005 and only 1% are expected to finish after 1 August 2008.

We reshape the dataset from the aims level to the individual level using the same method described in the FE and Apprenticeships sections. We also preserve demographic characteristics such as gender, ethnicity, age etc.

Once the consistency checks with the learner file are performed we can merge in the HMRC and DWP identifiers from the lookup file. TTG learners are uniquely identified in the lookup file by the learner identifiers l01 and l03 but there are only 182,895 learners who can be matched.

Once the merge with the lookup file is complete, non achievers and learners who are under 18 or over 59 years of age are dropped (resulting in the loss of 2,604 achievers), leaving a final sample of 41,983 TTG achievers (97% of whom are FL2 achievers). Figure 8 below reveals that 91% of TTG achievers are concentrated in 5 sector subject areas: Construction, Planning and Built Environment, Health, Public Services and Care, Engineering and Manufacturing Technologies, Retail and Commercial Enterprise, Education and Training. The characteristics of the data set are described in the figures below.

Figure 10: Distribution of TTG achievers by subject area
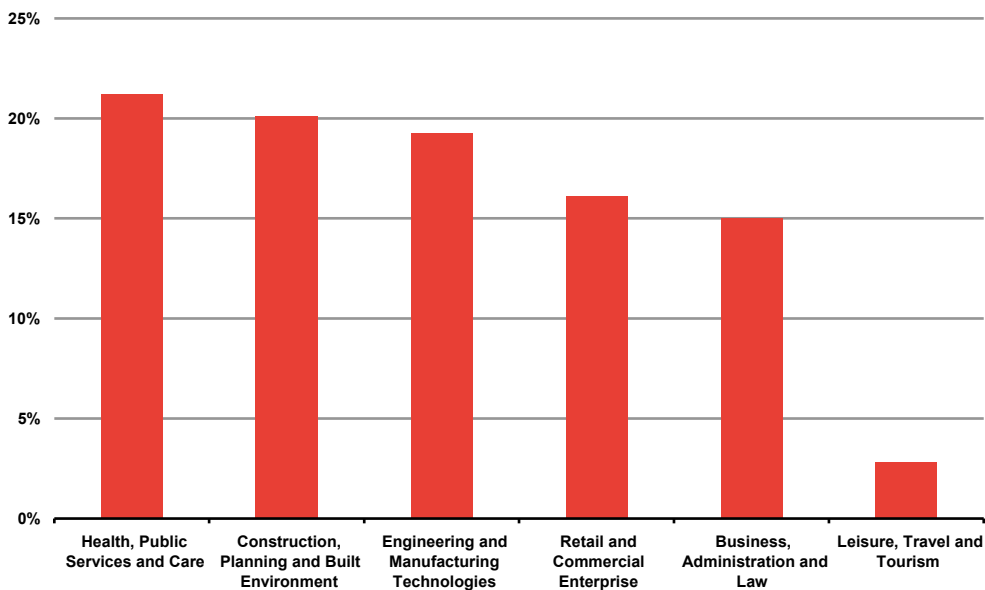
Frontier analysis of ILR data

Figure 11: TTG achievers age distribution
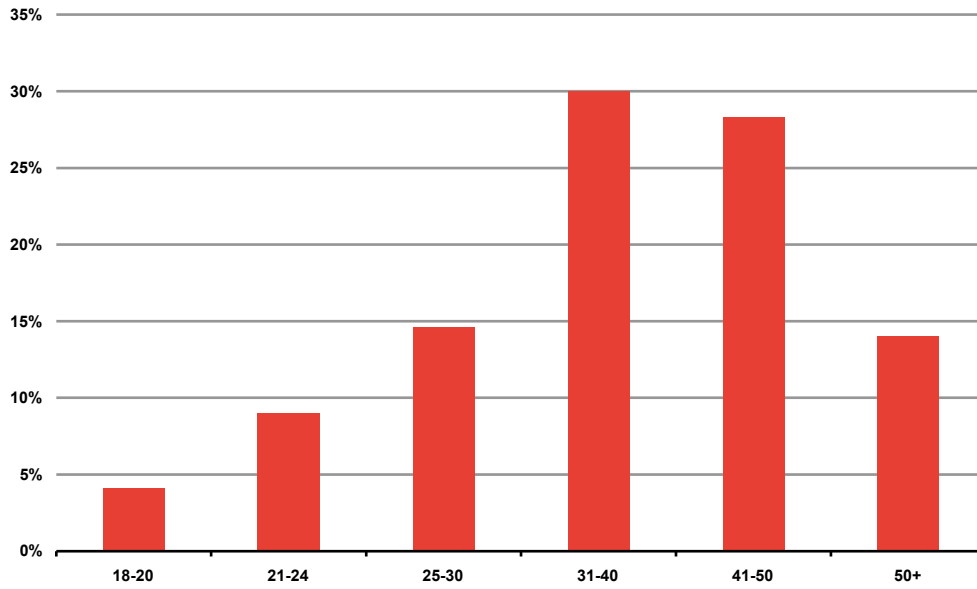
Frontier analysis of ILR data

Using HMRC/DWP data to derive measures of employment history and outcomes

Derivation of dataset

The HMRC/DWP (Work and Pensions Longitudinal Study) data contains the following elements:

- National Benefits Database (NBD, benefit spells);

- P45 (employment spells);

- P14 (annual earnings).

In this note we describe how the raw data in each of these datasets is used to derive the history and outcome variables used for comparing the effects of different FE courses. For each dataset there is an initial data cleaning stage, followed by reshaping and reconciling the data.

National Benefits Database

Nature of the raw data

The NBD is a database of benefit spells, which will be used to create a benefit history for each individual, telling us month by month whether that individual was receiving certain types of benefit.

For this purpose the main elements of each entry are:

- Start and end date of benefit spell;

- Type of benefit;

- Personal identifier (ccorcid)

There are many other fields including date of birth, date of death, postcode, number of children, benefit office, quantity of each benefit received, etc. With several exceptions, we will not wish to retain this information, since much of it is duplicated in other datasets and retaining extra variables slows down processing of this very large dataset.

Types of benefit

The raw dataset contains 7,281,078 separate spells on benefits. These correspond to 2,337,872 individual claimants. The different types of benefits are shown in the chart below:

Figure 12: Distribution of benefit spells by type
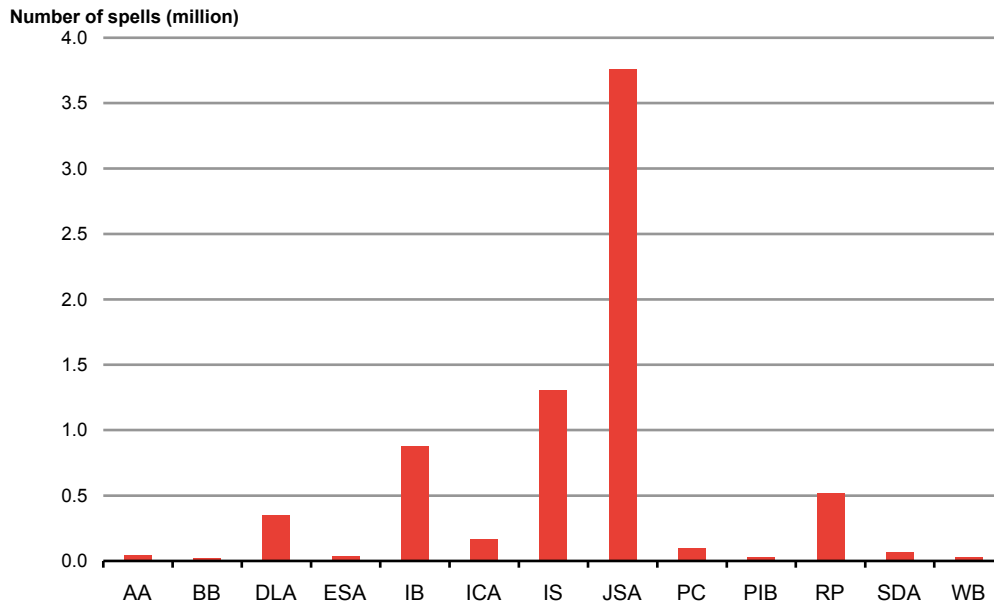
Frontier analysis of HMRC/DWP data

Our analysis will focus primarily on out-of-work benefits, but we also retain information on working-age disability benefits, leaving us with the following benefits:

- Disability Living Allowance (DLA),

- Employment and Support Allowance (ESA),

- Incapacity Benefit (IB),

- Income Support (IS),

- Jobseekers' Allowance (JSA),

- Passported Incapacity Benefit (PIB).

To reduce the size of the dataset we have merged PIB, IB and ESA (the successor to IB) into a single category.

Data cleaning

Overall, the NBD data is considerably 'cleaner' than the P14 and P45 data, meaning that our data cleaning exercise only removes a handful of observations:

Date of birth

For the same individual, sometimes the dates of birth in different entries do not agree with each other. This applies to 1409 benefit spells (317 individuals). Since we use age data from the ILR, this does not matter.

A number of benefit spells begin before the claimant has reached the age of 16. This led to 288 JSA spells being removed.

Other

One spell of negative duration was removed.

23 duplicate spells were removed.

6103 individuals born before 1940 were removed.

Data processing

Our aim was to produce a dataset with one line per individual, with each line recording individual's benefit history on a monthly basis. For each month from 2003 to 2009, our data processing code ascertains what proportion of the month an individual spent on each benefit. For example, a spell starting on the 15th of February covers half of February. This is analogous to the method we use for deriving months in employment from the P45, set out below.

Reducing the data down to one line per individual, we obtain a monthly benefit history for IB, IS, DLA and JSA.

P45 data

The P45 data lists the employment spells of an individual. As with the NBD data, the objective is to move from a list of spells to a monthly history for each individual. For each spell we focus on the following information:

- Personal identifier (both 'person_instance_idnstance_id' for HMRC records and the matching 'ccorcid' for NBD data);

- Start and end date of employment

- Flags for occupational pension payments, benefit payments and 'old' records.

The raw data contains 50,652,754 employments spells (corresponding to 5,059,522 individuals). Many of these records are duplicates or near duplicates. One reason this occurs is that when data is extracted at different dates the old record is not deleted. This increases the number of superfluous observations within the dataset.

In other cases the data is poorly recorded.

Cleaning the data

A number of successive steps are taken in cleaning the data. The following are not controversial:

- *Old records* - There is a flag used for identifying 'old' records. These appear to be duplicates of other information held within the dataset and can readily be dropped. This results in 21,746,787 observations being deleted.

- *Spells ending before 2003* – Since we do not consider employment histories prior to 2003, we can delete a further 7,576,163 observations.

- *Spells of negative or zero length* – This results in 7,164 observations being deleted.

- *Exact duplicates* – This results in 1,131,394 observations being deleted.

- *Missing start date / end date* – This results in 312,515 observations being deleted.

- *Benefits flag* – Some P45 spells are actually benefit spells. These 2,349,922 observations are removed.

- *Occupational Pensions* – 551,683 observations are flagged as occupational pension payments. These are removed.

- *Spells beginning from 2010* – 168 observations deleted

Uncertain start and end dates

A serious problem with the P45 data arises from the fact that in many cases start and end dates of employment are not recorded precisely. Suppose an employee leaves their job at some point during a year, but the precise leaving date is not known. In this case, the convention is to use an arbitrary leaving date – the end of that financial year (5th April). Similarly, if the precise start date is not known, it will be recorded as the first day of the financial year (6th April). Uncertain start and end dates therefore lead to an over-estimate of the time an individual is in employment.

In some cases a spell with uncertain start or end dates can overlap with a spell with both certain start and end dates. For example, suppose an individual has a spell running from 1st July to 5th April (i.e. certain start and uncertain end) and another running from 1st July to 31st October (i.e. certain start and certain end). It is reasonable to consider that these are the same spell, and that the individual was not in fact working from 1st November to 5th April. In total there are 2,528,312 'near duplicate' spells to remove.

Having cleaned the data as set out above, we are left with 14,413,091 spells of employment and 4,595,663 individuals to whom these spells apply. However, nearly one quarter of spells in the final dataset contain either an uncertain start or end date (see figure overleaf).

Figure 13: Composition of cleaned P45 data by precision of start and end dates
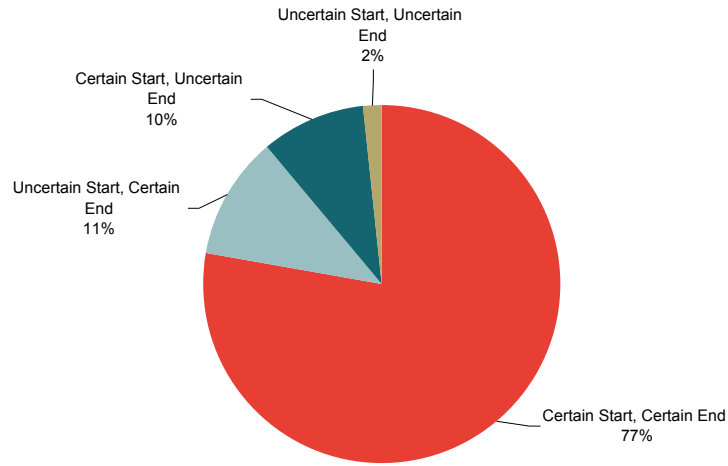
Frontier analysis of HMRC/DWP data

Reshaping the data

We need to move from a database of employment spells to a database of individuals with their month-by-month employment history. To do this we take each month (from 2003 to 2009) and measure the proportion of time in each month that an individual was employed. This collapses the data down to the level of the individual rather than the employment spell.

This method is illustrated in the stylised example below. This shows an individual and 3 different spells of employment.

Table 9: Reshaping P45 data: Bob's employment history

	Start	End	J	F	M	A	M	J	J	A	S	O
Spell A	15 Feb	31 Apr	0	.5	1	1	0	0	0	0	0	0
Spell B	1 Mar	15 Jun	0	0	1	1	1	.5	0	0	0	0
Spell C	1 Aug	31 Dec	0	0	0	0	0	0	0	1	1	1
Employment history			0	.5	1	1	1	.5	0	1	1	1

Stylised example

While this method is simple to program and fast to calculate, a slight difficulty arises where several spells spanning the same month only cover part of it. For example, suppose Spell A covers 1st to 14th Feb and Spell B covers 15th to 28th Feb. We would want to add both these periods together, so that all of February is in employment. This is indeed the approach we take (taking the sum and capping at 100%). A potential inaccuracy arises if two spells cover the same part of the month, i.e. if Spell A and Spell B covered up to 14th Feb, in which case summing the month proportions will result in a (modest) overstatement

of employment. Since there are few of these partial-month overlaps, and any overstatement of employment is likely to be at most a few days, we are content to use this simple calculation method at this stage.

P14 data

The P14 databases contain P14 end of year PAYE information from HMRC. The data contains amounts of earnings and tax, per employment, within individual tax years, for each individual. Records are returned by employers at the end of each tax year. As with the ILR aims data our objective is to obtain individual-level earnings for each individual and each financial year that we have data for. The key variables are:

- Personal identifier- we have both HMRC (person_instance_idnstance_id) and DWP (ccorcid)

- Start and end date of earning spells

- Pay per employment spell

- Flags indicating if more records are expected for an individual in a financial year (ripeness flag)

The raw data contains 34,212,225 earnings records of which 4,911,732 have missing earnings data. Reliable data covers the period 2003-04 to 2008-09. The earliest tax year recorded in the data is 2001-02 but all 1,084,278 records from that year have missing earnings data and are of no use. Other issues in the P14 data include:

- A number of the remaining records are duplicates or near duplicates.

- There are records with negative or zero earnings.

- Taxable benefits are included in the data and are difficult to identify.

- Earnings spell start and end dates are missing for the majority of records and some spells fall in the wrong financial year. Hence earnings can only be calculated consistently on an annual basis.

- Total annual earnings are recorded but not used – employees may have several jobs and employers do not always have accurate information on all earnings from all jobs potentially resulting in an underestimate of total annual earnings. We add earnings from individual spells to obtain annual earning.

- There are occupational pensions records which are not earnings

- The same HMRC person identifier may have multiple DWP identifiers and vice versa

Cleaning the data

The following simple steps have been taken to create a usable annual earnings data set:

- Records before 2003-04 have missing earnings data and are deleted. This results in the removal of 1,084,281 records.

- Missing earnings records – all records with missing earnings data – have a ripeness flag "Y" suggesting this record may have been inserted simply to show the record for the individual/year is complete. Deleting these results in the removal of 3,827,456 records.

- Occupational pensions – these are payments that are not from jobs and are deleted resulting in the removal of 1,256,853 records.

- Deceased individuals – results in deleting 112,544 individuals.

- Exact duplicates – this results in 2,595,298 records being deleted.

- DOB before 11 Jan 1940 were removed – results in deleting 902,326 records.

- Earning spells of negative duration – deleting these records results in 12,282 records being removed.

- Negative pay – 48,936 records have negative pay values. They are likely to be tax refunds but are not always flagged up as such. These have been deleted.

- Tax refunds – 257,221 records which have been flagged up as tax refunds have been deleted.

- Near duplicates – multiple records which are marked as ripe and are identical in everything other than the extract date. We keep only the latest ripe record, which results in dropping approximately 65,000[10] observations.

Reshaping to individual level

Before any data processing was done the P14 data set had 34,212,225 records. Having cleaned the earnings data in the way described above, we are left with earning spells spanning 6 financial years and corresponding to 4,636,930 individuals. To calculate annual earnings we sum across earning spells. We then reshape the data from long to wide format resulting in one line per individual containing information for each year on total earnings, number of records and a record completeness indicator. The process is illustrated in the tables overleaf.

---

[10] Due to the sequence of operations changed this number can be different if the operation is performed at a different stage

Table 10: Bob's earning history

Person	Year	Spell	Pay this employment	Ripe
Bob	2003-04	1	2,000	Yes
Bob	2003-04	2	500	Yes
Bob	2003-04	3	300	Yes
Bob	2004-05	1	2,000	Yes
Bob	2004-05	2	10,000	Yes
Bob	2005-06	1	4,000	Yes
Bob	2005-06	2	3,000	Yes
Bob	2005-06	3	5,000	Yes
Bob	2006-07	1	6,000	Yes
Bob	2006-07	2	7,000	Yes
Bob	2007-08	1	10,000	No
Bob	2007-08	2	3,000	No
Bob	2008-09	1	7,000	No

BECOMES

	Pay 2003-04	Pay 2004-05	Pay 2005-06	Pay 2006-07	Pay 2007-08	Pay 2008-09
Bob	2,800	12,000	7,000	13,000	13,000	7,000

Stylised example. Excludes 12 additional columns showing Bob's ripeness and number of jobs for each year

Reconciliation of P45 and NBD data

We use the ccorcid identifier (or person_instance_id if ccorcid is unavailable) to generate unique identifiers for each individual. This allows us to merge together the employment and benefits data. An important exercise here is to check for consistency between the employment and benefit spells. For someone to be receiving Jobseekers' Allowance or Incapacity Benefit, they should not be in employment. Therefore these benefits should be mutually exclusive with employment spells.

There are several reasons we might observe an individual being both in employment and receiving these benefits:

- Time lag between beginning job and withdrawal of benefits;

- Employment spell with uncertain start or end;

- Benefit   fraud;

The extent of various types of overlap, and how they vary over time, is shown in the chart overleaf.

Figure 14: Overlapping benefit and employment spells
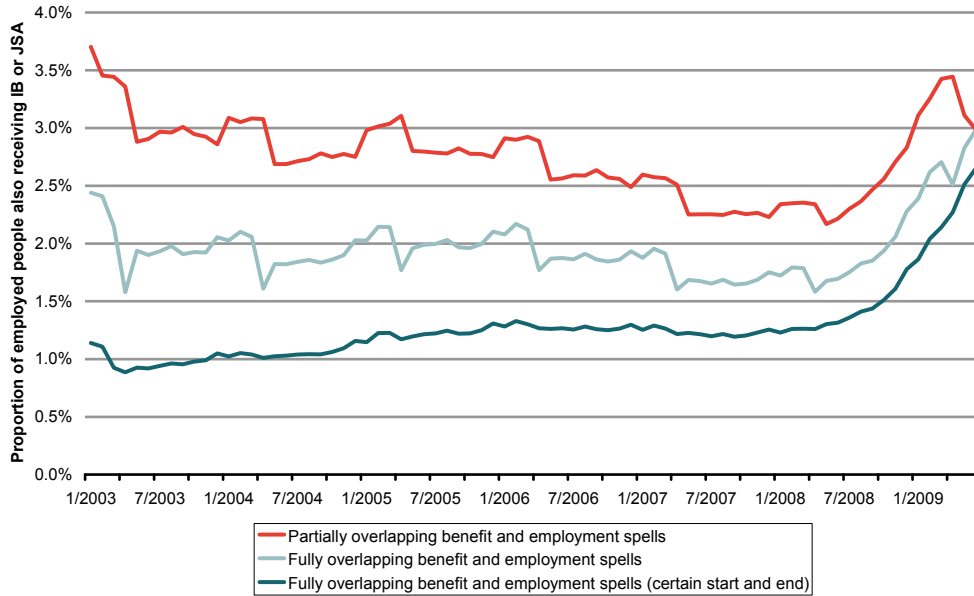
Frontier analysis of HMRC/DWP data

The widest definition of overlap is shown by the red line. This refers to any month in which the proportion of the month spent in employment plus the proportion of the month spent on benefits is greater than 100%. In this case the individual must be spending part of that month in both employment and benefit. In any month, roughly 3% of individuals in employment fall within this definition.

A stricter definition of overlap, shown by the light blue line, is to consider months during which an individual is in employment for all of it, yet is also receiving benefits during all of it. This is roughly 2% of individuals.

Finally, we can focus on cases where the employment has a certain start and end date. This corresponds on average to just over 1% of individuals in employment.

Overall we view the NBD data as being more reliable than the P45 data. We therefore use it to "correct" inaccuracies in the P45 data. That is, wherever there is inconsistency between the two, we correct the P45 to restore consistency. We do this regardless of the certainty of start and end dates of employment. The mathematical rule we employ is:

Corrected % Employed$_t$ = min[% Employed$_t$, 1 − max(% IB$_t$, % JSA$_t$)]

The worked example below illustrates how this works in practice.

Table 12: Reconciling employment and benefit histories

	J	F	M	A	M	J	J	A	S	O	N	D
Employment	0	.5	1	1	1	.5	0	1	1	1	0	0
IB	0	0	0	0	0	0	0	0	0	0	0	0
JSA	1	0	0	0	0	.75	1	.5	0	0	.5	1
Corrected	0	.5	1	1	1	.25	0	.5	1	1	0	0

	J	F	M	A	M	J	J	A	S	O	N	D

employment

Stylised example

Combining employment history and earnings data

We can now combine the corrected employment history and annual earnings data to estimate the average pay of an individual for the months they are working. We then multiply this by the proportion of each month worked to get an estimate of earnings per month.

Time in employment per tax year

We need to calculate average time spent in employment for each tax year. We take a relatively simplistic approach to this, adding the proportions of the months and dividing by 12. There are several issues to bear in mind, but which should not have any appreciable impact.

- *Month length and public holidays*. Arguably we should weight months according to number of working days they contain. For simplicity we do not do this.

- *Discrepancy between tax year and calendar month*. The tax year begins on the 6th of April. Arguably we could define months beginning on the 6th so that the tax year and employment months fully correspond. This would be a cumbersome and potentially confusing adjustment, however. Instead we allocate the first sixth of April to the tax year coming to an end and assign the remaining five-sixths of it to the new tax year that starts thereafter.

The approach we take is shown in the table below. This person has worked for half of the year ((0.83 + 1 + 0.5 + 1+ 1+ 1+0.5 +0.17)/12 = 0.5)

Table 13: Calculating proportion of tax year in employment

	A	M	J	J	A	S	O	N	D	J	F	M	A
Employment	1	1	.5	0	1	1	1	0	0	0	0	.5	1
Weight	.83	1	1	1	1	1	1	1	1	1	1	1	.17
Weighted proportion of month worked	.83	1	.5	0	1	1	1	0	0	0	0	.5	.17

Stylised example

Calculation of average earnings per month worked

Dividing the earnings per tax year by the proportion of the tax year an individual spends in employment, we obtain a yearly estimate of average earnings per month in employment. So if someone has earned £12,000 and worked half the year we would consider them to earn £2,000 per month in employment.

The income distribution for individuals appearing in the P45 is shown below. At the very top of the income distribution are some implausibly high levels of income (in excess of £100,000 per month). The very low incomes in the lower part of the distribution will undoubtedly be driven partly by part-time working.

Figure 15: Distribution of average income per month worked (by year)
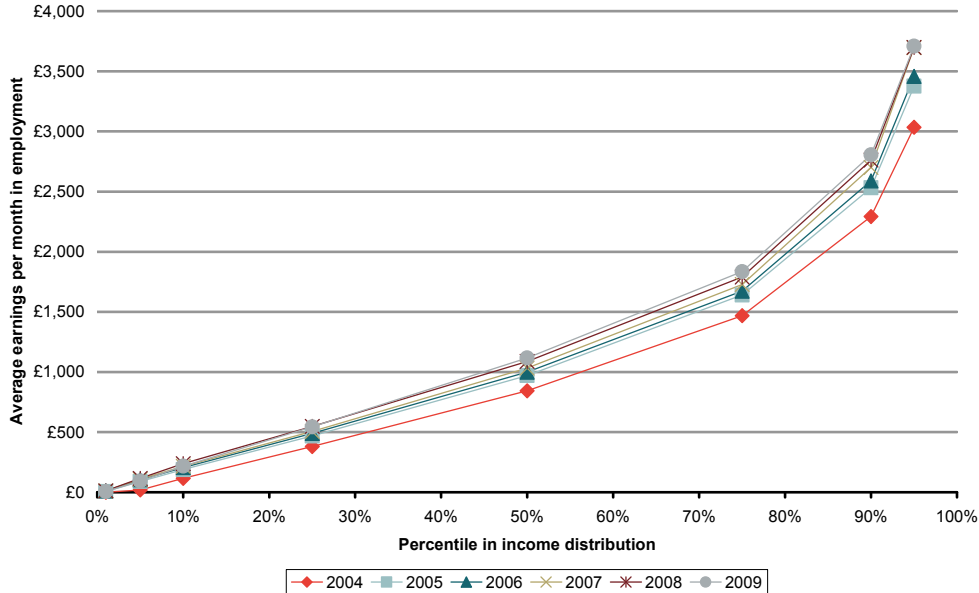
Frontier analysis of HMRC/DWP data

Calculation of monthly earnings

We then multiply the earnings per month worked by the proportion of each month in employment to get an estimate of monthly earnings. Since April straddles two financial years, we use a weighted average of the estimated earnings in April according to the rule stated above. This procedure is shown below.

Table 14: Calculation of monthly earnings

	J	F	M	A	M	J
Employment	0	.5	1	1	1	.5
Earnings/month employed, FY ending April 2006	£2000	£2000	£2000	£2000	n/a/	n/a
Earnings/month employed, FY ending April 2007	n/a	n/a	n/a	£2500	£2500	£2500
Corrected employment	0	£1000	£2000	£2417	£2500	£1250

Stylised example

Short description of the merged ILR- HMRC/DWP data set

Having gone through the data processing steps described above, we then merged the three HMRC/DWP data sets together using ccorcid as the unique person identifier where that was available and replacing it with person_instance_id in cases where no ccorcid was

available. We then merged each individual ILR data set with the combined HMRC/DWP data set resulting in three ILR-HMRC/DWP data sets, one for each of the funding streams we analyse. The number of achievers in each of these merged data sets is described in the table below:

Table 15: Number of achievers in merged ILR HMRC/DWP data set

	FE	Apprenticeships	TTG
FL3	293,235	57,598	1,179
FL2	285,188	117,337	40,804
L3	631,431	-	-
L2	813,477	-	-
BL2	919,533	-	-

Frontier analysis of ILR-HMRC/DWP data

Descriptive Analysis – FE

General considerations

In this chapter we use the combined datasets to provide a range of descriptions of the earnings and employment statuses of students who went through the FE system. So far as we know this is the first time that it has been possible to provide a comprehensive picture of how earnings and employment status, both before and after the course of study, vary according to the level and subject of study in FE.

As described in the previous chapter, the data we use contains only learners who achieved an FE qualification at some point during the academic years 2005-06 and 2006-07. These are matched to employment, unemployment and earnings records from HMRC and DWP spanning 6 financial years, from April 2003 to April 2009. Matching ILR records with DWP and HMRC data allows the construction of an individual level data set containing the following information:

- A range of demographic characteristics such as age, gender, ethnicity, disability, disadvantage status and others

- Level and subject of the qualification achieved, when it was achieved and where it was achieved

- Time spent in employment/on benefits as well as earnings both before and after learning took place

This is a remarkable dataset. It allows us to make many interesting comparisons between the labour market histories and outcomes of learners studying different courses in terms of level, subject, course provider, funding stream and others in a way not previously possible.

It is of course the case that the comparisons should be interpreted with care. Observed differences in outcomes by a certain characteristic cannot be taken as evidence that the characteristic has an effect on those outcomes. For example, if we observe that the earnings of L2 Science and Mathematics achievers are higher for graduates of college X relative to those of college Y, we cannot infer that college X is performing better than college Y. The differences in earnings could be caused by a variety of other factors such as differences in the prior ability or attainment of the students (which we have been unable to control for due a lack of data), differences in the average age of the learners, differences in the locations of the college and differences in the type of qualification studied. The purpose of the descriptive analysis is not to uncover causal relationships but to gain a better understanding of the key characteristics of learners in the different funding streams, subject areas and levels.

This will allow us to answer a range of questions including:

- Who are the individuals studying FE courses at each level?

- How old are they?

- Are they predominantly male/female?

- Are ethnic minority groups over-/under-represented in certain courses/levels?

- What is the proportion of learners who live in deprived areas?

- How did FE achievers perform in the labour market before they started their studies?

- How likely were they to be employed/unemployed before they started their course?

- How many months were they in employment for in the 12 months preceding the start of the course?

- What were their annual earnings before they started their learning?

- How did FE achievers perform in the labour market after they finished their studies?

- How likely were they to be employed/unemployed after they finished their course?

- How many months were they in employment for in the 12 month period after their course finished?

- What were their annual earnings after they completed their learning?

- Are there differences between the employment and earnings outcomes for learners undertaking the same course at a different provider?

- Are there differences between the employment and earnings outcomes of learners undertaking different courses?

- Are there differences between the employment and earnings outcomes of FE and Apprenticeships learners aged 18-24 undertaking the same courses at the same level?

Data Limitations

The most significant limitation of the data is that it only contains information on individuals who undertake learning and hence there is no clear counterfactual or comparison group. There are a range of other issues which cause additional complications. These are described in more detail in the next chapter.

One additional complication arises from the fact that we are unable to distinguish part-time workers from full-time workers in the earnings data. The implication of this is that an observed increase or fall in earnings may simply reflect a shift in the hours worked (moving from full-time to part–time, or vice versa) rather than a genuine pay change. This problem

is likely to affect females more than males as many more females work part-time.[11] We do not consider it possible to correct this weakness in the data, and therefore include separate descriptive statistics for men and women. Our view is that when it comes to comparing earnings, the former are more interpretable and more robust.

Another group of learners in the data that may be affected by this problem is the group of FE learners studying for A-Levels, who then go on to Higher Education. University students in part-time employment will earn low wages. Hence low wages following a FL3 qualification may be due to a learner continuing education by going to university rather than poor returns to that qualification. As we are unable to distinguish between academic and vocational learners in the FE data, particular care must be taken when interpreting the outcomes of learners aged less than 20 years old. An additional issue affecting this group of learners is the lack of prior labour market history and school achievement data. Prior attainment is available for some, but not all learners aged less than 20 years old.

There are a number of other issues with using this data, which we come to in the course of our analysis in this and subsequent chapters. We now go on to answer a range of questions using the unique dataset which we have constructed.

Characteristics of FE achievers – full sample

In Chapter 3 of this report we described how we transformed the raw ILR and HMRC/DWP data into three merged ILR-HMRC/DWP data sets, one for each of the funding streams we focus on. We start by describing the largest of the three data sets, the FE file. In this section we describe the full FE sample, before breaking the sample down into different qualification levels in subsequent sections of this chapter.

The merged FE-HMRC/DWP data set we constructed contains 2,434,599 learners aged between 16 and 59. All of those achieved a learning aim in either or both 2005-06 and 2006-07 academic years. We study the employment histories and outcomes of FE learners in the 12 month periods immediately before and after their spell in learning. When studying outcomes, we use a 3 month buffer period post-learning to allow some time outside the labour market following achievement. Because course start and end dates vary from individual to individual, the 12-month periods during which we observe labour market histories and outcomes may fall in different months or even years. For example, a learner who started learning on 1 September 2005 and finished on 1 January 2006 will have a labour market history covering the period 1 September 2004 to 1 September 2005 and an outcomes period covering 1 April 2006 to 1 April 2007.

As we need sufficiently long time periods both before and after learning in order to have reliable estimates of labour market performance, we exclude learners whose qualification started before 1 August 2004 or after 1 August 2007 from the analysis.

---

[11] ONS Focus on Gender Report 2008 shows that 38% of women with dependant children work part-time (22% of women without dependant children) compared with only 4% of men with dependant children (7% of men without dependent children), available at : http://www.statistics.gov.uk/focuson/gender/

Demographic characteristics

The key demographic characteristics of FE achievers are summarised below:

- Age: The mean age of the full sample is 31 years. A quarter of FE learners are aged less than 20 years with another quarter aged over 40.

- Gender: 1.43m out of 2.43m FE achievers are female (59%).

- Ethnicity: Just under a quarter of FE learners are from an ethnic minority. The largest ethnic minority groups are: Asian including Chinese (7.2 %), white non-British (6.8%) and Black (5.3%).

- Deprivation status: Around a third of FE achievers live in a deprived area.[12]

Learner levels

The largest group of FE achievers is BL2 which includes SFL learners. This group constitutes 38% of the sample while L2 and L3 have shares of 33% and 26% respectively. Within L2 and L3 there are approximately equal numbers of FL2 and FL3 achievers. These two groups correspond to around 12% of the sample.

Figure 16: FE achievers levels

Below level 2 ■ Level 2 ■ Level 3 ■ Level 4
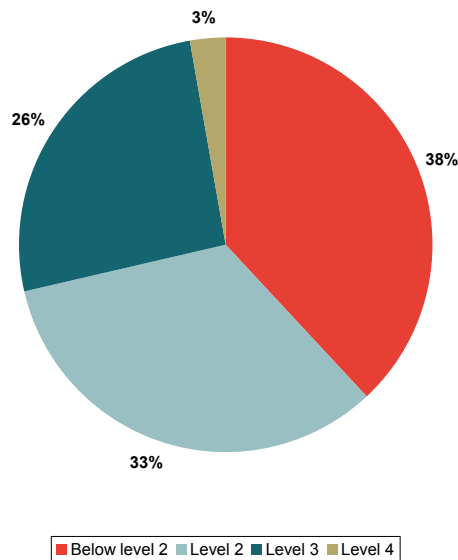
Frontier analysis of FE-HMRC/DWP data. All FE achievers

---

[12] Deprived area definition: The 27% of Lower Super Output Areas with the highest Index of Multiple Deprivation (IMD) score.

Prior Attainment

Prior learner attainment data (recorded in levels) is available for some but not all FE achievers. It is unknown for just under half of the sample but this varies by level of study

- 67% of L3 achievers have recorded prior attainment but

- Only 40% of BL2 achievers have this information recorded

We describe the overall distribution of the FE sample in terms of prior attainment in the Figure below. 36% of FE achievers for whom prior attainment is available have achieved at L2 in the past. We also show how prior attainment varies by level in the Figures below

Figure 17: Prior attainment of FE achievers (FE)
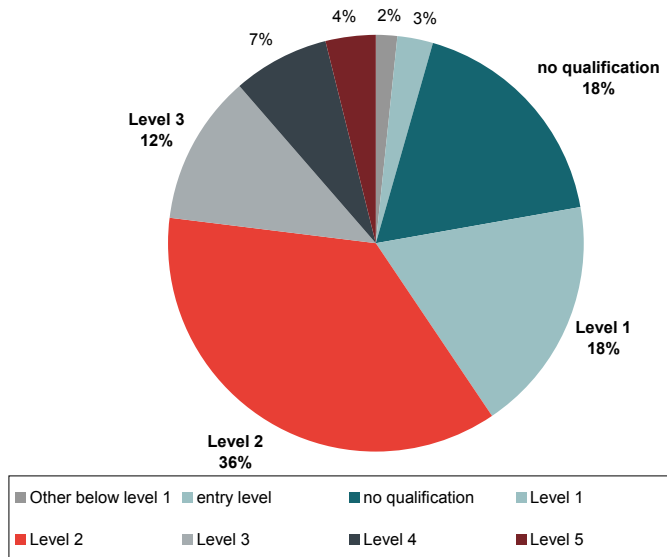
Frontier analysis of FE-HMRC/DWP data. All FE achievers

Figure 18: Prior attainment by level of study (FE)
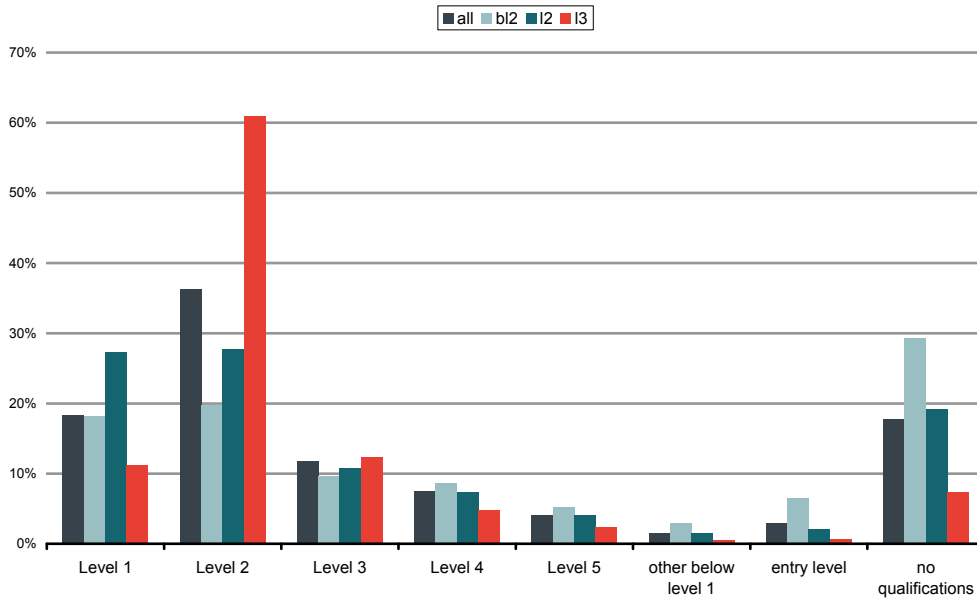
Frontier analysis of FE-HMRC/DWP data. All FE achievers

Subject areas of study

The characteristics of FE learners vary not only in terms of level and prior attainment but also area of study. Our calculations show that the distribution of learners across subjects is very uneven. Nearly half of all FE achievers are concentrated in 3 sector subject areas:

- Health, Public Services and Care - 514,233

- Preparation for Life and Work – 467,393

- Information and Communication Technology – 225,121

The subject areas with the fewest achievers make up less than 4% of the total sample. These are:

- Agriculture, Horticulture and Animal Care – 46,754

- Social Sciences – 23,523

- History, Philosophy and Theology – 19,419

Demographic characteristics by level

The demographic characteristics of achievers vary a great deal by level of study. In general, achievers following courses at BL2 are older, more likely to live in an economically deprived area and to be from an ethnic minority than learners achieving FL2 and FL3 qualifications. Only 15% of BL2 achievers fall in the youngest age group (16-19) compared to 44% of FL2 and 66% of FL3 achievers. A third of BL2 are from ethnic minorities compared to only 18% of FL2 and 19% of FL3 achievers.

Table 16: FE achiever characteristics by level of study (FE)

	BL2	L2	FL2	L3	FL3
% aged 16-19	15%	22%	44%	51%	66%
% aged 20-24	13%	12%	11%	10%	10%
% aged >24	72%	66%	45%	39%	24%
% ethnic	33%	20%	18%	20%	19%
% male	43%	40%	48%	40%	37%
% deprived	38%	34%	36%	27%	27%

Frontier analysis of FE-HMRC/DWP data. All FE achievers.

Demographic characteristics by sector subject area

Not only are FE achievers unevenly distributed between different sector subject areas, but within sector subject area they tend to have very different demographic characteristics. The following summarise some of the most interesting findings:

- **Predominantly male subjects:** 94% of achievers in Construction, Planning and Built Environment and 83% of achievers in Engineering and Manufacturing Technologies are male.

- **Predominantly female subjects:** Education and Training (77%), Retail and Commercial Enterprise (75%) and Health and Public Services and Care (71%) are female-dominated sector subject areas.

- **Concentration of young learners:** 76% of Social Sciences and 67% of Science and Mathematics achievers are aged 20 years or under while 98% of those taking a course in Education and Training are aged over 20.

- **Concentration of ethnic minorities:** Almost half of achievers in Preparation for Life and Work are not white British. This is also the sector subject area with the highest concentration of achievers from deprived areas (45%) and the highest concentration of prior benefit claimants – 41% of Preparation for Life and Work achievers claimed some sort of benefit at some point since April 2003.

- **Work full year:** Achievers in Education and Training are the most likely to have worked for at least 11 months in the year preceding the course start date: 55% of achievers, compared with only 22% of achievers in Social Sciences.[13]

---

[13] This difference is likely to be a consequence of the different concentrations of young learners in these subject areas.

Labour market outcomes by level

As a starting point we consider the aggregate labour market outcomes of the FE sample as a whole, disaggregating only by age and level of study (the key indicators are summarised in Table 17 below).

Focusing on adult learners (aged 19+) BL2 achievers appear to have the poorest labour market performance. They are more likely to be on benefits pre-learning than the rest. On average, this group of learners claimed benefits for 2.49 of the twelve months preceding learning which is a full month more than the 1.49 and 1.37 months that FL2 and FL3 learners claimed for. They are also less likely to be in employment: 61% were employed 6 months before learning compared with 68% of FL2 achievers and 69% of FL3 achievers.

However, BL2 achievers have the highest pay pre-learning. Taken at face value this seems surprising given these are the learners with the lowest previous qualifications. However, as Table 16 shows this group of learners are significantly older than the rest and hence likely to have been active in the labour market longer, which may explain their higher earnings.

Following achievement in FE, all labour market indicators see improvements at all levels of study. In terms of employment BL2 achievers benefit the most with increases of 9% compared to 6% at FL2 and 5% at FL3. On the other hand, pay increases the most for FL3 achievers (5%) and benefits decline by a quarter. These are significantly better than FL2 and BL2 achievers who experience earnings increases of 2% to 3% and benefit falls of 18% and 7% respectively.

The bottom five rows of the table include learners of all age groups. The presence of learners aged 16-18 explains the significantly higher employment rate increases in particular among FL2 and FL3 achievers.

Table 17: Key outcome indicators (FE)

		Before training			After training			% change		
		BL2	FL2	FL3	BL2	FL2	FL3	BL2	FL2	FL3
19+	Employment (months)	7.36	8.22	8.11	8.02	8.72	8.55	9%	6%	5%
	Employment rate (6 months)	61%	69%	68%	67%	73%	71%	9%	6%	5%
	Benefit (months)	2.49	1.49	1.37	2.32	1.22	1.02	-7%	-18%	-26%
	Benefit rate (6 months)	21%	12%	11%	19%	10%	8%	-7%	-18%	-27%
	Earnings (filtered)	£20,268	£18,113	£19,430	£20,734	£18,640	£20,418	2%	3%	5%
All	Employment (months)	6.88	7.21	5.71	7.84	8.48	8.16	14%	18%	43%
	Employment rate (6 months)	57%	60%	47%	65%	71%	68%	14%	18%	44%
	Benefit (months)	2.24	1.23	0.77	2.16	1.05	0.61	-4%	-15%	-21%

		Before training			After training			% change		
		BL2	FL2	FL3	BL2	FL2	FL3	BL2	FL2	FL3
	Benefit rate (6 months)	19%	10%	6%	18%	9%	5%	-4%	-15%	-22%
	Earnings (filtered)	£20,130	£17,969	£19,027	£20,568	£18,465	£19,644	2%	3%	3%

Frontier analysis of FE-HMRC/DWP data

Labour market outcomes by subject area

The demographic characteristics of FE achievers vary by level of study but also subject area. This should be taken into consideration when interpreting descriptive statistics. For example, if we observe that achievers in a given subject area have poor labour market performance pre-learning, we need to consider how the underlying characteristics of these learners compare with the characteristics of the rest of the sample. We demonstrate the relevance of this point in the table that below. It shows that the characteristics of achievers vary a great deal by subject area.

Table 18: FE achievers' characteristics and labour market history

Subject area	Male	Ethnic minority	Aged 19+	Deprived area	Ever on benefits	Worked 11+months pre
Health, Public Services and Care	29%	19%	86%	34%	26%	48%
Science and Mathematics	37%	25%	36%	28%	14%	26%
Agriculture, Horticulture and Animal Care	50%	8%	74%	20%	25%	37%
Engineering and Manufacturing Technologies	83%	19%	75%	31%	22%	43%
Construction, Planning and Built Environment	94%	13%	71%	30%	27%	36%
Information and Communication Technology	41%	23%	84%	32%	33%	43%
Retail and Commercial Enterprise	25%	17%	75%	33%	29%	41%
Leisure, Travel and Tourism	59%	16%	61%	25%	17%	35%
Arts, Media and Publishing	36%	19%	52%	26%	22%	30%
History, Philosophy and Theology	38%	17%	44%	23%	17%	29%
Social Sciences	36%	24%	27%	28%	14%	22%
Languages, Literature and Culture	33%	22%	76%	22%	17%	49%
Education and Training	23%	17%	99%	25%	25%	55%
Preparation for Life and Work	43%	47%	86%	45%	41%	35%
Business, Administration and Law	35%	24%	74%	30%	20%	48%
All	41%	25%	76%	33%	27%	41%

Frontier analysis of FE-HMRC/DWP data. All FE achievers

Average earnings

All earnings presented in subsequent sections have been deflated using Retail Prices Index (RPI) in order to correct for inflation.[14]

We start by presenting the average earnings of all FE achievers before revealing earnings variation by sector subject area and demographic group. Our calculations show that on average FE achievers earned £7,653 pre-learning and £8,977 post-learning. We include all achievers in the calculation of these average statistics. It is important to note that there are a number of reasons why these numbers appear to be low in absolute terms. Our FE sample includes:

- Individuals who were unemployed pre-learning (at least some of whom were claiming some sort of benefit), and are therefore assigned zero earnings

- Individuals who were not in work for other reasons (assigned zero earnings)

- Individuals who were in education before starting FE (assigned zero earnings)

- Individuals   working part-time

- Individuals who are employed but who also receive some self-employment income (the P14 data does not cover the earnings of self-employed individuals).

In addition to this, an individual's earnings may be coded as zero if the P14 and P45 data sets do not agree about what an individual is doing at a point in time. For example, an individual who is considered employed in the P45 data may not have an earnings record. Finally, the P14 data contains some records which are taxable benefit payments rather than earnings which are not easily identifiable. We have set earnings to equal zero where an individual is recorded as receiving benefits and has an earnings record.

As a consequence of the above, the pre and post-learning earnings of a very large proportion of the FE achiever sample are coded as zero: 42% of pre-learning and 31% of post-learning earnings.

Our calculations show that there were 1,015,994 individuals with zero earnings pre-learning[15]. Of those, 741,712 (73%) were not employed in the 12 months pre-learning. Of these unemployed individuals139,962 were claiming benefits for the full 12 months pre-learning and 182,563 were claiming benefits for at least some time during that period.

---

[14] We use the 2008-09 fiscal year as our base year for this calculation.

[15] It is likely that at least some of these individuals were self employed and hence not captured by the HMRC, DWP data. It is not possible to quantify the number of self employed individuals in the data

The remaining 559,149 learners who have no earnings, did not claim any benefits and were not employed are predominantly young – 55% are aged 18 or less.

The remaining 274,282 who have zero pre-training earnings have some employment record in the 12 months preceding learning. In fact 58% or 176,649 are recorded as working in every month of the year preceding learning. There are several possible reasons why an individual may appear to be in work but have zero earnings.

- We know that P14 data does not cover all employees as there is no requirement to supply a P14 if an employee is below the PAYE tax threshold and is not going to be claiming new tax credits through the employer.

- An individual may be incorrectly recorded as being in work in the P45 data.

- An individual's earnings may be misreported as zero in the P14 data even though he/she is in paid work.

It is not clear if any one of these possibilities is more or less likely to be causing this anomaly than the others. Hence we have not excluded individuals with zero recorded earnings but positive employment spells from the descriptive analysis that follows.

Average earnings by sector subject area

We present average earnings in each of the sector subject areas in the Table below. Again, these are calculated based on the full sample of all achievers without distinguishing between levels for the purposes of completeness. The first column of the Table presents the sample sizes used in the calculation of average earnings which again include all learners, including those whose earnings are coded as zero. Sample sizes fluctuate enormously between the sector subject areas. They are very large in Health, Public Services and Care (514,233) and Preparation for Life and Work (467,393) and small in History, Philosophy and Theology (19,429) and Social Sciences (23,523).

Pre-learning earnings are lowest for learners achieving in Social Sciences and Science and Mathematics. These are also the subject areas with the highest proportion of zero earnings, a likely consequence of the very large concentration of young learners and females in these subject areas. As Table 18 shows 64% of Science and Mathematics learners and 73% of Social Sciences learners are aged between 16 and 18. These two subject areas also happened to have the lowest proportion of learners who were employed for the whole year pre-learning.

Table 19: Mean earnings pre and post-learning (FE)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	514,233	8,993	10,045	33%	26%
Science and Mathematics	76,154	3,574	5,394	54%	26%
Agriculture, Horticulture and Animal Care	46,754	8,265	9,164	43%	32%
Engineering and Manufacturing Technologies	131,069	10,695	12,754	35%	26%

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Construction, Planning and Built Environment	93,024	8,974	11,202	40%	30%
Information and Communication Technology	225,121	7,714	8,601	43%	35%
Retail and Commercial Enterprise	174,050	6,649	7,688	39%	30%
Leisure, Travel and Tourism	118,819	9,381	11,153	41%	24%
Arts, Media and Publishing	176,294	5,033	6,324	52%	33%
History, Philosophy and Theology	19,429	4,666	5,715	54%	30%
Social Sciences	23,523	2,731	4,795	57%	26%
Languages, Literature and Culture	123,926	11,427	12,143	38%	28%
Education and Training	84,900	10,234	11,417	28%	24%
Preparation for Life and Work	467,393	4,763	6,136	53%	44%
Business, Administration and Law	159,910	9,691	11,606	34%	22%
All	2,434,599	7,653	8,977	42%	31%

Frontier analysis of FE-HMRC/DWP data. All FE achievers

Due to the large fall in the number of individuals with zero earnings post-learning (from 42% to 31% of the sample), average earnings will increase even in the absence of any genuine wage increase. Put differently, mean earnings may be increasing purely because more people are in work rather than because they are receiving higher wages. In order to capture genuine wage changes it is important to control for changes in working patterns as much as possible. We do this by concentrating our analysis on a subsample of individuals, which we describe next.

Average earnings excluding zeros and outliers (filtered earnings)

So far we have included all individuals in our data set, including learners not in work, in the calculation of average earnings. Due to the large number of learners with zero recorded earnings, mean earnings appear to be very low. In what follows we apply a series of rules in order to identify the earnings of learners who are in work. We begin by excluding obvious outliers from the sample such as zero earnings and earnings over £80,000. This reduces the size of the sample used for calculation of earnings pre-learning by over 1 million individuals: 1,015,994 have zero earnings and 5,540 have earnings over £80,000. Applying the same rule to earnings post-learning results in a smaller drop in sample size: 757,014 individuals have zero post-training earnings and 5,537 have earnings over £80,000. The removal of zeros and earnings over £80,000 from the sample causes average earnings to increase substantially to £12,647 and £12,637 pre- and post-learning respectively.

The removal of zero earnings from the sample has the effect of excluding individuals who are not employed from the analysis but does not address the presence of part-time workers. The statistics will remain biased downwards without correcting for the number of hours worked.

In order to control for the presence of part-time workers in the data, we apply additional filters to the sample, i.e. we calculate separately the average earnings of male and female learners who were employed for at least 11 months either side of the learning window and were earning at least £4,800 per annum. Effectively this restricts our earnings analysis to achievers who are in continuous employment both pre and post-learning and whose monthly earnings exceed £400. The immediate effect of this restriction is to reduce the size of the sample used for the calculation of mean earnings - the number of individuals for whom we have wage information pre-learning falls to 654,002 pre-learning and 670,370 post-learning.

In our view, applying these additional rules to the sample is necessary in order to capture genuine wage changes rather than changes in earnings caused by a shift in number of months/hours worked for example. As males are less likely to be in part-time work than females, we consider changes in male earnings to be more robust and easily interpretable.

We show mean filtered earnings pre-learning for all demographic groups of interest. We also show how earnings change following achievement in FE in the tables that follow.

Table 20: Mean filtered earnings by demographic group (FE)

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	18,096	18,181	23,795	15,581	3%	3%	3%	3%
Science and Mathematics	16,081	16,355	19,186	14,991	2%	4%	2%	2%
Agriculture, Horticulture and Animal Care	19,911	20,112	21,006	18,444	2%	2%	3%	0%
Engineering and Manufacturing	21,675	22,095	22,975	16,235	7%	7%	8%	4%
Construction, Planning and Built Environment	21,652	22,235	21,947	18,437	9%	9%	9%	9%
Information and Communication	18,407	18,508	22,758	16,116	2%	2%	2%	2%
Retail and Commercial Enterprise	16,358	16,524	20,673	14,649	2%	3%	2%	3%
Leisure, Travel and Tourism	23,959	24,538	26,945	18,799	-1%	0%	-1%	0%
Arts, Media and Publishing	20,288	20,788	23,103	19,136	-1%	1%	-2%	-1%
History, Philosophy and Theology	19,756	20,102	24,546	17,414	-1%	2%	0%	-2%
Social Sciences	16,512	17,300	18,681	15,753	0%	5%	-2%	0%
Languages, Literature and Culture	23,876	24,055	29,587	20,795	1%	1%	1%	1%
Education and Training	18,340	18,355	24,532	16,231	4%	4%	5%	5%
Preparation for Life and Work	16,763	16,877	19,695	14,803	4%	4%	5%	3%
Business, Administration and Law	19,574	19,788	24,340	17,235	5%	6%	4%	6%
All	19,083	19,273	23,237	16,345	3%	4%	4%	3%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 21: Mean filtered earnings by demographic group (FE)

Study area	Before training				% change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	18,063	18,292	16,312	18,856	3%	3%	4%	2%
Science and Mathematics	16,166	15,623	14,796	16,498	2%	2%	3%	2%
Agriculture, Horticulture and	19,788	21,107	18,564	20,189	1%	3%	1%	2%
Engineering and Manufacturing	21,772	21,117	19,122	22,646	8%	5%	7%	7%
Construction, Planning and Built	21,608	22,035	20,454	22,049	9%	8%	8%	9%
Information and Communication	18,291	19,039	17,087	18,817	2%	3%	2%	2%
Retail and Commercial	16,259	16,920	14,569	17,122	2%	4%	4%	1%
Leisure, Travel and Tourism	24,133	22,751	19,698	25,002	-2%	0%	1%	-2%
Arts, Media and Publishing	20,235	20,558	18,379	20,769	-1%	-1%	0%	-2%
History, Philosophy and Theology	19,652	20,441	17,302	20,374	-2%	2%	-1%	-1%
Social Sciences	16,538	16,396	14,987	17,086	-1%	2%	-1%	0%
Languages, Literature and	23,919	23,660	20,743	24,513	0%	2%	3%	0%
Education and Training	18,263	18,827	17,143	18,666	5%	4%	5%	4%
Preparation for Life and Work	17,042	16,252	15,883	17,251	2%	7%	4%	4%
Business, Administration and	19,557	19,672	18,030	20,074	5%	5%	5%	6%
All	19,162	18,693	17,050	19,823	3%	4%	4%	3%

Source: Frontier analysis of ILR-HMRC/DWP data

Average real earnings for the sample as a whole are £19,083 pre-learning and £19,681 post-learning, an increase of 3%.

As expected, male earnings are significantly higher than female earnings in both periods. Pre-learning, the average male was earning just under £7,000 more than the average female, and the gap widens to approximately £7,200 post-learning. Mean male earnings grew by 4% in real terms following achievement, from £23,237 to £24,079. Female earnings growth is more modest at 3% (from £16,345 to £16,800).

Annual earnings vary a great deal by subject area, they tend to be highest for achievers in Languages, Literature and Culture and lowest for those achieving in Science and Mathematics for both males and females.

There are also differences in the growth of average real earnings by subject area. Average earnings are constant for achievers in Social Sciences and decline by 1% in real terms for achievers in:

- Leisure, Travel and Tourism

- Arts, Media and Publishing

- History, Philosophy and Theology

All other subject areas have positive growth in mean real earnings but growth rates differ. The highest average earnings increases are seen in:

- Construction, Planning and Built Environment (9%)

- Engineering and Manufacturing Technologies (7%)

- Business, Administration and Law (5%)

- Preparation for Life and Work (4%)

Considering the other demographic groups of interest we find that:

- White British learners earn on average £19,162 (2.5% more than learners from ethnic minorities) in the period before entry to FE.

- Following achievement in FE, the earnings of white British learners grow by 3% to £19,728. Those of ethnic minorities grow by 4% from £18,693 to £19,449, which serves to narrow the gap to 1.4%.

- Learners in deprived areas earn £17,050 pre-learning, 14 % less than the average earned by achievers who do not live in deprived areas. Post-learning the gap between the two groups declines slightly to 13%

Employment

We use the full sample of all learners for the calculation of employment rates pre and post-learning. We present 3 different statistics illustrating the employment histories and outcomes of FE achievers:

- Average number of months worked

- Proportion of sample who were in employment for at least 11 months

- Proportion of sample in employment 6 months before/after course

On average, FE achievers are in employment for 6.74 months before learning but this increases to 8.19 months afterwards. Time in employment varies a great deal by subject area both before and after learning. Achievers in Education and Training were in employment for 8.4 months post-learning which is more than twice as long as the average post-learning employment for a Social Sciences achiever. This huge difference is largely a consequence of differences in learner characteristics such as age: the average age of Education and Training learners is 37.5 years, over 16 years older than the average age of a Social Sciences learner.

In terms of employment rates, the proportion of learners in work increases from an average of 56% 6 months before learning to 68% 6 months post-learning. Again, these large increases in employment rates are at least partly caused by young learners entering the labour market. Not surprisingly, pre-learning employment rates tend to be lowest in subject areas with a high concentration of young learners like Social Sciences (33% in employment 6 months pre-learning) for example. Employment rates for learners in this subject area almost double to 61% six months post-learning. This example illustrates why the average statistics presented in the tables below must be interpreted in the context of sample composition.

In order to illustrate the impact of age on employment rates, we present a separate table showing the employment rates of individuals aged 19 or more below. As expected, excluding learners aged 16 to 18 from the sample has the effect of increasing all average employment indicators, particularly pre-learning. This exclusion also reduces the changes in the employment indicators dramatically. Nonetheless, employment is improving following training for all subject areas but improvements are largest in Preparation for Life and Work: employment 6 months post-learning is 10 percentage points higher than its pre-learning level at 63%, but is still among the lowest in the sample.

Table 22: Employment rates before and after learning (FE)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	55%	64%	65%	73%	7.78	8.81
Science and Mathematics	28%	48%	37%	62%	4.52	7.56
Agriculture, Horticulture and Animal Care	45%	55%	54%	66%	6.58	7.94
Engineering and Manufacturing Technologies	50%	62%	60%	72%	7.23	8.65
Construction, Planning and Built Environment	44%	56%	55%	67%	6.60	8.04
Information and Communication Technology	47%	56%	56%	66%	6.77	7.91
Retail and Commercial Enterprise	47%	57%	58%	69%	6.95	8.23
Leisure, Travel and Tourism	42%	58%	52%	70%	6.29	8.46
Arts, Media and Publishing	33%	48%	43%	61%	5.25	7.42
History, Philosophy and Theology	31%	46%	40%	60%	4.85	7.23
Social Sciences	23%	46%	33%	61%	4.04	7.45
Languages, Literature and Culture	51%	60%	59%	70%	7.10	8.42
Education and Training	61%	70%	70%	78%	8.42	9.35
Preparation for Life and Work	39%	51%	50%	61%	6.02	7.38
Business, Administration and Law	53%	65%	62%	75%	7.49	9.04
All	46%	58%	56%	68%	6.74	8.19

Frontier analysis of FE-HMRC/DWP data. All FE achievers.

Table 23: Employment rates before and after learning (FE 19+)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	61%	67%	71%	75%	8.55	8.98
Science and Mathematics	55%	59%	66%	69%	7.86	8.26
Agriculture, Horticulture and Animal Care	56%	60%	66%	68%	7.91	8.19
Engineering and Manufacturing Technologies	61%	66%	71%	74%	8.55	8.88
Construction, Planning and Built Environment	56%	60%	67%	69%	8.01	8.22
Information and Communication Technology	53%	59%	63%	67%	7.48	8.03
Retail and Commercial Enterprise	56%	60%	67%	70%	8.08	8.37
Leisure, Travel and Tourism	59%	64%	69%	73%	8.32	8.80
Arts, Media and Publishing	51%	55%	61%	63%	7.31	7.59
History, Philosophy and Theology	54%	55%	64%	62%	7.60	7.54
Social Sciences	50%	54%	60%	62%	7.28	7.54
Languages, Literature and Culture	63%	66%	71%	73%	8.49	8.78
Education and Training	61%	71%	71%	78%	8.46	9.37
Preparation for Life and Work	42%	53%	53%	63%	6.42	7.50
Business, Administration and Law	66%	72%	75%	79%	8.97	9.49
All	55%	62%	65%	70%	7.85	8.42

Frontier analysis of FE-HMRC/DWP data. All FE achievers.

Benefit spells

In this section we describe the benefit histories and outcomes of the full FE sample. Similar to the way in which we describe employment we present several measures of benefit histories and outcomes:

- Average number of months on benefits in the 12 months before and after training (after the 3 month 'buffer' between employment and training)

- Proportion of sample on benefits 6 months before and after course

- Proportion of sample claiming benefits at any point before/after course

- Length of time on benefits – numbers claiming for 11 months plus

The types of benefit included in our measure are Income Support (IS), Job Seeker's Allowance (JSA) and Incapacity Benefit (IB). The average length of time during which the average FE achiever was claiming one of the above benefits stands at one and a half months pre-learning and decreases to 1.34 months post-learning. We include all FE

achievers in the calculation of these statistics. Excluding young learners (aged 16-18) from the sample increases the average duration of benefit claims to just under 2 months.

Figure 19: Duration of benefit spells by subject area, all FE achievers
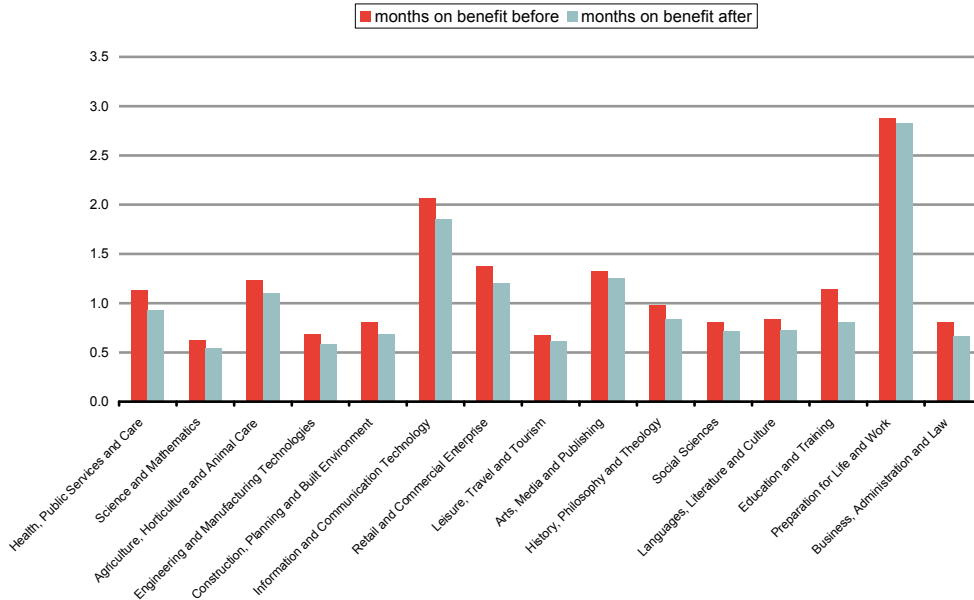
Frontier analysis of FE-HMRC/DWP data. All FE achievers.

Next we consider the proportion of the sample claiming a benefit at fixed points in time before and after the learning spell. Our calculations reveal that the proportion of FE learners on benefits 6 months before and 6 months after and 3 months before and after the course are 12% and 11% respectively. Overall 17% of all FE learners claimed some sort of benefit during any of the 12 months pre-learning. Post-learning, the corresponding number was 15%.

There were 221,375 learners who were claiming a benefit for all 12 months before the course and 204,844 after. 159,918 were claiming benefits continuously in both periods. Of those, 44% are achievers in Preparation for Life and Work.

Table 24: Benefit spells before and after learning (FE)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	15%	12%	9%	8%	10%	8%
Science and Mathematics	8%	7%	5%	5%	5%	5%
Agriculture, Horticulture and Animal Care	15%	13%	10%	9%	10%	9%
Engineering and Manufacturing Technologies	11%	9%	6%	5%	6%	5%
Construction, Planning and Built Environment	13%	11%	7%	6%	7%	6%
Information and Communication Technology	23%	20%	17%	16%	17%	15%
Retail and Commercial Enterprise	17%	15%	11%	10%	12%	10%

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Leisure, Travel and Tourism	9%	8%	6%	5%	6%	5%
Arts, Media and Publishing	15%	14%	11%	11%	11%	10%
History, Philosophy and Theology	11%	9%	8%	7%	8%	7%
Social Sciences	9%	9%	6%	6%	7%	6%
Languages, Literature and Culture	10%	8%	7%	6%	7%	6%
Education and Training	14%	10%	9%	7%	9%	7%
Preparation for Life and Work	30%	29%	23%	24%	24%	24%
Business, Administration and Law	10%	9%	7%	6%	7%	6%
All	17%	15%	12%	11%	12%	11%

Frontier analysis of FE-HMRC/DWP data. All FE achievers.

As before, excluding achievers aged 16-18 causes all measures of benefits to increase. The proportion of adult learners on benefits (6 months after learning ended) declines from 16% to 14%.

Table 25: Benefit spells before and after learning (FE 19+)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	17%	13%	11%	9%	11%	8%
Science and Mathematics	20%	16%	13%	11%	13%	11%
Agriculture, Horticulture and Animal Care	19%	15%	13%	12%	14%	11%
Engineering and Manufacturing Technologies	14%	10%	7%	6%	7%	6%
Construction, Planning and Built Environment	17%	13%	9%	7%	9%	7%
Information and Communication Technology	27%	23%	19%	18%	20%	18%
Retail and Commercial Enterprise	21%	18%	15%	12%	15%	12%
Leisure, Travel and Tourism	14%	11%	9%	8%	9%	7%
Arts, Media and Publishing	26%	23%	20%	19%	21%	18%
History, Philosophy and Theology	24%	19%	18%	15%	18%	14%
Social Sciences	31%	26%	23%	20%	23%	19%
Languages, Literature and Culture	13%	10%	9%	8%	9%	8%
Education and Training	14%	10%	9%	7%	9%	7%
Preparation for Life and Work	34%	32%	26%	26%	27%	26%
Business, Administration and Law	13%	10%	8%	7%	9%	7%
All	22%	18%	15%	14%	16%	14%

Frontier analysis of FE-HMRC/DWP data. All FE achievers.

BL2 Achievers

BL2 consists of the lowest level achievers in the FE sample. This is the largest group of learners in the data set with 929,533 achievers including:

- SFL – learners following an aim which counts towards that participation target. These include Certificates in Adult Literacy, Numeracy, Key Skills in Communication and other subjects.

- BL2 – learners whose notional NVQ level is 1 but are not following an aim which counts towards the skills for life participation target.

Demographic characteristics

A summary of the main demographic characteristics of below level achievers are presented in the tables and figures below. Some of the key average statistics are summarised below:

- *Age*: The average age of BL2 achievers is 34 years. The share of learners aged less than 20 years is 15%

- *Gender*: 43% are male

- *Ethnicity*: 33% are from an ethnic minority

- *Deprivation*: 38% live in deprived areas

Sector subject area concentration

BL2 achievers are distributed very unevenly across the sector subject areas with over 70% of achievers concentrated in three subject areas.

- Preparation for Life and Work – 358,894 achievers. Virtually all Skills for Life achievers are in this subject area (285,866)

- Health, Public Services and Care – 172,452 achievers

- Information and Communication Technology – 117,659 achievers

The characteristics of BL2 achievers vary a great deal between subject areas. Virtually all (93%) BL2 achievers in Construction, Planning and Built Environment are male while 80% of Education and Training achievers are female. There are more ethnic minority achievers in Preparation for Life and Work than there are white British achievers. Almost half of learners in this group also live in a deprived area. For a more detailed summary of the key variables of interest see the tables and figures presented previously.

Table 26: FE Achievers characteristics and labour market history (FE BL2)

Subject area	Male	Ethnic minority	Aged 19+	Deprived area	Ever on benefits	Worked 11+months pre
Health, Public Services and Care	38%	17%	91%	32%	27%	55%
Science and Mathematics	37%	28%	73%	38%	36%	39%
Agriculture, Horticulture and Animal Care	48%	12%	85%	26%	38%	42%
Engineering and Manufacturing Technologies	77%	22%	72%	34%	24%	43%
Construction, Planning and Built Environment	93%	14%	53%	34%	27%	29%
Information and Communication Technology	33%	23%	94%	33%	39%	44%
Retail and Commercial Enterprise	24%	21%	77%	41%	32%	42%
Leisure, Travel and Tourism	67%	15%	82%	22%	19%	47%
Arts, Media and Publishing	27%	21%	91%	30%	37%	49%
History, Philosophy and Theology	29%	17%	94%	24%	33%	51%
Social Sciences	25%	17%	93%	36%	39%	51%
Languages, Literature and Culture	33%	20%	97%	19%	19%	61%
Education and Training	20%	19%	94%	42%	40%	41%
Preparation for Life and Work	46%	54%	75%	48%	43%	34%
Business, Administration and Law	30%	28%	86%	35%	32%	46%
All	43%	33%	86%	38%	35%	43%

Frontier analysis of FE-HMRC/DWP data. BL2 FE achievers

Figure 20: Demographic characteristics (BL2) relative to whole FE sample
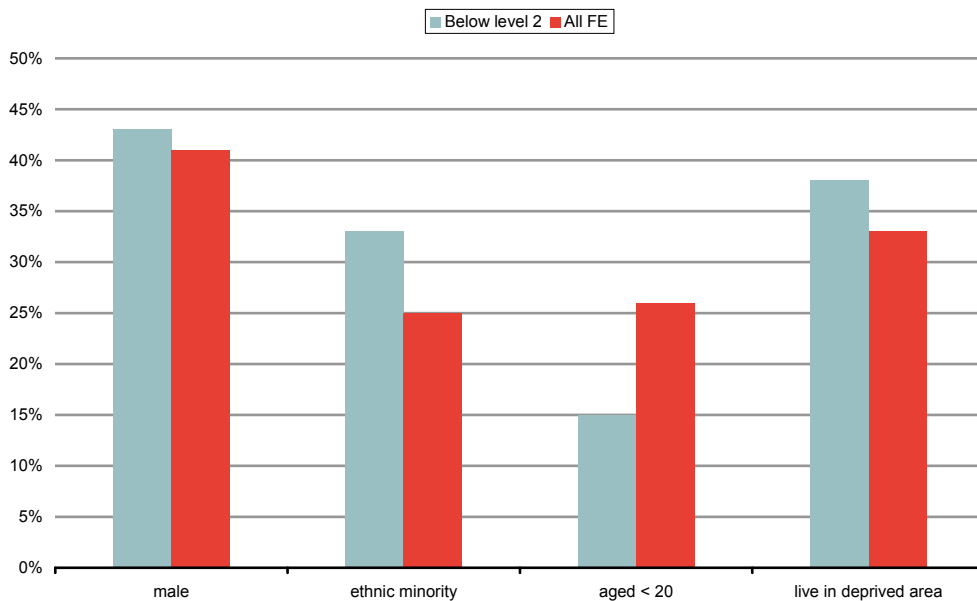
Frontier analysis of FE-HMRC/DWP data. All BL2 achievers.

Figure 1: Number of achievers by subject area (FE BL2)
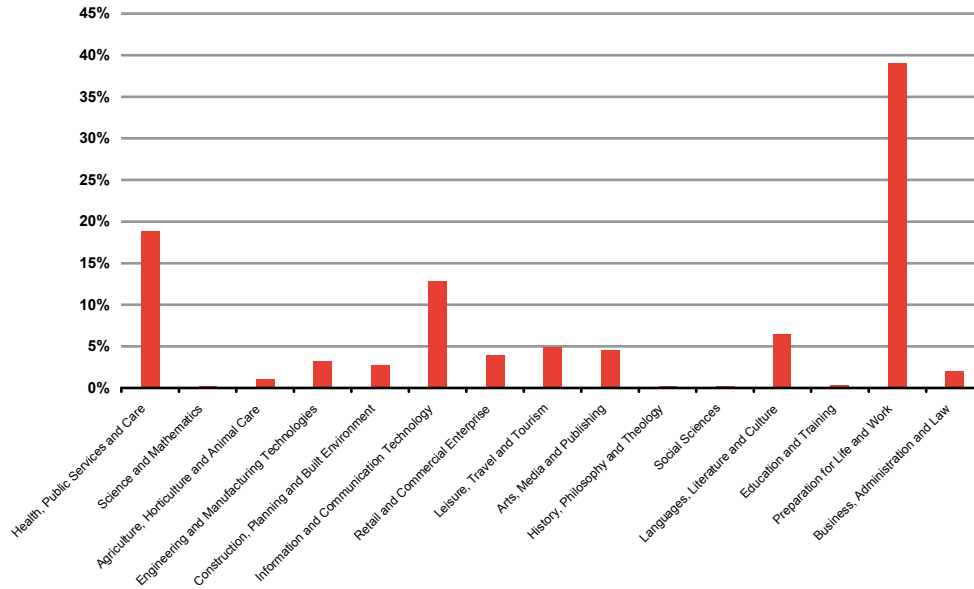
Frontier analysis of FE-HMRC/DWP data. All BL2 achievers.

Earnings

The average earnings of BL2 achievers are summarised in the table below and graphically in Figure 22 below. These average earnings are calculated using the full sample of BL2 achievers including zeros and outliers, which causes the average to be low.

Table 27: Mean earnings pre-learning (FE BL2)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	172,452	11,030	11,735	30%	27%
Science and Mathematics	1,332	7,023	7,502	53%	43%
Agriculture, Horticulture and Animal Care	9,690	8,766	8,874	49%	44%
Engineering and Manufacturing Technologies	28,799	11,474	12,435	39%	28%
Construction, Planning and Built Environment	24,371	6,947	8,557	50%	31%
Information and Communication Technology	117,659	7,822	8,049	44%	40%
Retail and Commercial Enterprise	35,872	6,209	7,092	40%	32%
Leisure, Travel and Tourism	44,301	14,926	15,659	32%	26%
Arts, Media and Publishing	41,181	9,007	8,955	47%	45%
History, Philosophy and Theology	2,017	10,102	9,677	42%	41%
Social Sciences	1,893	8,814	9,462	41%	39%
Languages, Literature and Culture	59,540	15,173	15,176	29%	29%

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Education and Training	2,554	6,245	6,467	45%	41%
Preparation for Life and Work	358,894	4,258	5,692	56%	48%
Business, Administration and Law	18,540	8,744	9,361	38%	31%
All	919,095	7,962	8,839	44%	38%

Frontier analysis of FE-HMRC/DWP data. BL2 FE achievers

Figure 22: Mean earnings pre and post-learning by subject area (FE BL2)
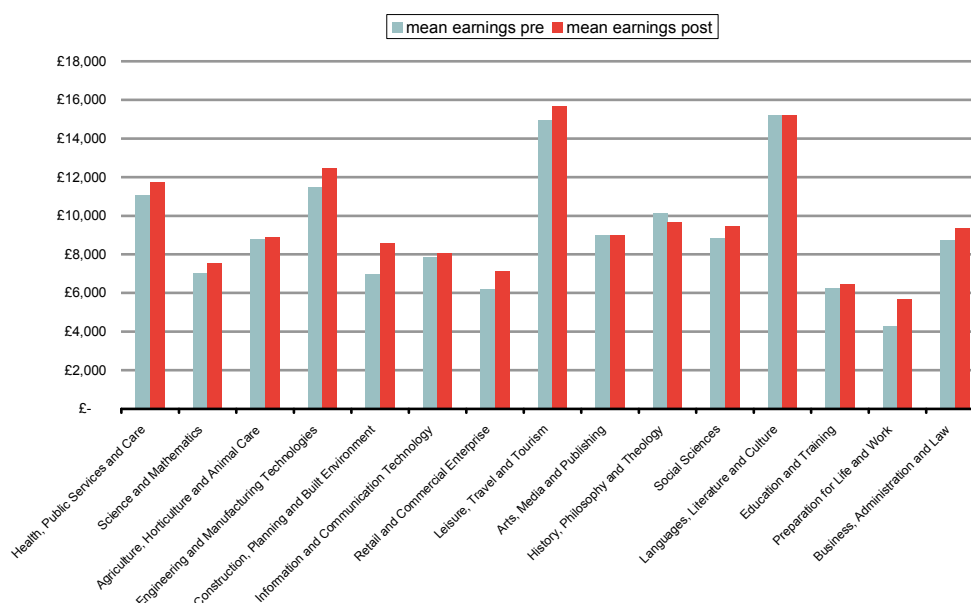
Frontier analysis of FE-HMRC/DWP data. All BL2 achievers.

The presence of zero earning entries in the sample was discussed in the preceding section of this chapter. In summary, low average earnings can be a reflection of one or more of the following:

- Individuals who were unemployed pre-learning (at least some of whom were claiming some sort of benefit)

- Individuals who were not in work for other reasons

- Individuals who were in education before starting FE

- Individuals   working part time

- Individuals who are self-employed and employed at the same time (P14 data does not cover the earnings of self-employed individuals)

The number of BL2 learners with zero pre-earnings varies by subject area and is likely to cause at least some of the average earnings difference between subject areas. Figure 23 below plots average subject area salaries against the share of learners with zero earnings before training. It is apparent that subject areas with low average earnings are associated with high proportions of zero earnings and conversely high earnings are correlated with relatively low shares of zero earnings. Another possible reason why earnings vary by subject area is that learners in different subject areas have different characteristics. For example, the average age in Information and Communication Technology is 40 years but only 25 in Construction, Planning and built Environment. Similarly, almost all achievers in the latter are male while 67% of the former are female. Clearly, such huge differences in learner composition can have a significant effect on earnings levels.

Figure 23: Mean earnings and proportion of achievers with zero earnings pre-learning (FE BL2)
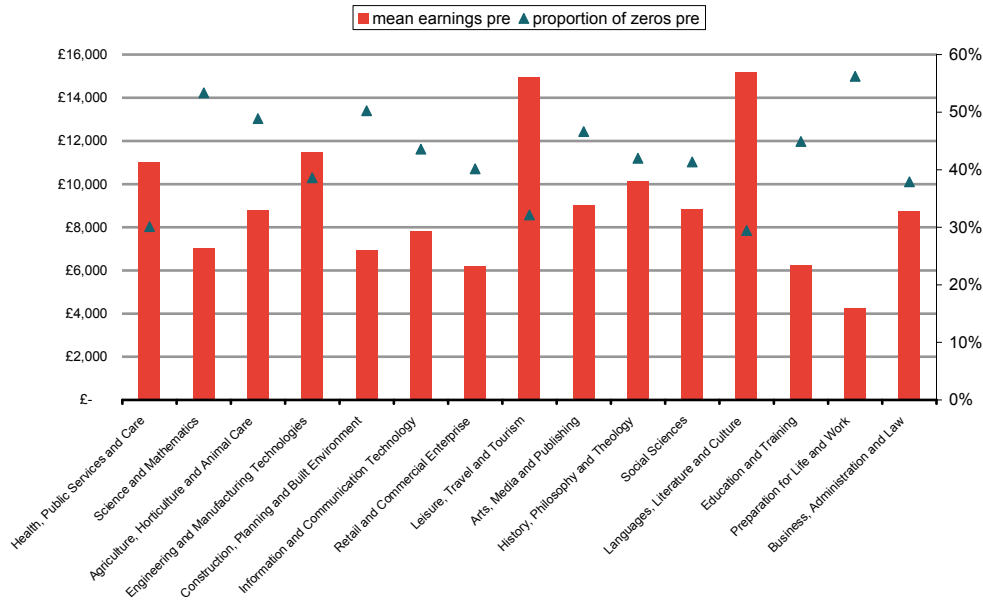
Frontier analysis of FE-HMRC/DWP data. All BL2 achievers.

In order to make more precise comparisons of earnings across subject areas and to analyse earnings growth over time, we consider it necessary to remove very high and low earnings, as well as zeros. 408,996 achievers learning BL2 (45% of the sample) had zero earnings prior to learning. Post-learning, the number fell to 352,976 (38% of the sample).

Of the 408,996 learners with zero pre-training earnings, 269,762 (66%) were not employed in the 12 months pre-learning. Their characteristics are:

- 81,329 were claiming benefits for longer than 11 months pre-learning, 102,082 were claiming benefits for at least some time during that period

- 33% of the remaining 167,680 who did not claim any benefits are young learners aged 18 or less

The remaining 139,234 learners have zero pre-training earnings and some employment record in the 12 months preceding learning. In fact 97,852 individuals worked in every month of the year preceding learning but have zero recorded earnings. There are various reasons why these individuals appear to be in work yet are not earning anything. We outline the possible reasons for this anomaly in section 5.2 of this report. For example, employees who do not earn more than the personal allowance threshold do not necessarily appear in the P14 data. We have retained these individuals in the descriptive analysis.

We have shown that due to the large number of learners with zero recorded earnings, the raw averages appear to be very low. In what follows we apply a series of rules aimed at directing the focus of the analysis towards learners who are in continuous full-time work. We apply two rules which are described below:

- Exclude obvious outliers from the sample such as zero earnings and earnings over £80,000.

- Exclude learners who were out of work for at least a month either side of the learning window, then exclude individuals earning below £400 per month worked.

The effect of these restrictions on the sample used to analyse pre-training earnings can be summarised in Figure 24 overleaf. We start off with a sample size of 919,095 individuals and end up with approximately 23% of that total. The application of these restrictions has almost exactly the same effect on the sample of pre-training and post-training earnings.

Whilst these rules reduce sample sizes quite dramatically, they are necessary in order to capture genuine wage changes rather than changes in earnings caused by a shift in number of months/hours worked for example. Whilst the removal of zero earnings from the sample excludes unemployed individuals, it does not address the possibility of part-time workers biasing average earnings downwards. This is the reason why we apply the second rule in an attempt to identify the earnings of only those individuals in full time work. Because females are much more likely than males to be in part-time employment we present separate statistics for men and women. We consider changes in male earnings to be more robust and easily interpretable.

Figure 24: Effect of filtering earnings on sample size pre and post-learning (FE BL2)
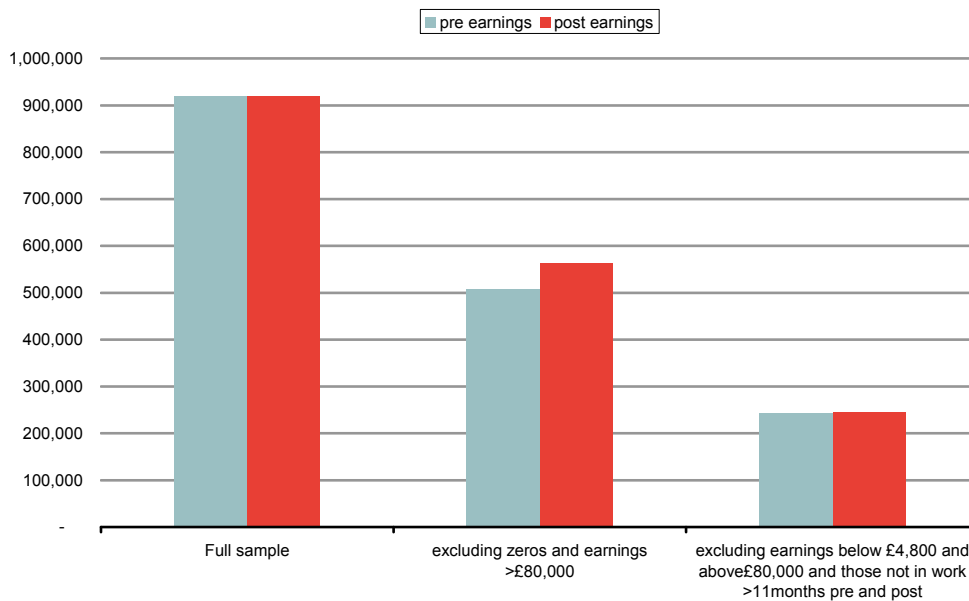
 Frontier analysis of FE-HMRC/DWP data. BL2 achievers.

The removal of individuals with zero earnings from the sample causes average real earnings to increase substantially from £7,962 and £8,839 to £13,628 and £13,748 pre and post-learning.

Considering only individuals in employment for a minimum of 11 months either side of the learning window and earning at least £400 per month worked, increases average earnings further to £20,130 pre-learning and £20,568 post-learning.

Annual earnings vary a great deal by subject area. The next section of this chapter presents a detailed description of earnings by demographic group and subject area.

Filtered earnings

So far we have analysed the earnings of all BL2 achievers. We have shown that in order to have reliable earnings data it is necessary to exclude a large proportion of the sample from the analysis. In this section of the chapter we focus our analysis on the sub-sample of BL2 achievers whose earnings data we consider reliable. These are individuals in employment for at least 11 months before and after learning whose annual salaries were in the range £4,800 - £80,000. We analyse the earnings of different demographic groups and differentiate by subject area. The demographic groups we focus on are defined on the basis of:

- Gender

- Age

- Ethnicity

- Level of deprivation

Figure 25: Filtered earnings sample sizes by subject area (FE BL2)
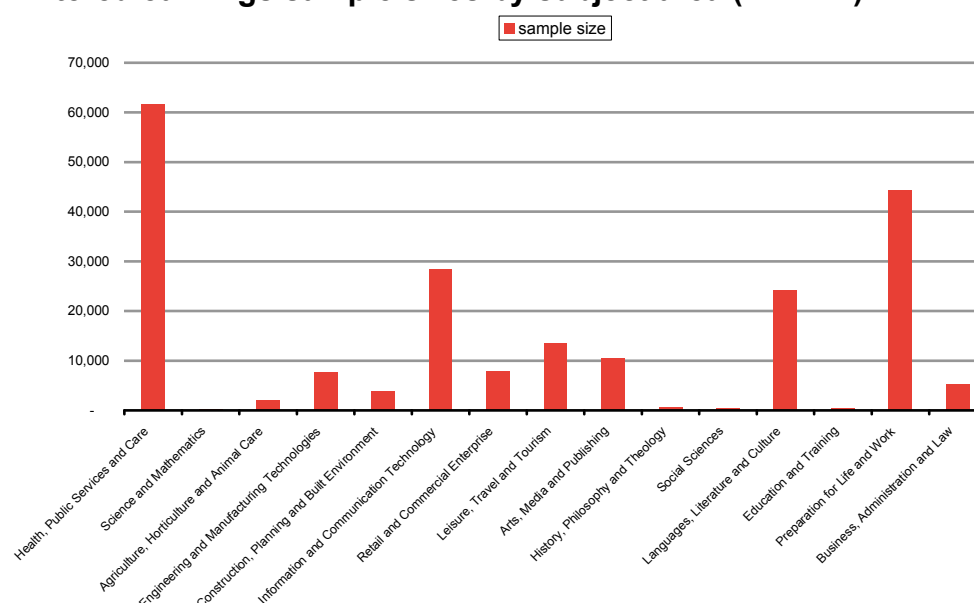
Frontier analysis of FE-HMRC/DWP data. BL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum

In the previous section of this chapter we showed that excluding outliers and individuals not in work for the full year pre- and post-learning has the effect of reducing the overall size of the sample to just over a quarter of its original size: from over 910,000 to just over 240,000. Figure 25 above shows how sample sizes vary by subject area. The variation in numbers is very large indeed with samples ranging from 284 in Social Sciences to 70,147 in Health Public Services and Care. A further breakdown of the data by demographic group is presented in the tables that follow. Cells with samples smaller than 100 achievers are highlighted in grey. Four subject areas have a number of cells with small numbers of observations – Science and Mathematics, History Philosophy and Theology, Social Sciences and Education and Training.

Table 28: Sample size for filtered earnings calculation by subject area and demographic group (FE BL2)

Subject	Men	Women	White	Ethnic minority	Not deprived	Deprived	Age 19+	All
Health, Public Services and Care	29,469	40,678	61,324	8,823	52,004	18,143	68,457	70,147
Science and Mathematics	80	204	242	42	219	65	267	284
Agriculture, Horticulture and Animal Care	1,008	1,511	2,219	300	2,124	395	2,464	2,519
Engineering and Manufacturing	6,443	2,359	7,147	1,655	6,331	2,471	8,284	8,802
Construction, Planning and Built Environment	4,108	494	4,005	597	3,392	1,210	4,133	4,602
Information and Communication Technology	10,271	22,518	27,516	5,273	24,912	7,877	32,139	32,789
Retail and Commercial Enterprise	2,189	7,389	7,907	1,671	6,075	3,503	9,127	9,578
Leisure, Travel and Tourism	11,756	5,232	15,014	1,974	14,131	2,857	16,406	16,988

Arts, Media and Publishing	2,766	8,742	9,587	1,921	9,296	2,212	11,329	11,508
History, Philosophy and Theology	180	475	560	95	552	103	645	655
Social Sciences	139	455	515	79	448	146	581	594
Languages, Literature and Culture	8,992	16,489	21,380	4,101	21,346	4,135	25,317	25,481
Education and Training	98	485	502	81	420	163	569	583
Preparation for Life and Work	23,895	27,447	28,287	23,055	31,515	19,827	48,734	51,342
Business, Administration and Law	1,811	4,287	4,968	1,130	4,483	1,615	5,875	6,098
All	103,205	138,765	191,173	50,797	177,248	64,722	234,327	241,970

Frontier analysis of FE-HMRC/DWP data. BL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum

Table 29: Mean filtered earnings by demographic group (FE BL2)

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	20,383	20,486	25,390	16,755	3%	3%	3%	3%
Science and Mathematics	20,151	20,356	27,247	17,368	2%	3%	1%	3%
Agriculture, Horticulture and Animal Care	21,885	22,028	24,996	19,810	2%	2%	3%	1%
Engineering and Manufacturing	23,224	23,612	25,358	17,396	3%	3%	3%	4%
Construction, Planning and Built Environment	23,218	24,073	23,737	18,903	2%	3%	2%	1%
Information and Communication	18,110	18,174	23,284	15,751	1%	0%	1%	1%
Retail and Commercial Enterprise	14,977	15,007	19,785	13,552	3%	3%	1%	3%
Leisure, Travel and Tourism	26,363	26,657	29,333	19,689	0%	0%	-1%	3%
Arts, Media and Publishing	21,733	21,827	26,982	20,073	1%	2%	2%	1%
History, Philosophy and Theology	20,899	20,989	25,511	19,152	-1%	-1%	5%	-3%
Social Sciences	19,884	20,030	25,859	18,058	5%	5%	2%	6%
Languages, Literature and Culture	24,263	24,302	30,172	21,040	1%	2%	1%	2%
Education and Training	16,614	16,617	23,318	15,260	0%	0%	9%	-2%
Preparation for Life and Work	16,853	19,386	19,260	14,757	4%	2%	5%	4%
Business, Administration and Law	18,851	18,991	24,986	16,260	1%	1%	0%	2%
All	20,130	21,084	24,472	16,900	2%	2%	2%	2%

Source: Frontier analysis of ILR-HMRC/DWP data

On average, BL2 achievers earned £20,130 before learning and £20,568 afterwards. There is a large amount of variation in the levels of earnings by subject area. The highest earning group pre-learning are Leisure, Travel and Tourism learners whose average

annual salary at £26,363 is more than £11,000 (or 76%) higher than the average salary of Retail and Commercial Enterprise learners.

The average post-learning salary is £20,568 or 2% higher than the average pre-learning salary in real terms. Real earnings grew at different rates in the different subject areas and demographic groups.

- High growth in Preparation for Life and Work (4% in real terms)

- Negative growth in History, Philosophy and Theology (-1%)

Figure 26: Growth in filtered earnings by subject area (FE BL2)
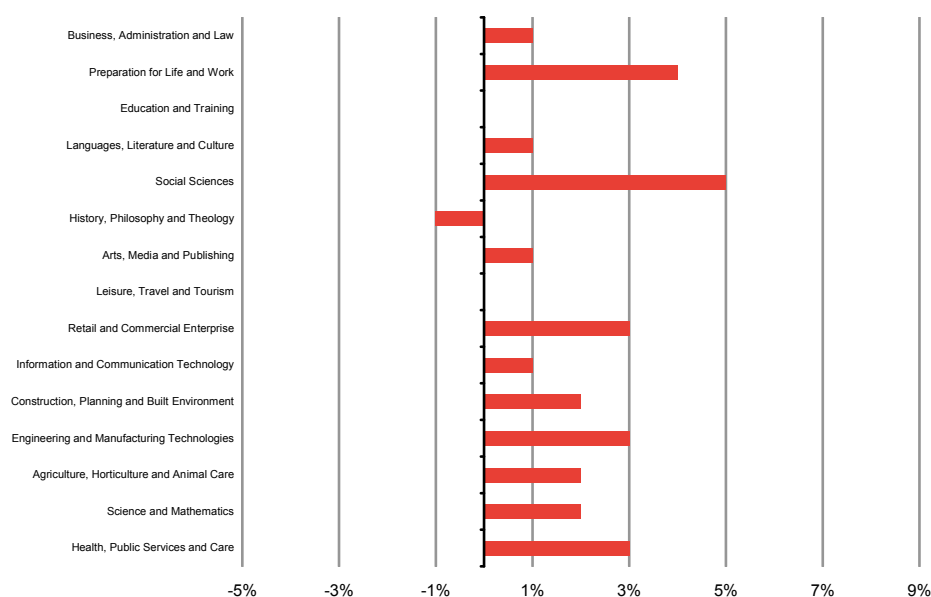
Frontier analysis of FE-HMRC/DWP data. BL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum

Next we present the average earnings of the other demographic groups of interest by subject area.

Table 30: Mean filtered earnings by demographic group (FE BL2)

Study area	Before training				% change			
	White	Ethnic minority	White	Ethnic minority	White	Ethnic minority	White	Ethnic minority
Health, Public Services and Care	20,422	20,111	17,983	21,220	3%	2%	4%	3%
Science and Mathematics	20,018	20,915	15,639	21,490	3%	0%	10%	1%
Agriculture, Horticulture and Animal Care	21,809	22,454	19,004	22,421	1%	3%	5%	1%
Engineering and Manufacturing Technologies	23,503	22,021	18,920	24,904	3%	2%	3%	3%

Study area	Before training				% change			
	White	Ethnic minority	White	Ethnic minority	White	Ethnic minority	White	Ethnic minority
Construction, Planning and Built Environment	23,232	23,126	20,515	24,182	2%	2%	2%	2%
Information and Communication Technology	17,991	18,734	16,776	18,532	0%	2%	2%	0%
Retail and Commercial Enterprise	14,931	15,195	13,190	16,007	2%	4%	5%	2%
Leisure, Travel and Tourism	26,493	25,372	21,343	27,378	0%	2%	3%	0%
Arts, Media and Publishing	21,645	22,172	19,618	22,237	1%	2%	2%	1%
History, Philosophy and Theology	20,613	22,588	19,548	21,151	0%	-3%	-4%	0%
Social Sciences	19,645	21,437	16,212	21,080	5%	1%	11%	3%
Languages, Literature and Culture	24,203	24,578	21,443	24,809	1%	3%	4%	1%
Education and Training	16,430	17,759	16,116	16,808	2%	-10%	2%	0%
Preparation for Life and Work	17,465	16,101	15,998	17,391	2%	7%	4%	4%
Business, Administration and Law	18,648	19,745	16,960	19,533	1%	1%	1%	1%
All	21,002	20,599	18,019	21,863	2%	2%	3%	1%

Source: Frontier analysis of ILR-HMRC/DWP data

Figure 27: Growth in real earnings by subject area and demographic group (FE BL2)
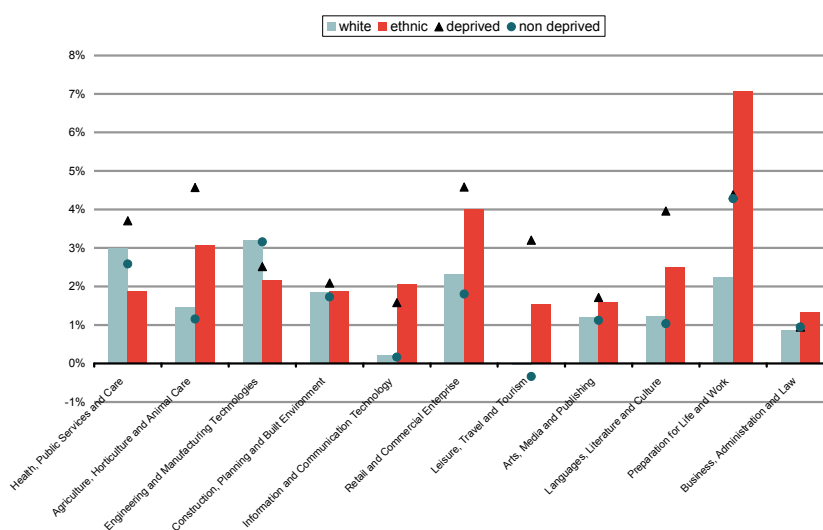
Frontier analysis of FE-HMRC/DWP data. BL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum

Figure 27 shows the growth in mean real earnings by subject area and demographic group excluding subject areas where sample sizes are smaller than 100 achievers in any of the demographic groups. Real earnings grow for most subject areas but at different rates. The highest proportional increase in real earnings is enjoyed by ethnic minority learners in Preparation for Life and Work whose earnings grew from £16,101 to £17,242, a 7% increase in real terms. Learners living in deprived areas see their average earnings increase faster than (or at least as fast as) the rest.

Employment

We present three different statistics illustrating the employment histories and outcomes of BL2 achievers:

- Average number of months worked

- Proportion of sample who were in employment for at least 11 months

- Proportion of sample in employment at a fixed point in time before and after course (6 months before/after course)

For the calculation of employment rates we use the full sample of BL2 achievers. In Figure 28 below we show the evolution of time in employment of BL2 achievers pre and post-learning by subject area. On average BL2 achievers were in employment for 6.82 months pre-learning. Following achievement in FE the average number of months employed increases to 7.83 months post-learning. Our calculations reveal that there is considerable variation in both the level and growth of months in employment by subject area.

Figure 28: Number of months worked pre and post-learning (FE BL2)
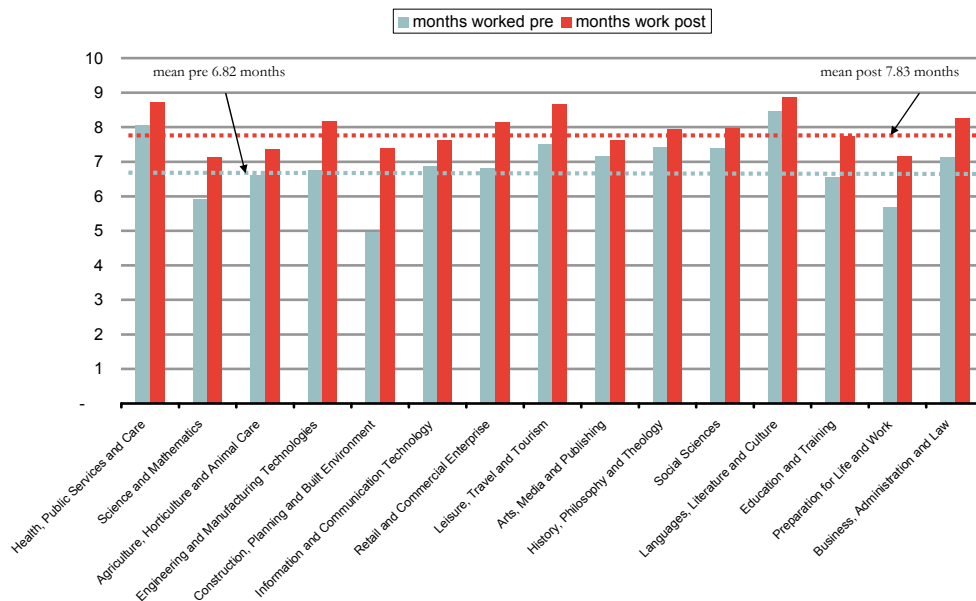
Frontier analysis of FE-HMRC/DWP data. BL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum

The longest employment spells are observed for achievers in Literature, Languages and Culture both pre and post-learning at 8.47 and 8.86 months respectively.

Learners in Construction, Planning and Built Environment have the shortest pre-learning employment spells with an average of just fewer than 5 months. However, average time in employment surges by almost 50% for this group compared to much more modest increases for the other subject areas.

These fluctuations in both levels and rates of growth of employment spells are caused largely by the differences in learner characteristics by subject area. For example, the group with the shortest employment spells pre-learning also happens to be the group with the lowest average age. For descriptive purposes, we plot average subject area age against average duration of employment pre-learning in the Figure below. It appears from the data that age could be a significant determinant of employment duration.

Figure 29: Average age and time in employment by subject area (FE BL2)
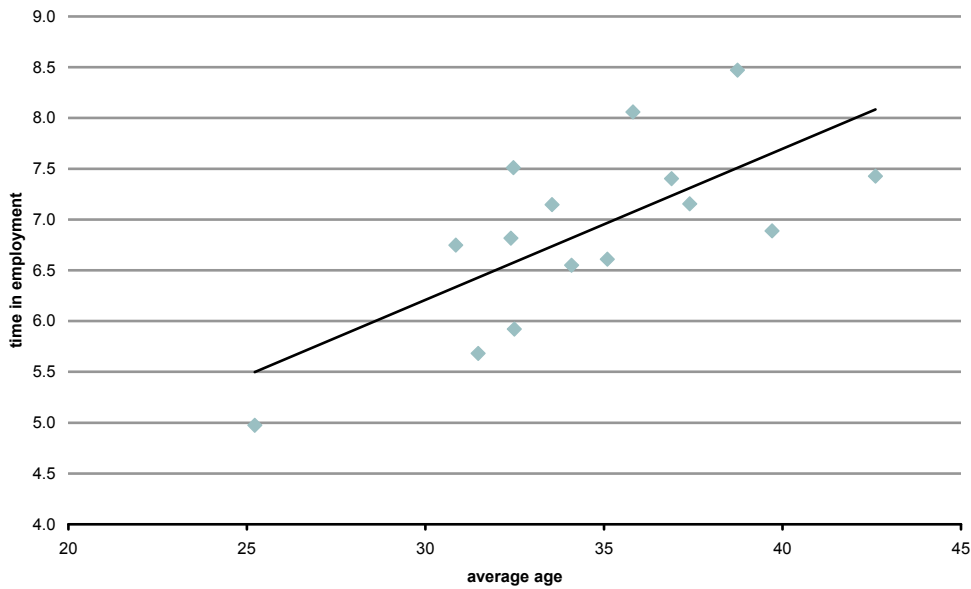
Frontier analysis of FE-HMRC/DWP data. All BL2 achievers.

In the tables below, we present other measures of employment such as the proportion of learners working for at least 11 months pre and post-learning as well as employment rates at fixed points in time pre and post-learning. All of these measures of employment show that employment increases for all subject areas post-learning. Employment rates increase from 56% 3 months pre-learning to 65% 3 months post-learning. Measuring employment rates at alternative pre and post-learning time points of 6 months does not have an effect on pre-employment and only a very modest effect on post-training employment, increasing it by one percentage point.

Table 31: Employment rates before and after learning (FE BL2)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	59%	64%	68%	73%	8.22	8.77

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Science and Mathematics	43%	50%	50%	59%	6.07	7.14
Agriculture, Horticulture and Animal Care	48%	53%	57%	61%	6.83	7.38
Engineering and Manufacturing Technologies	48%	57%	57%	68%	6.91	8.18
Construction, Planning and Built Environment	32%	48%	42%	62%	5.10	7.41
Information and Communication Technology	49%	55%	59%	64%	7.05	7.64
Retail and Commercial Enterprise	48%	58%	58%	68%	7.03	8.16
Leisure, Travel and Tourism	57%	63%	66%	72%	7.91	8.69
Arts, Media and Publishing	53%	56%	61%	64%	7.27	7.65
History, Philosophy and Theology	55%	60%	63%	66%	7.55	7.96
Social Sciences	54%	58%	63%	66%	7.51	7.97
Languages, Literature and Culture	63%	67%	71%	74%	8.55	8.86
Education and Training	46%	55%	57%	65%	6.79	7.77
Preparation for Life and Work	37%	50%	48%	60%	5.81	7.18
Business, Administration and Law	51%	59%	61%	69%	7.36	8.26
All	47%	56%	57%	65%	7.35	8.09

Frontier analysis of FE-HMRC/DWP data. BL2 achievers.

Table 32: Employment rates before and after learning (FE BL2 19+)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	63%	67%	72%	75%	8.67	8.96
Science and Mathematics	52%	57%	61%	63%	7.27	7.57
Agriculture, Horticulture and Animal Care	54%	57%	62%	64%	7.46	7.63
Engineering and Manufacturing Technologies	61%	64%	71%	72%	8.50	8.68
Construction, Planning and Built Environment	50%	54%	62%	63%	7.43	7.60
Information and Communication Technology	51%	56%	61%	64%	7.24	7.70
Retail and Commercial Enterprise	58%	64%	68%	72%	8.21	8.58
Leisure, Travel and Tourism	65%	68%	73%	76%	8.81	9.07
Arts, Media and Publishing	56%	58%	63%	65%	7.62	7.77
History, Philosophy and Theology	57%	61%	65%	66%	7.77	8.00
Social Sciences	57%	60%	65%	67%	7.82	8.06
Languages, Literature and Culture	65%	67%	73%	74%	8.70	8.92

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Education and Training	52%	60%	63%	69%	7.42	8.26
Preparation for Life and Work	44%	51%	52%	58%	6.24	6.93
Business, Administration and Law	57%	62%	67%	71%	8.00	8.50
All	57%	62%	66%	69%	7.97	8.31

Frontier analysis of FE-HMRC/DWP data. BL2 achievers.

Benefits

In this section we describe the benefit histories and outcomes of BL2 achievers. The types of benefit included in our measure are Income Support (IS), Job Seeker's Allowance (JSA) and Incapacity Benefit (IB).

Similar to the way in which we describe employment we present several measures of benefit histories and outcomes. These are:

- Average number of months on benefits before and after course

- Proportion of sample on benefits 6 months before and after course

- Proportion of sample claiming benefits at any point before/after course

- Proportion of sample claiming benefits for 12 months before/after course

Figure 30: Months on benefits pre and post-learning by subject area (FE BL2)
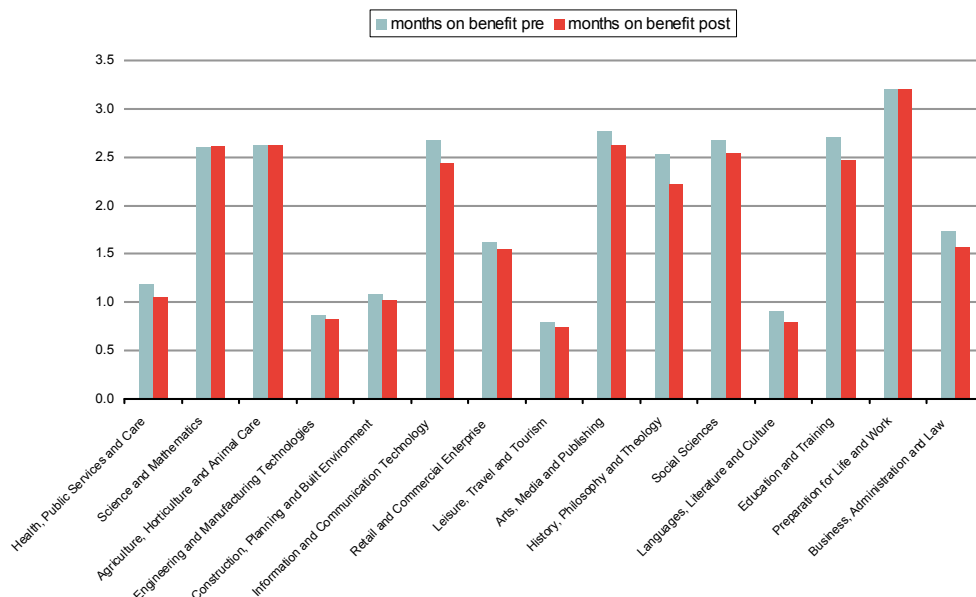
Frontier analysis of FE-HMRC/DWP data. All BL2 achievers.

We begin by considering time spent on benefits pre and post-learning for the sample as a whole as well as by sector subject area. On average, BL2 achievers were claiming benefits for 2.2 months pre and post-learning. The mean time on benefits fluctuates substantially across subject areas. On average, learners in Preparation for Life and Work spent 3.2 months on benefits pre-learning which is 4 times higher than the time learners in Leisure, Travel and Tourism spent claiming benefits. The average duration of benefit claims is lower post-learning for most subject areas, but the changes are very small.

This is consistent with the numbers presented in the table below which use alternative measures of benefit histories and outcomes, such as the proportion of the sample who claimed some benefit at a point in time before and after learning (first two columns) as well as the proportion of the sample on benefits at fixed time points pre and post-learning. Our calculations show that 24% of BL2 achievers claimed some benefit in the year preceding the course compared to 23% after the course. Again, this rate varies substantially across subject areas:

- It is highest for learners achieving in Preparation for Life and Work where 1 in 3 were benefit claimants both pre and post-learning.

- It is lowest for learners achieving in Leisure, Travel and Tourism where only 10% claimed a benefit in the 12 months pre-learning and 9% post-learning.

Columns 3 to 6 of the table present the proportion of learners on benefit at a given point in time. We use two time points relative to the learning window – 3 months pre/post and 6 months pre/post. The number of benefit claimants is remarkably stable over time. According to this measure around 18% of BL2 learners were on benefits before and after learning took place. Once again, the proportion of learners claiming benefits is highest for the subject area Preparation for Life and Work.

Table 33: Benefit spells before and after learning (FE BL2)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	15%	13%	10%	9%	10%	10%
Science and Mathematics	28%	27%	20%	22%	21%	20%
Agriculture, Horticulture and Animal Care	27%	27%	21%	22%	22%	21%
Engineering and Manufacturing Technologies	12%	11%	7%	7%	7%	7%
Construction, Planning and Built Environment	15%	15%	8%	9%	9%	8%
Information and Communication Technology	29%	26%	21%	21%	22%	21%
Retail and Commercial Enterprise	19%	17%	14%	13%	14%	14%
Leisure, Travel and Tourism	10%	9%	7%	6%	7%	7%
Arts, Media and Publishing	28%	26%	23%	22%	23%	23%
History, Philosophy and Theology	24%	22%	21%	19%	21%	21%
Social Sciences	27%	25%	22%	22%	22%	22%

Languages, Literature and Culture	11%	9%	7%	7%	8%	7%
Education and Training	29%	26%	21%	21%	23%	21%
Preparation for Life and Work	33%	33%	26%	27%	27%	26%
Business, Administration and Law	21%	18%	14%	13%	14%	14%
All	24%	23%	18%	18%	19%	18%

Frontier analysis of FE-HMRC/DWP data. BL2 FE achievers.

Table 34: Benefit spells before and after learning (FE BL2 19+)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	16%	13%	11%	9%	11%	9%
Science and Mathematics	36%	33%	27%	28%	28%	27%
Agriculture, Horticulture and Animal Care	31%	29%	25%	24%	25%	24%
Engineering and Manufacturing Technologies	16%	13%	9%	8%	10%	8%
Construction, Planning and Built Environment	27%	23%	15%	14%	16%	13%
Information and Communication Technology	30%	26%	22%	22%	23%	21%
Retail and Commercial Enterprise	23%	20%	17%	15%	17%	15%
Leisure, Travel and Tourism	12%	10%	8%	7%	8%	7%
Arts, Media and Publishing	30%	27%	25%	24%	25%	23%
History, Philosophy and Theology	26%	23%	22%	20%	22%	19%
Social Sciences	29%	26%	24%	23%	23%	22%
Languages, Literature and Culture	11%	9%	8%	7%	8%	7%
Education and Training	26%	22%	20%	19%	20%	18%
Preparation for Life and Work	54%	52%	46%	46%	47%	46%
Business, Administration and Law	23%	20%	16%	15%	16%	14%
All	24%	21%	18%	17%	18%	17%

Frontier analysis of FE-HMRC/DWP data. BL2 FE achievers.

SFL learners

Skills for Life learners are learners following an aim which counts towards the Skills for Life participation target. These include Certificates in Adult Literacy, Numeracy, Key Skills in communication and others. In this section we summarise the characteristics of SFL

learners separately from other BL2 learners because they are a distinctive group of BL2 learners.

Demographics

SFL learners are characterised by the following key demographic variables:

- *Age:* The average age of SFL achievers is 32 years , with 13% aged less than 20

- *Gender:* 45% of SFL achievers are male

- *Ethnicity:* There are more SFL achievers from ethnic minorities than there are white British achievers with 58%

- *Deprivation:* 48% of SFL achievers live in deprived areas

Figure 31: SFL learner demographics relative to FE as a whole (FE SFL)
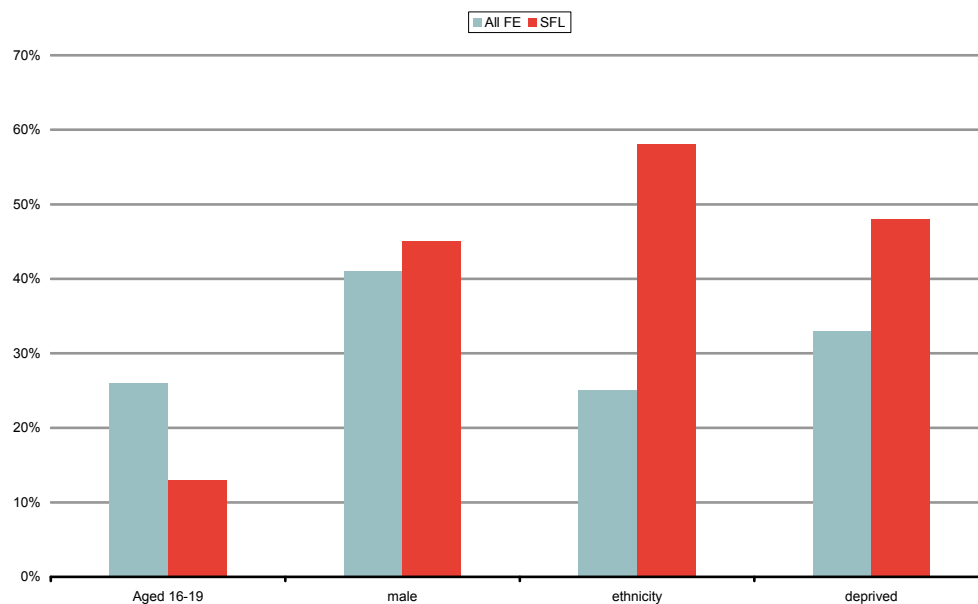
Frontier analysis of FE-HMRC/DWP data. SFL achievers and FE achievers.

The Figure above reveals that relative to the full FE sample, SFL achievers are older and much more likely to be deprived or from an ethnic minority than FE learners in general.

Subject area concentration

Virtually all SFL learners follow courses which fall under the Preparation for Life and Work subject area. There are 285,866 SFL achievers in total and 99.86% of those are in preparation for Life and Work.

Prior Attainment

The data set contains information on the previous qualifications of 38% of all SFL achievers. The prior attainment of SFL achievers is summarised in Figure 31 overleaf. SFL

achievers are likely to have no qualifications or have previous qualifications in the lower levels.

Figure 32: Prior attainment (FE SFL)
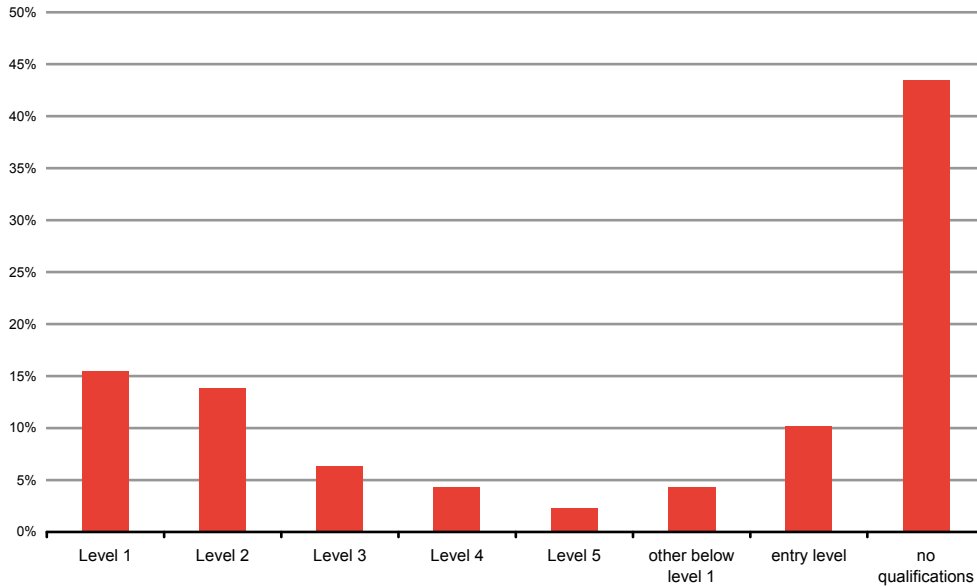
Frontier analysis of FE-HMRC/DWP data. SFL achievers.

Economic outcomes of SFL achievers pre and post-learning

We summarise the mean outcomes of SFL achievers pre and post-learning, differentiating by demographic group. Summarising the raw earnings data produces low averages due to the large proportion of zero earnings both pre- and post-learning. Just over half of the sample has no earnings pre-learning. This falls to 45% post-learning. The largest drop is seen in the group of young learners, from 58% to 35%. Mean earnings increase for all demographic groups following FE albeit from a very low base.

Columns 7 and 8 of Table 35 below present the employment rates of SFL achievers 6 months either side of the learning window. These are increasing for all demographic groups. On average, 48% of SFL achievers were employed before the course but this increases to 61% following achievement. Pre-learning white learners are more likely to be in employment than ethnic learners but this trend is reversed post-learning.

Table 35: Economic outcomes pre and post-learning (FE SFL)

Demographic group	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post	In work 6m pre	In work 6m post	Benefit 6m pre	Benefit 6m post
Male	128,324	5,374	7,159	51%	44%	45%	57%	22%	22%
Female	157,542	3,822	5,165	55%	46%	51%	64%	26%	25%
White	119,633	5,214	5,924	53%	48%	53%	58%	33%	33%
Ethnic minority	166,233	4,019	6,158	54%	43%	45%	63%	18%	17%

Demographic group	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post	In work 6m pre	In work 6m post	Benefit 6m pre	Benefit 6m post
Deprived	138,494	3,774	5,034	58%	50%	47%	58%	30%	29%
Not Deprived	147,342	5,219	7,024	49%	40%	50%	64%	19%	19%
Age 19+	249,570	4,850	6,238	53%	47%	50%	62%	26%	25%
All	285,866	4,519	6,060	53%	45%	48%	61%	24%	24%

Frontier analysis of FE-HMRC/DWP data. SFL achievers.

The proportion of SFL achievers claiming benefits is relatively stable following FE – approximately a quarter of the sample claim both before and after. Following achievement:

- Females are more likely to claim benefits than males

- White British learners are more likely to claim than non-white British learners

- Learners living in deprived areas are more likely to claim than those not living in deprived areas

- Adults are more likely to be benefit claimants than the sample as a whole

- Filtered   earnings

In Table 36 below we show the mean and median earnings of SFL achievers who were in continuous employment both before and after learning. We also exclude zero earnings and earnings under £4,800 and over £80,000 from this analysis.

Table 36: Filtered earnings (FE SFL)

Demographic group	Sample size pre	Sample size post	Mean earnings pre	Mean earnings post	% change	Median earnings pre	Median earnings post	% change
Male	20,186	20,358	18,785	19,894	6%	17,047	18,187	6%
Female	23,896	24,435	14,559	15,125	4%	12,574	13,170	5%
White	23,592	23,959	16,937	17,426	3%	14,904	15,393	3%
Ethnic minority	20,490	20,834	15,983	17,138	7%	14,104	15,337	9%
Deprived	17,227	17,427	15,880	16,643	5%	14,117	14,866	5%
Not Deprived	26,855	27,366	16,888	17,705	5%	14,782	15,703	6%
Age 19+	42,064	42,330	16,570	17,369	5%	14,661	15,482	6%
All	44,082	44,793	16,494	17,292	5%	14,506	15,360	5%

Frontier analysis of FE-HMRC/DWP data. SFL achievers. in continuous employment and earning between £4,800 and £80,000 per annum

Our calculations show that:

- Men earn approximately 30% more than women both before and after learning

- Ethnic minorities earn slightly less than their white counterparts, the differential is around 6% pre and 2% post-learning

- Learners living in deprived areas earn 6% less than those who do not

- Adult learners earn slightly more than the sample as a whole

Real earnings are growing for all demographic groups; both mean and median growth is 5%. Growth is particularly strong for achievers aged less than 19 whose mean earnings increase by 12% (median earnings increase even more, by 20%). This is also the demographic group in which the dispersion of earnings around the mean is highest, reflected in the high mean standard error statistics presented in the previous table. We show the growth in mean and median earnings of SFL achievers graphically below.

Figure 33: Filtered earnings growth (FE SFL)
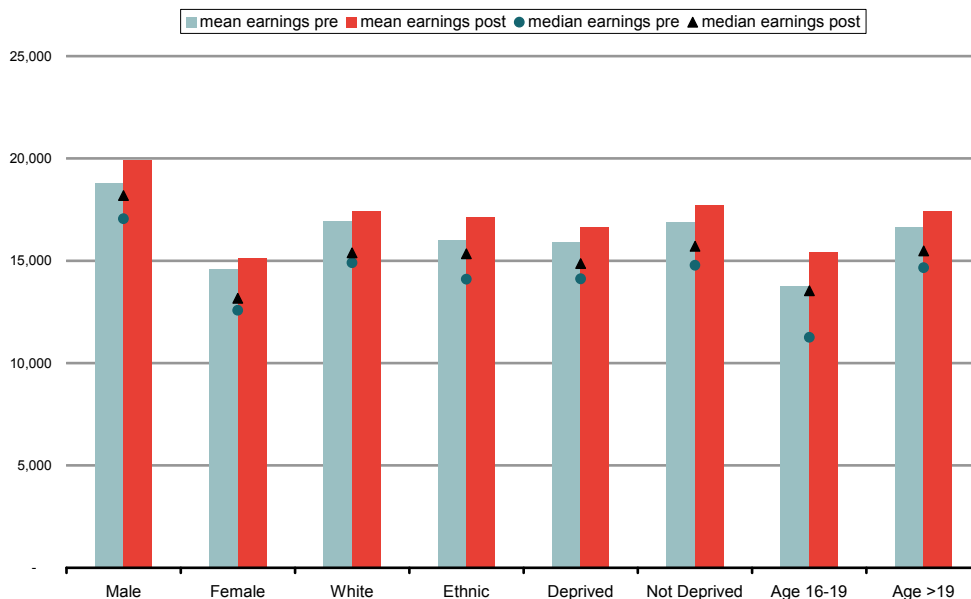
Frontier analysis of FE-HMRC/DWP data. SFL achievers. in continuous employment and earning between £4,800 and £80,000 per annum

L2 achievers

L2 achievers comprise learners whose notional NVQ level is 2. This category includes learners doing a FL2 qualification as well as those doing part L2 qualifications such as a single GCSE for example. FL2 achievers are learners who follow aims, the total width of which adds up to 100% or more of L2. The data set we constructed contains 813,236 L2 achievers of which 285,140 are FL2 achievers.

We begin this chapter by briefly describing all L2 achievers before going into a more detailed analysis of FL2 achievers.

L2 achiever demographic characteristics

- *Age:* The average age of L2 achievers is 32 years and the share of learners aged 16 to 19 is 22%

- *Gender:* 40% of L2 achievers are male

- *Ethnicity:* 80% are white British

- *Deprivation:* 34% live in deprived areas

Sector subject area concentration

L2 achievers are distributed more evenly across the sector subject areas relative to BL2 achievers. The 4 subject areas with the highest number of achievers account for 59% of L2 achievers. These are:

- Health, Public Services and Care – 215,822 achievers (27%)

- Retail and Commercial Enterprise – 95,485 achievers (12%)

- Preparation for Life and Work – 89,519 achievers (11%)

- Information and Communication Technology – 71,578 achievers (9%)

Prior attainment

Prior attainment is known for a half of L2 achievers, or 412,521 learners. Of those over a quarter have prior qualifications at level 1, a fifth have no qualifications and 40% have prior qualifications at L2 or L3 while 11% have L4+ or higher. The remaining 3% have entry level or BL1 prior attainment. These are described in Figure 34 overleaf.

Figure 34: Prior attainment (FE L2)
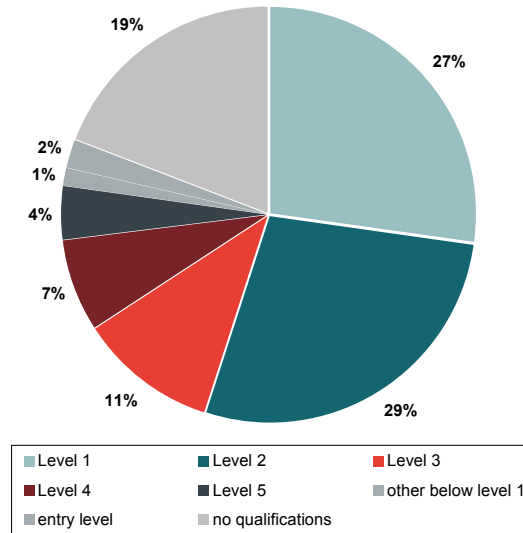
Frontier analysis of FE-HMRC/DWP data. L2 achievers with recorded prior attainment

Earnings

We begin by summarising the raw earnings data of all L2 achievers without differentiation by demographic group.

Our calculations show that on average, L2 achievers were earning £8,276 pre-learning and £9,470 post-learning. Again, the presence of large numbers of zero earnings in the raw data (due to reasons discussed in previous sections of this report, see p.57 for an overview) biases average earnings downwards. In the figure overleaf, we plot average and median earnings before and after learning by subject area. The raw data reveals that both average and median earnings fluctuate a great deal by subject area. Mean earnings are highest for achievers in Languages, Literature and Culture in both periods and lowest in Social Sciences. These earnings differentials are at least partly caused by differences in the demographic composition of learners by subject area such as age, gender and ethnicity. For example, the group with the highest average earnings is on average 5 years older than the group with the lowest average earnings. We present median earnings in order to take account of the dispersion of earnings within subject area which is indeed very substantial. Median earnings are very different from mean earnings reflecting the large number of zero earnings in the raw data. In fact, median earnings are zero for achievers in Social Sciences and Arts, Media and Publishing.

Figure 35: Earnings pre and post-learning (FE L2)
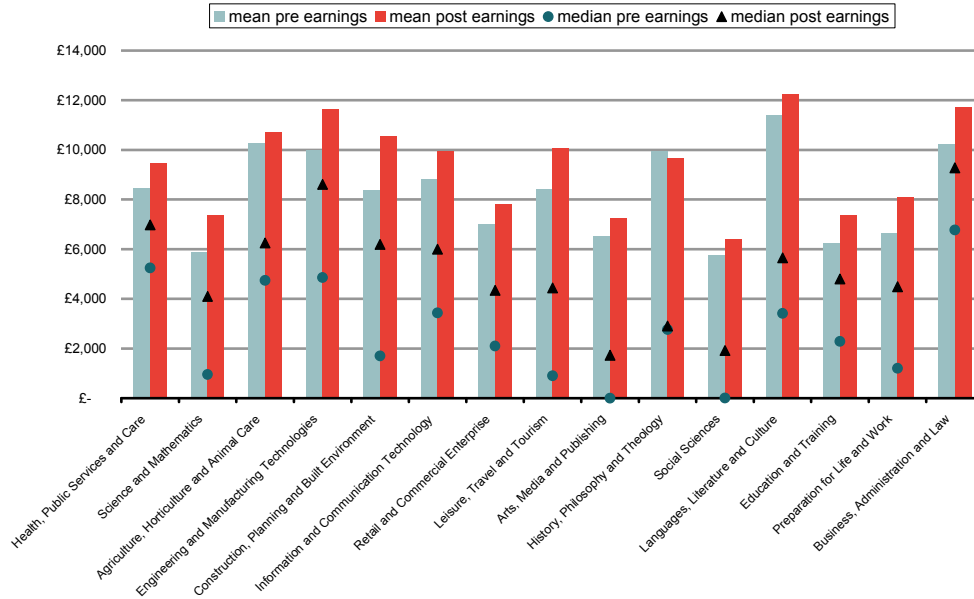
Frontier analysis of FE-HMRC/DWP data. All L2 achievers

Filtered earnings

In this section we analyse the dispersion of the earnings of achievers who were in work for at least 11 months either side of the learning window. We also exclude earnings below £4,800 and above £80,000 from this analysis. The average earnings resulting from these restrictions appear much closer to what one would expect. Pre-learning earnings are on average £17,969 and post-learning earnings are £18,465. Again there is variation in the levels of earnings across subject area. Languages, Literature and Culture are the subject area with the highest average at £23,313 pre-learning. In Figure 36 overleaf we plot the mean and median pre-earnings by subject area. In addition we also present the 25 and 75 percentiles of the subject area specific earnings distribution to take account of the dispersion of earnings.

Figure 36: Filtered earnings pre and post-learning (FE L2)
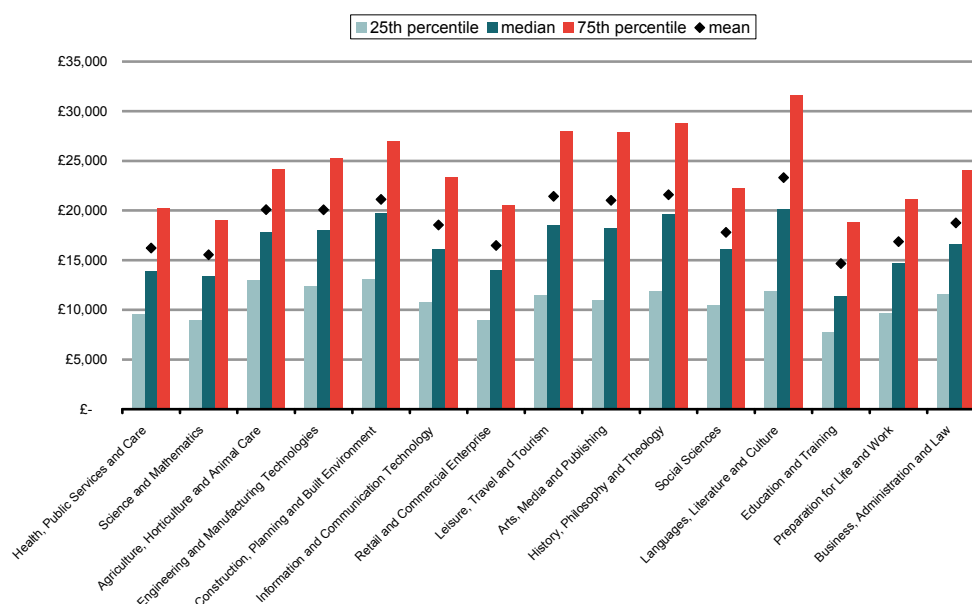
Frontier analysis of FE-HMRC/DWP data. All L2 achievers in continuous employment and earning between £4,800 and £80,000 per annum

Employment and benefits

We summarise the employment and benefits histories and outcomes of L2 achievers in the tables below. We present average time in work before and after as well as proportion of achievers in employment for the full year either side of the learning window and proportion of learners who claimed a benefit at any point in the 12 months either side of the learning window.

On average, L2 achievers were in work for 7.2 months pre and 8.5 months post-learning with the proportion in continuous employment also increasing from half to 60%. At the same time the proportion of L2 achievers claiming a benefit is 3 percentage points lower in the 12 months post-learning when 13% claimed a benefit compared to 16% pre-learning.

Table 37: Employment rates before and after learning (FE L2)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6months pre	In work 6months post	Months worked pre	Months worked post
Health, Public Services and Care	55%	65%	66%	74%	7.92	8.94
Science and Mathematics	43%	55%	53%	67%	6.35	8.10
Agriculture, Horticulture and Animal Care	51%	59%	61%	68%	7.33	8.22
Engineering and Manufacturing Technologies	50%	63%	60%	73%	7.29	8.71
Construction, Planning and Built Environment	42%	54%	54%	66%	6.52	7.89
Information and Communication Technology	51%	60%	60%	69%	7.21	8.32
Retail and Commercial Enterprise	47%	57%	58%	68%	7.04	8.20

Subject area	Worked 11months + pre	Worked 11months + post	In work 6months pre	In work 6months post	Months worked pre	Months worked post
Leisure, Travel and Tourism	40%	56%	51%	69%	6.19	8.28
Arts, Media and Publishing	37%	48%	46%	60%	5.58	7.25
History, Philosophy and Theology	54%	56%	61%	63%	7.31	7.58
Social Sciences	40%	49%	49%	61%	5.94	7.33
Languages, Literature and Culture	53%	61%	61%	70%	7.32	8.40
Education and Training	53%	67%	63%	76%	7.54	9.07
Preparation for Life and Work	46%	58%	56%	68%	6.69	8.16
Business, Administration and Law	58%	67%	67%	77%	8.01	9.19
All	50%	60%	60%	71%	7.21	8.48

Frontier analysis of FE-HMRC/DWP data. L2 achievers.

Table 38: Benefit spells before and after learning (FE L2)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	15%	11%	9%	7%	9%	7%
Science and Mathematics	14%	12%	9%	8%	9%	8%
Agriculture, Horticulture and Animal Care	13%	10%	8%	7%	8%	6%
Engineering and Manufacturing Technologies	11%	10%	6%	5%	6%	5%
Construction, Planning and Built Environment	14%	12%	7%	6%	7%	6%
Information and Communication Technology	20%	16%	13%	12%	14%	12%
Retail and Commercial Enterprise	17%	14%	11%	10%	11%	9%
Leisure, Travel and Tourism	11%	10%	7%	6%	7%	6%
Arts, Media and Publishing	18%	17%	13%	13%	14%	13%
History, Philosophy and Theology	21%	17%	16%	15%	16%	15%
Social Sciences	27%	25%	21%	20%	22%	20%
Languages, Literature and Culture	13%	11%	9%	8%	9%	8%
Education and Training	20%	15%	15%	12%	15%	11%
Preparation for Life and Work	20%	19%	14%	14%	15%	14%
Business, Administration and Law	12%	10%	8%	7%	8%	7%
All	16%	13%	10%	9%	10%	9%

Frontier analysis of FE-HMRC/DWP data. L2 achievers.

FL2 achievers

Having described the main characteristics of L2 achievers as a whole we now focus our attention on those who achieved FL2 qualifications.

FL2 achiever demographics

FL2 achievers are learners who follow learning aims at L2 (whose total width adds up to more than 100% of FL2) and achieve their aims with grades A* to C.

Figure 37: FL2 achiever demographics relative to FE as a whole (FE FL2)
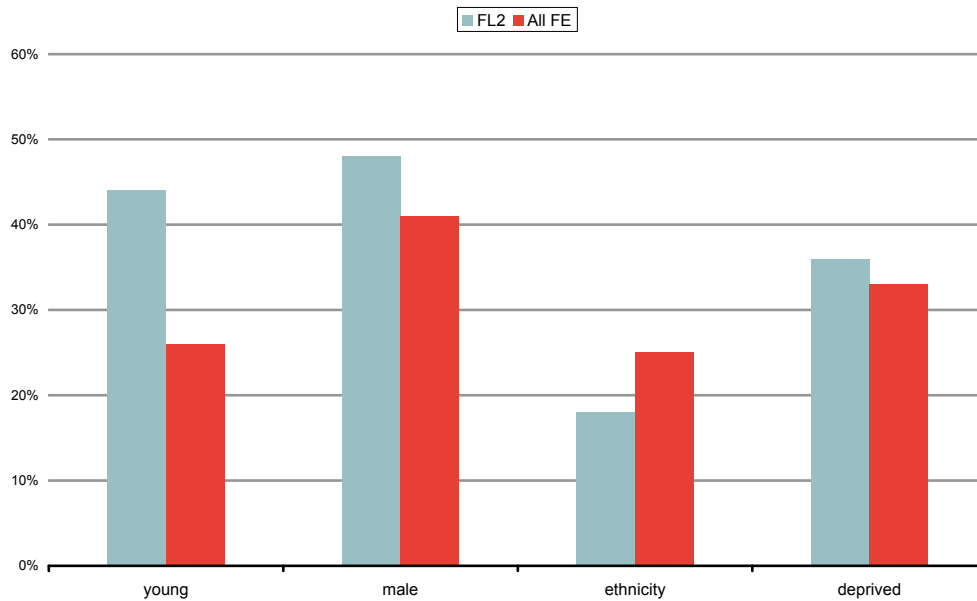
Frontier analysis of FE-HMRC/DWP data. FL2 achievers and FE achievers.

Relative to all FE achievers, FL2 learners are significantly younger, are more likely to be male or live in a deprived area and less likely to be from an ethnic minority. Some of the key demographic characteristics of the 285,140 FL2 achievers are summarised below:

- *Age:* FL2 achievers are very young with an average age of 27 years and the share of achievers aged 16-19 is 44%

- *Gender:* 48% of FL2 achievers are male

- *Ethnicity:* 82% are white British

- *Deprivation:* 36% live in deprived areas

As was the case with other groups studied in this report, learners following aims in different subject areas are remarkably different. In the table below we present a detailed description of learner demographics by subject area, revealing that demographic characteristics vary widely between different subject areas. Cells with small samples are highlighted in grey.

Table 39: FE Achievers characteristics and labour market history (FE FL2)

Subject area	Male	Ethnic minority	Aged 19+	Deprived area	Ever on benefits	Worked 11+months pre
Health, Public Services and Care	17%	20%	63%	39%	24%	39%
Science and Mathematics	44%	49%	21%	48%	13%	20%
Agriculture, Horticulture and Animal Care	42%	6%	49%	23%	22%	31%
Engineering and Manufacturing Technologies	90%	17%	66%	37%	24%	45%
Construction, Planning and Built Environment	98%	12%	68%	34%	30%	39%
Information and Communication Technology	63%	29%	41%	40%	20%	31%
Retail and Commercial Enterprise	20%	15%	58%	36%	27%	38%
Leisure, Travel and Tourism	64%	18%	31%	38%	16%	23%
Arts, Media and Publishing	53%	23%	13%	37%	14%	14%
History, Philosophy and Theology	51%	21%	33%	33%	12%	29%
Social Sciences	36%	33%	24%	41%	13%	21%
Languages, Literature and Culture	37%	41%	25%	43%	19%	15%
Education and Training	6%	12%	98%	25%	25%	53%
Preparation for Life and Work	45%	29%	43%	43%	26%	26%
Business, Administration and Law	33%	23%	74%	36%	22%	54%
All	48%	18%	59%	36%	24%	39%

Frontier analysis of FE-HMRC/DWP data. FL2 FE achievers

Learners in Arts, Media and Publishing and Science and Mathematics and Arts are predominantly young with average ages of 18 and 19 years while the mean age in Education and Training is 37 years.

Construction, Planning and Built Environment and Engineering and Manufacturing Technologies and Construction are male dominated subjects - with shares of female learners in these subject areas of only 2% and 10% respectively. On the other hand, women make up 94% of Education and Training learners.

Learners in Agriculture, Horticulture and Animal Care are predominantly white British (94%) but almost half of Science and Mathematics learners are from an ethnic minority.

In terms of deprivation, almost half of Science and Mathematics achievers live in deprived areas compared with a quarter of Education and Training achievers.

Overall, it is quite apparent that there are very large differences in the demographic composition of the sector subject area which are likely to be reflected in subsequent measures of economic performance.

Sector subject area concentration

The majority of the 285,140 FL2 achievers (80%) study aims fall under 5 subject areas. These are:

- Health, Public Services and Care – 20%

- Retail and Commercial Enterprise – 19%

- Engineering and Manufacturing Technologies – 15%

- Construction, Planning and Built Environment – 13%

- Business, Administration and Law – 12%

Consequently, there are a number of subject areas with extremely low samples. For example there are only 78 learners in Social Sciences and History, Philosophy and Theology.

Figure 38 below shows the full distribution of FL2 learners across subject areas. Due to the very low sample sizes in a number of the subject areas, care must be taken when interpreting summary statistics. We highlight subject areas where samples are below 100 in grey in subsequent outputs.

Figure 38: Achiever distribution by subject area (FE FL2)
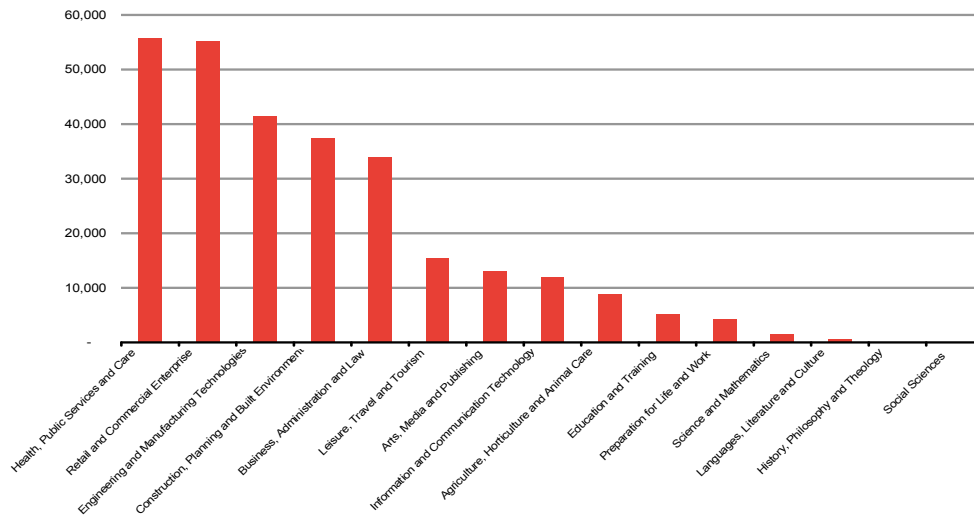
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

Prior attainment

Prior attainment is available for 64% of FL2 achievers. The majority have prior qualifications of Level 1 or L2:

- 40% of those with a prior attainment record have qualifications at Level 1

- 30% are qualified at L2

- 18% have no previous qualifications

- 12% are distributed evenly between higher level qualifications and entry level and BL1 qualifications.

FL2 achiever earnings

We begin by describing the raw earnings data which includes zeros and outliers. Mean earnings pre and post-learning stand at £5,785 and £7,975 respectively. The low average earnings are due to the large number of individuals with zero earnings. Pre-learning, 44% of FL2 achievers have zero earnings but this number decreases to 25% post-learning. The high proportion of zero earnings pre-learning is a likely consequence of the young age of FL2 achievers.

We examine the relationship between average age and the proportion of individuals with zero earnings by exploiting the variation in these variables by subject area. We present this graphically in Figure 39, which plots average age and the proportion of zero earnings by subject area.

A clear pattern emerges such that subject areas with high numbers of adult learners have fewer recorded zero earnings relative to subject areas with high numbers of younger learners. As average age decreases, the proportion of zero earnings in a subject area increases. In Science and Mathematics, where the average age is 19, the proportion of learners whose earnings are recorded as zero before learning is 68%. The corresponding number for Education and Training (where the average age is 37 years) is only 35%.

Figure 39: Mean age and proportion of achievers with zero earnings by subject area (FE FL2)
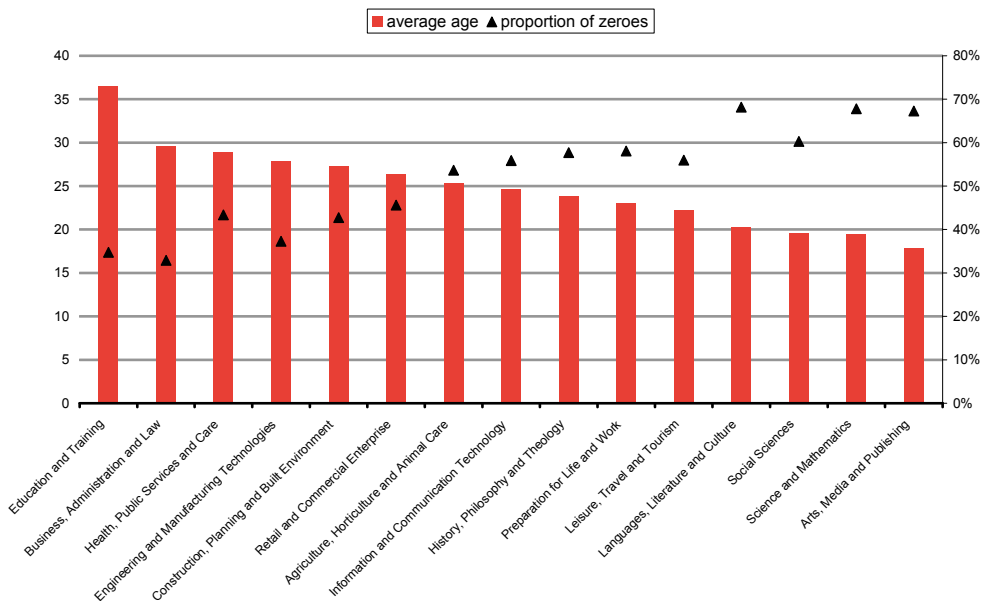
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

Clearly, the large number of zeros in the earnings data will cause average statistics to appear very low. In addition to that, the high correlation between age and zero earnings revealed previously will drive some of the differences in earnings by subject area.

We show the relationship between average earnings and proportion of zero earnings graphically in Figure 40. Once again we exploit the substantial variation in both variables by subject area. The data shows that average earnings are significantly lower in subject areas with high concentrations of zeroes. For example, mean earnings in Science and Mathematics (68% zeroes) are £2,203 before learning, the corresponding number for Business, Administration and Law (33% zeros) is £8,621.

Figure 40: Mean earnings and proportion of achievers with zero earnings pre-learning by subject area (FE FL2)
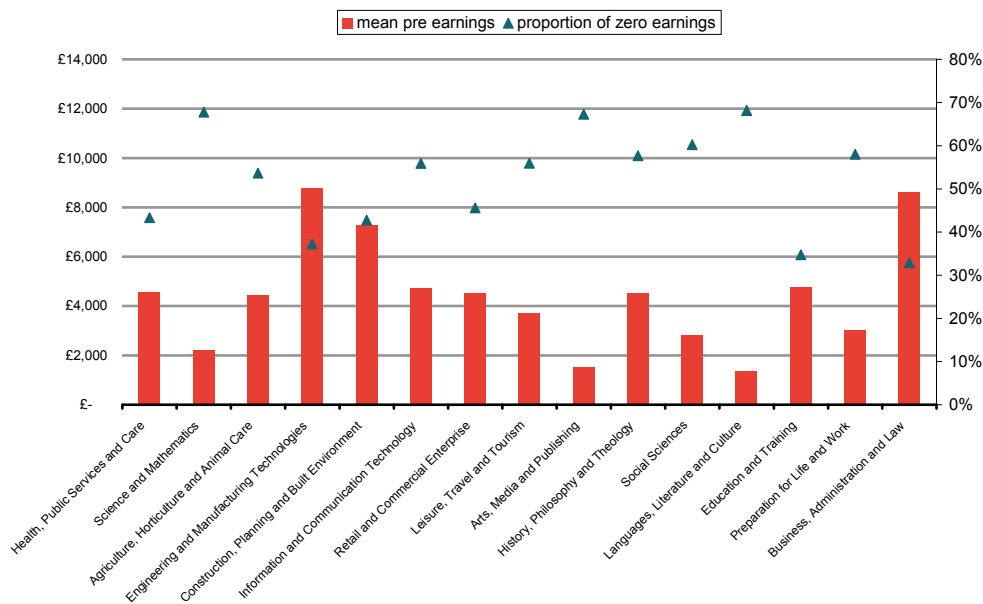
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

Table 40: Mean earnings pre and post-learning (FL2 FE)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	55,852	4,562	6,741	43%	24%
Science and Mathematics	1,564	2,203	4,468	68%	26%
Agriculture, Horticulture and Animal Care	8,825	4,448	6,232	54%	30%
Engineering and Manufacturing Technologies	41,551	8,767	11,304	37%	23%
Construction, Planning and Built Environment	37,481	7,279	9,733	43%	33%
Information and Communication Technology	11,895	4,726	6,572	56%	28%
Retail and Commercial Enterprise	55,234	4,531	6,512	46%	27%
Leisure, Travel and Tourism	15,463	3,691	6,221	56%	23%

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Arts, Media and Publishing	13,127	1,508	3,555	67%	30%
History, Philosophy and Theology	78	4,510	7,578	58%	18%
Social Sciences	78	2,833	4,648	60%	21%
Languages, Literature and Culture	606	1,366	4,511	68%	27%
Education and Training	5,118	4,747	6,608	35%	22%
Preparation for Life and Work	4,275	3,026	5,703	58%	29%
Business, Administration and Law	33,993	8,621	10,544	33%	21%
All	285,140	5,785	7,975	44%	26%

Frontier analysis of FE-HMRC/DWP data. FL2 FE achievers

Based on the analysis above, it is clear that the presence of zeros and outliers will bias average earnings downwards. As before, we focus subsequent earnings analyses on a sub-set of FL2 achievers- learners in continuous work before and after learning whose annual earning fall between £4,800 and £80,000.

FL2 filtered earnings

The effect of restricting our sample to FL2 achievers who were in continuous work both before and after learning took place (for at least 11 months) and whose annual earnings were between £4,800 and £80,000 on the number of observations available for analysis is summarised in Figure 41 below.

Figure 41: Sample size for filtered earnings analysis (FE FL2)
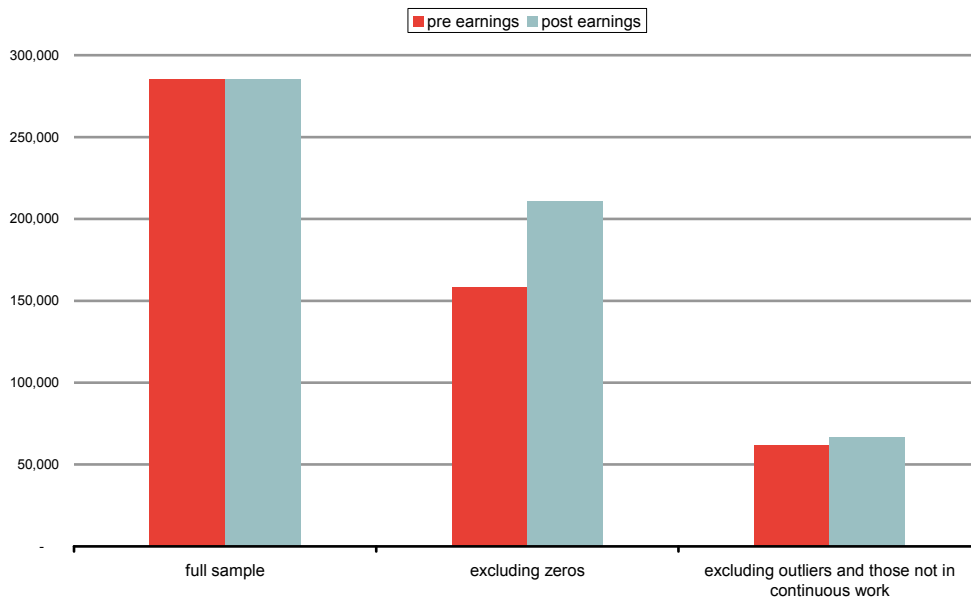
Frontier analysis of FE-HMRC/DWP data. FL2 achievers.

Reliable earnings data is available for 63,508 individuals pre-learning and 67,054 individuals post-learning. Breaking down the data by subject area and demographic group we get very small samples in a significant number of cells. Our calculations show that earnings comparisons are not possible for the following subject areas due to small samples:

- Science and Mathematics,

- History, Philosophy and Theology

- Social Sciences and Languages

- Literature and Culture

Sample sizes are also small in Preparation for Life and Work and Arts, Media and Publishing with totals of fewer than 1,000 achievers.

Table 41: Sample size for filtered earnings calculation by subject area and demographic group (FE FL2)

Subject	Men	Women	White	Ethnic minority	Not deprived	Deprived	Age 19+	All
Health, Public Services and Care	1,728	10,206	9,887	2,047	7,488	4,446	11,415	11,934
Science and Mathematics	39	120	119	40	100	59	116	159
Agriculture, Horticulture and Animal Care	767	616	1,261	122	1,000	383	1,270	1,383
Engineering and Manufacturing	10,736	1,846	10,710	1,872	7,864	4,718	11,960	12,582
Construction, Planning and Built Environment	7,781	157	7,236	702	5,589	2,349	7,336	7,938
Information and Communication	732	1,416	1,832	316	1,493	655	1,974	2,148
Retail and Commercial Enterprise	3,162	7,250	8,965	1,447	6,575	3,837	9,655	10,412
Leisure, Travel and Tourism	1,286	425	1,536	175	1,035	676	1,462	1,711
Arts, Media and Publishing	279	232	392	119	341	170	250	511
History, Philosophy and Theology	-	-	-	-	-	-	-	-
Social Sciences	-	-	-	-	-	-	-	-
Languages, Literature and Culture	10	21	-	-	-	-	-	31
Education and Training	81	1,316	1,249	148	1,051	346	1,390	1,397
Preparation for Life and Work	129	304	332	101	270	163	374	433
Business, Administration and	4,372	8,477	11,287	1,562	8,914	3,935	12,397	12,849
All	31,117	32,391	54,841	8,667	41,758	21,750	59,641	63,508

Frontier analysis of FE-HMRC/DWP data. FL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum. Cells which are potentially disclosive have been marked with "-".

The calculations presented on the previous page, indicate that earnings comparisons must be interpreted with care due to small sample sizes. Average statistics can potentially be skewed by outliers. In order to capture the dispersion of earnings within cells we include a number of summary statistics in the earnings analysis that follows such as median and mean standard error.

Table 42: Earnings comparisons by subject area (FE FL2)

Subject area	Mean pre	Mean post	Median pre	Median post	Mean SE pre	Mean SE post	Mean % change	Median % change	Sample post
Health, Public Services and	12,913	13,633	11,350	12,314	67	64	6%	8%	12,885
Science and Mathematics	13,068	13,902	12,108	12,841	505	635	6%	6%	167
Agriculture, Horticulture and	16,632	16,718	15,190	15,836	244	225	1%	4%	1,468
Engineering and Manufacturing	19,708	20,984	18,175	19,476	87	88	6%	7%	12,937
Construction, Planning and	20,322	21,959	19,288	20,781	122	117	8%	8%	8,285
Information and Communication	17,397	17,795	15,596	15,863	208	211	2%	2%	2,191
Retail and Commercial	14,511	14,964	12,422	12,877	85	81	3%	4%	11,331
Leisure, Travel and Tourism	19,332	18,557	17,595	16,795	262	247	-4%	-5%	1,895
Arts, Media and Publishing	15,339	15,544	12,918	12,030	412	441	1%	-7%	584
Languages, Literature and	12,933	13,093	9,336	10,919	1,677	1,041	1%	17%	42
Education and Training	10,810	11,252	8,831	9,414	194	171	4%	7%	1,647
Preparation for Life and Work	14,091	14,271	11,834	12,441	417	404	1%	5%	476
Business, Administration	17,066	17,645	15,395	16,033	79	78	3%	4%	13,127
All	16,677	17,398	14,768	15,504	37	37	4%	5%	67,054

Frontier analysis of FE-HMRC/DWP data. All FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum. Grey cells indicate sample size smaller than 100

The table above shows that average earnings are highest for achievers in Construction, Planning and Built Environment. At £20,322 pre-learning, they are twice as high as average earnings in Education and Training. Following achievement in FE, average earnings grow for all subject areas excluding Leisure, Travel and Tourism where real earnings decline by 4%. Growth is highest for achievers in Construction, Planning and Built Environment where average earnings post-learning are 8% higher than their pre-learning level. Analysis of median earnings yields very similar results. One notable difference here is that mean average earnings for achievers in Arts, Media and Publishing grow by 1%, but median earnings for the same group of achievers declines by 7%. This suggests that much of the increase at the mean is being caused by a few individuals experiencing large gains, 'skewing' the mean upwards, while most individuals actually experience a decline in earnings.

We present the growth in mean and median earnings of FL2 achievers graphically below. We exclude subject areas where sample sizes are very low.

Figure 42: Mean filtered earnings by subject area (FE FL2)
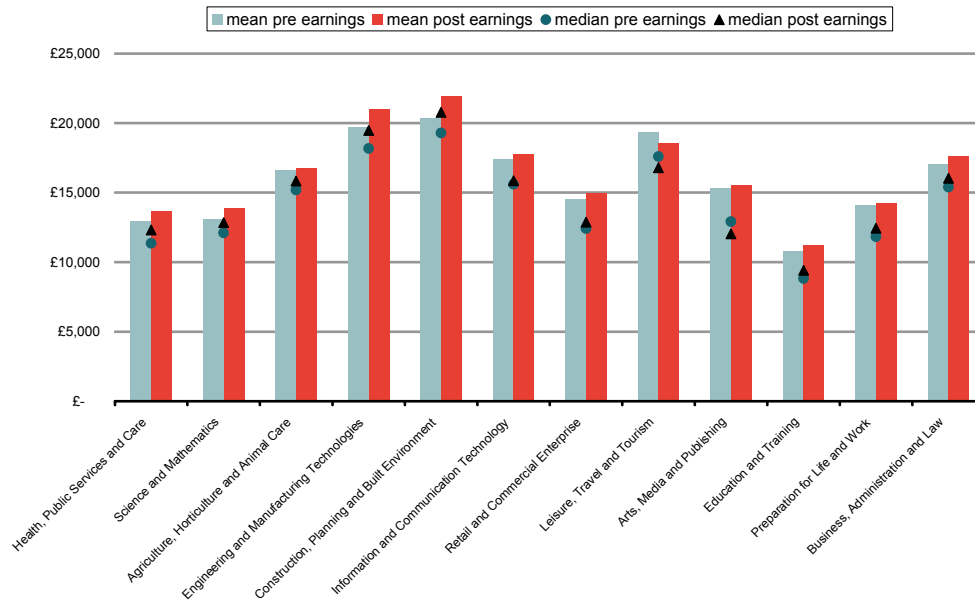
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum.

In summary FL2 earnings are high in;

- Construction, Planning and Built Environment, mean £20,322

- Engineering and Manufacturing Technologies, mean £19,708

And low in:

- Education and Training, mean £10,810

- Health, Public Services and Care, mean £12,913

On average, real earnings grew by 4% from £16,677 to £17,398. Highest growth in real earnings occurred in:

- Construction, Planning and Built Environment (8%)

- Engineering and Manufacturing Technologies (6%)

Lowest growth in real earnings in:

- Leisure, Travel and Tourism (-4%)

- Arts, Media and Publishing (1%)

Next we compare the earnings levels and growth rates of the various demographic groups in our data set. The tables present the mean earnings of men, women, ethnic minorities and other demographic groups. They show that subject specific earnings vary substantially by demographic group.

Men earn more than women in all subject areas, but the gap in earnings varies by subject area. For example, men who achieved in Business, Administration and Law earned 46% more than women in the same subject area. For Arts, Media and Publishing the gap was only 6%.

It is not clear if white British learners always earn more than ethnic minority learners. White achievers in Health, Public Services and Care earn 13% less than their ethnic counterparts, on average. However, in Leisure, Travel and Tourism the exact opposite is true.

Achievers who live in deprived areas tend to earn less than those who do not, with the exception of achievers in Health, Public Services and Care where earnings are equal and Agriculture, Horticulture and Animal Care where deprived achievers actually earn more.

Young achievers tend to earn less than adult learners in most subject areas. However in some subject areas the opposite is true: Health, Public Services and Care; Science and Science and Mathematics; Arts, Media and Publishing

Table 43: Mean filtered earnings by demographic group (FE FL2)

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	12,913	12,875	16,385	12,325	6%	6%	6%	6%
Science and Mathematics	13,068	12,758	16,238	12,037	6%	9%	3%	7%
Agriculture, Horticulture and Animal Care	16,632	16,765	18,043	14,875	1%	2%	3%	-2%
Engineering and Manufacturing Technologies	19,708	20,093	20,352	15,959	6%	7%	7%	2%
Construction, Planning and Built Environment	20,322	21,020	20,412	15,899	8%	8%	8%	8%
Information and Communication Technology	17,397	17,641	20,622	15,730	2%	3%	0%	4%
Retail and Commercial Enterprise	14,511	14,621	18,870	12,609	3%	4%	3%	3%
Leisure, Travel and Tourism	19,332	20,263	20,624	15,423	-4%	-1%	-2%	-7%
Arts, Media and Publishing	15,339	15,114	16,176	14,332	1%	8%	-2%	5%
Languages, Literature and Culture	12,933	13,887	16,552	11,210	1%	1%	-21%	17%
Education and Training	10,810	10,811	18,103	10,361	4%	4%	3%	5%
Preparation for Life and Work	14,091	14,222	16,575	13,037	1%	-2%	-2%	3%

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Business, Administration and Law	17,066	17,265	21,970	14,537	3%	3%	2%	5%
All	16,677	16,913	20,119	13,370	4%	5%	5%	4%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 44: Mean filtered earnings by demographic group (FE FL2)

Study area	Before training				% change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	12,624	14,311	12,877	12,934	5%	7%	6%	5%
Science and Mathematics	13,280	12,435	13,012	13,101	7%	3%	3%	8%
Agriculture, Horticulture and	16,553	17,445	17,118	16,446	0%	10%	3%	0%
Engineering and Manufacturing	19,826	19,029	18,665	20,333	6%	8%	5%	7%
Construction, Planning and Built	20,291	20,645	20,198	20,375	8%	8%	6%	9%
Information and Communication	17,512	16,728	16,349	17,857	2%	5%	2%	3%
Retail and Commercial	14,374	15,358	13,732	14,965	3%	3%	4%	3%
Leisure, Travel and Tourism	19,504	17,822	17,815	20,323	-4%	-7%	0%	-7%
Arts, Media and Publishing	15,111	16,088	15,785	15,117	0%	5%	-6%	5%
Languages, Literature and	-	-	-	-	-	-	-	-
Education and Training	10,797	10,918	11,060	10,728	4%	1%	4%	4%
Preparation for Life and Work	13,793	15,071	13,285	14,577	3%	-4%	6%	-1%
Business, Administration and	17,153	16,439	16,669	17,242	3%	6%	2%	4%
All	16,694	16,567	16,091	16,982	4%	6%	4%	4%

Source: Frontier analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

FL2 achiever employment

We present 3 different statistics illustrating the employment histories and outcomes of FL2 achievers:

- Average number of months worked

- Proportion of sample who were in employment for at least 11 months

- Proportion of sample in employment at a fixed point in time before and after course (6 months before/after course)

For the calculation of employment rates we use the full sample of FL2 achievers. In Figure 43 overleaf we show the evolution of time in employment of FL2 achievers pre and post-

learning by subject area. On average achievers in this group were in employment for just under half of the year preceding learning. Following achievement in FE the average length of time in employment increases by over 2 months to 8.3 months post-learning. Our calculations reveal that there is considerable variation in both the level and growth over time in employment by subject area.

Figure 43: Number of months worked pre and post-learning (FE FL2)
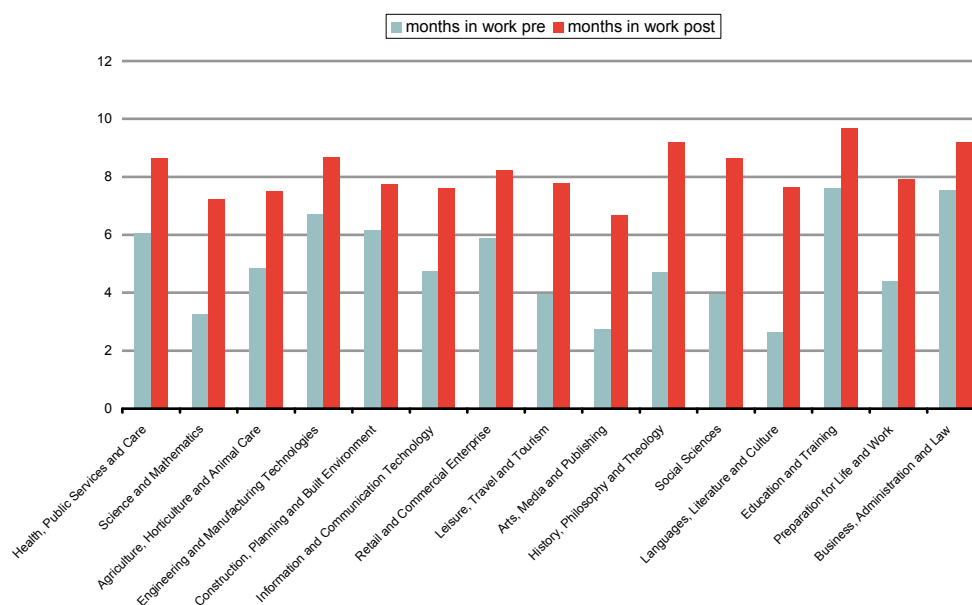
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

The longest employment spells are observed for Education and Training achievers both pre and post-learning with values of 7.62 and 9.68 months respectively. Achievers in Languages, Literature and Culture were in employment for only 2.6 of the 12 months pre-learning.

FL2 achievers' time in employment increases very sharply post training for several subject areas. For example, there are four subject areas for which average time in employment more than doubles albeit from a low base. These are:

- Socia l Sciences

- Languages, Literature and Culture

- Arts, Media and Publishing and

- Science and Mathematics

Learners in these subject areas were in employment for less than 4 of the 12 months preceding FE. Following achievement, time in employment surges to between 6.7 and 8.4 months. Again, age appears to be a significant factor determining both the employment rate and its change over time. The subject areas with the highest increases in employment happen to be the subject areas with the highest concentrations of learners aged 20 or less.

To illustrate this point we plot percentage changes in average time in employment against average age in the 15 subject areas in Figure 44 below. There appears to be a clear trend such that subject areas with older learners experience modest increases in employment spells while those with predominantly young learners have very high rates of change in employment times, probably reflecting the fact that many younger learners were not working at all pre-training.

Figure 44: Mean age and changes in employment by subject area (FE FL2)
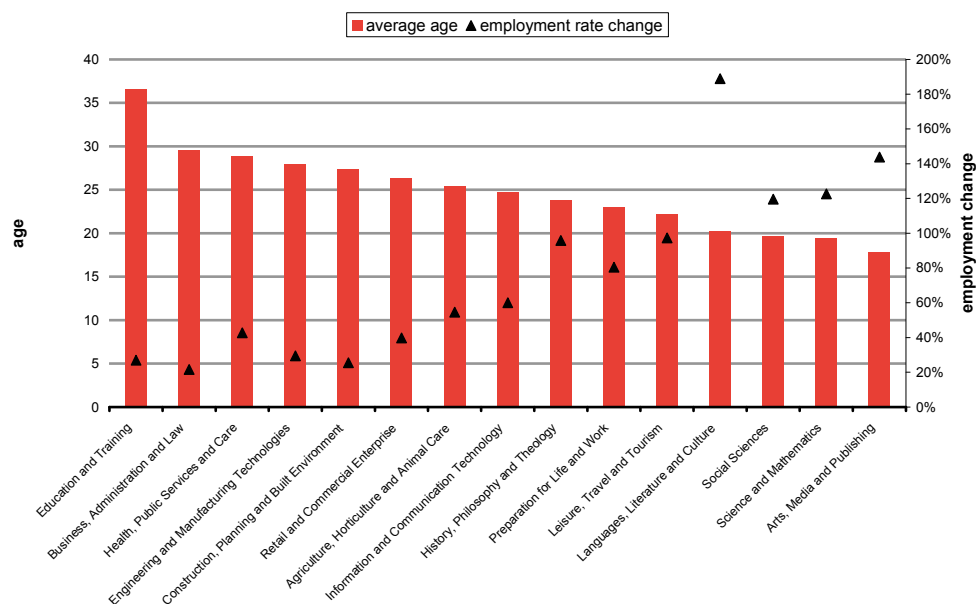
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

We next focus our attention on other measures of employment such as the proportion of learners working continuously before and after learning as well as the proportion of time worked in a given month before and after learning (3 and 6 months). We present our findings in the table on the next page.

These alternative employment measures are consistent with our findings so far. They show that post-learning employment rates are higher than pre-learning employment rates in all subject areas. Overall, the magnitude of the change is in the region of 20 percentage points. Following FE:

- The proportion of learners in continuous employment goes up from 39% to 57%

- The proportion of time worked goes up from 48% to 68% using 3 months intervals and;

- The proportion of time worked goes up from 49% to 69% using 6 months intervals

As was the case previously, employment rates vary widely between subject areas both before and after learning. Pre-learning they are lowest in the subject areas with the highest proportions of young learners. For example only 14% of achievers in Arts, Media and Publishing (average age of 18) and 15% of achievers in Languages, Literature and Culture

(average age of 20) were in continuous employment pre-learning. In contrast, more than half of learners in Education and Training (average age of 37) were in work for at least 11 of the 12 months preceding learning. Following achievement in FE, employment increases in all subject areas but gains are highest for young learners. Interestingly, employment increases sharply also in Education and Training where most learners are adults.

Table 45: Employment rates before and after learning (FE FL2)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	39%	60%	50%	72%	6.05	8.64
Science and Mathematics	20%	45%	26%	59%	3.24	7.22
Agriculture, Horticulture and Animal Care	31%	48%	40%	62%	4.86	7.51
Engineering and Manufacturing Technologies	45%	61%	55%	72%	6.70	8.67
Construction, Planning and Built Environment	39%	52%	51%	65%	6.16	7.73
Information and Communication Technology	31%	49%	39%	63%	4.76	7.62
Retail and Commercial Enterprise	38%	55%	48%	69%	5.89	8.23
Leisure, Travel and Tourism	23%	48%	32%	65%	3.95	7.80
Arts, Media and Publishing	14%	38%	22%	55%	2.74	6.67
Languages, Literature and Culture	15%	48%	20%	64%	2.64	7.64
Education and Training	53%	73%	64%	81%	7.62	9.68
Preparation for Life and Work	26%	51%	36%	66%	4.38	7.91
Business, Administration and Law	54%	67%	63%	77%	7.55	9.19
All	39%	57%	49%	69%	5.96	8.30

Frontier analysis of FE-HMRC/DWP data. FL2 achievers.

Table 46: Employment rates before and after learning (FE FL2 19+)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	55%	69%	68%	77%	8.14	9.22
Science and Mathematics	54%	63%	62%	70%	7.63	8.52
Agriculture, Horticulture and Animal Care	51%	59%	62%	68%	7.48	8.09
Engineering and Manufacturing Technologies	61%	66%	72%	74%	8.67	8.93
Construction, Planning and Built Environment	50%	54%	63%	65%	7.54	7.74
Information and Communication Technology	58%	63%	68%	72%	8.14	8.62
Retail and Commercial Enterprise	55%	61%	66%	70%	7.98	8.45
Leisure, Travel and Tourism	49%	58%	61%	68%	7.43	8.18

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Arts, Media and Publishing	35%	40%	47%	50%	5.73	5.97
Languages, Literature and Culture	35%	54%	42%	64%	5.18	7.53
Education and Training	54%	74%	65%	81%	7.70	9.72
Preparation for Life and Work	45%	58%	57%	69%	6.83	8.23
Business, Administration and Law	67%	73%	76%	81%	9.08	9.65
All	57%	64%	68%	73%	8.15	8.76

Frontier analysis of FE-HMRC/DWP data. FL2 achievers.

Finally we explore the variation in employment by subject area and demographic group. We show two tables, one for each period of interest- the 12 months before and 12 months after learning. The employment measure presented in the tables is the proportion of learners in continuous employment. Our calculations show that:

- Women are more likely to be in continuous employment than men both before and after learning. This is true for almost all subject areas in the period following learning except Agriculture, Horticulture and Animal Care and Retail and Commercial Enterprise where the opposite is true. Overall, 59% of women were in continuous work post-learning compared with 55% of men.

- White British learners have higher employment rates than ethnic minority learners. This is true for all subject areas except Agriculture, Horticulture and Animal Care. Post-learning 59% of white British learners worked for at least 11 months compared with 51% of ethnic minority learners

- Learners living in deprived areas are less likely to be employed than the rest of the sample. This holds for all subject areas. Post-learning 53% of achievers from deprived areas worked for 11 months or more compared with 59% of achievers living in non-deprived areas.

- Adult learners are significantly more likely to be in continuous employment than the sample as a whole

In general, age appears to be the most significant factor driving the change in overall employment rates of FL2 achievers. Combining the results from the tables on the next pages we can see that the employment of the sample as a whole increases by 18% while that of adult learners goes up by only 7%. This implies that young achievers aged 16-18 experience a substantial increase in employment.

There is little difference in the employment growth of the other demographic groups of interest.

Table 47: Employment rate (work 11 months+) by demographic group (FE FL2)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	39%	55%	31%	40%	21%	14%	26%	21%
Science and Mathematics	20%	54%	14%	25%	25%	9%	25%	24%
Agriculture, Horticulture and Animal Care	31%	51%	34%	29%	17%	8%	17%	18%
Engineering and Manufacturing	45%	61%	43%	62%	16%	5%	18%	6%
Construction, Planning and Built Environment	39%	50%	39%	42%	13%	4%	13%	13%
Information and Communication	31%	58%	21%	49%	18%	5%	21%	13%
Retail and Commercial Enterprise	38%	55%	44%	36%	17%	23%	15%	18%
Leisure, Travel and Tourism	23%	49%	24%	19%	25%	9%	24%	30%
Arts, Media and Publishing	14%	35%	14%	14%	24%	5%	23%	25%
Languages, Literature and Culture	15%	35%	15%	14%	33%	18%	32%	35%
Education and Training	53%	54%	46%	54%	20%	20%	19%	20%
Preparation for Life and Work	26%	45%	18%	33%	25%	13%	27%	23%
Business, Administration and Law	54%	67%	51%	55%	13%	6%	14%	13%
All	39%	57%	37%	40%	18%	7%	18%	19%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 48: Employment rate (work 11 months+) by demographic group (FE FL2)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	40%	37%	38%	40%	21%	20%	19%	22%
Science and Mathematics	27%	14%	18%	23%	24%	24%	21%	27%
Agriculture, Horticulture and Animal Care	30%	44%	35%	30%	18%	10%	12%	19%
Engineering and Manufacturing Technologies	46%	43%	46%	44%	17%	13%	13%	19%
Construction, Planning and Built Environment	40%	35%	36%	41%	13%	10%	11%	14%
Information and Communication Technology	36%	21%	27%	34%	17%	20%	17%	19%
Retail and Commercial Enterprise	38%	38%	40%	37%	18%	14%	14%	19%

Leisure, Travel and Tourism	24%	17%	22%	23%	26%	25%	24%	27%
Arts, Media and Publishing	14%	14%	13%	14%	25%	21%	21%	26%
Languages, Literature and Culture	17%	11%	12%	16%	38%	27%	28%	38%
Education and Training	54%	49%	52%	54%	20%	18%	19%	20%
Preparation for Life and Work	26%	26%	26%	26%	26%	22%	21%	28%
Business, Administration and Law	59%	34%	48%	57%	12%	18%	13%	13%
All	40%	33%	38%	39%	18%	18%	15%	20%

Source: Frontier analysis of ILR-HMRC/DWP data

Benefits

In this section we describe the benefit histories and outcomes of FL2 achievers. The types of benefit included in our measure are Income Support (IS), Job Seeker's Allowance (JSA) and Incapacity Benefit (IB).

We begin by considering time spent on benefits pre and post-learning for the sample as a whole as well as by sector subject area. On average, FL2 achievers were claiming benefits for 0.94 months pre and 0.79 months post-learning but mean time on benefits fluctuates substantially across subject areas as can be seen in Figure 45 below. Learners in Preparation for Life and Work spent 1.43 months on benefits pre-learning which is more than twice as long as the time learners in Leisure, Travel and Tourism spent claiming benefits. The average duration of benefit claims is lower post-learning for most subject areas, but the changes are very small.

Figure 45: Months on benefits pre and post-learning by subject area (FE FL2)
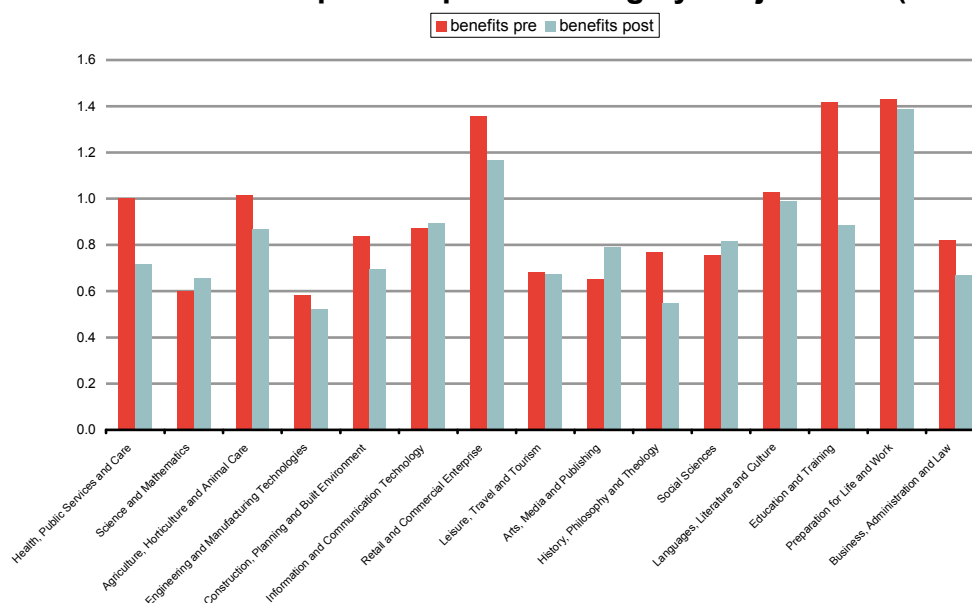
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

This particular measure of benefits reveals an overall downward trend suggesting benefit claims are falling post FE. This appears to be the case for 11 of the 15 subject areas. We present alternative measures of benefit histories and outcomes in the tables below. These include the proportion of the sample claiming a benefit at any point in time before and after learning (first two columns) and the proportion of the sample claiming benefits at fixed time points pre and post-learning. Pre-learning benefit rates are highest in:

- Preparation for Life and Work, Retail and Commercial Enterprise and Education and Training where 16% of learners were benefit claimants

- And lowest in:

- Arts, Media and Publishing (8%)

- Science and Mathematics (8%)

- Leisure, Travel and Tourism (9%)

Following achievement in FE the proportion of individuals claiming benefits falls in most subject areas with the exception of Preparation for Life and Work and Arts, Media and Publishing where it increases slightly. Consequently, Preparation for Life and Work remains the subject area with the highest proportion of benefit claimants post-learning with 17% of achievers claiming at some point in the 12 months after the end of the course.

Table 49: Benefit spells before and after learning (FE FL2)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	14%	9%	9%	6%	8%	6%
Science and Mathematics	8%	8%	4%	6%	5%	6%
Agriculture, Horticulture and Animal Care	13%	11%	8%	7%	9%	7%
Engineering and Manufacturing Technologies	10%	9%	5%	4%	5%	4%
Construction, Planning and Built Environment	14%	12%	7%	6%	7%	6%
Information and Communication Technology	11%	11%	7%	8%	7%	7%
Retail and Commercial Enterprise	16%	14%	11%	10%	11%	10%
Leisure, Travel and Tourism	9%	9%	5%	6%	6%	6%
Arts, Media and Publishing	8%	10%	5%	7%	6%	7%
Languages, Literature and Culture	13%	12%	8%	9%	9%	8%
Education and Training	16%	10%	12%	8%	12%	7%
Preparation for Life and Work	16%	17%	11%	12%	12%	12%
Business, Administration and Law	11%	9%	7%	6%	7%	6%
All	13%	11%	8%	7%	8%	7%

Frontier analysis of FE-HMRC/DWP data. FL2 FE achievers.

Table 50: Benefit spells before and after learning (FE FL2 19+)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	20%	12%	13%	8%	12%	8%
Science and Mathematics	24%	23%	15%	17%	17%	16%
Agriculture, Horticulture and Animal Care	24%	17%	16%	13%	17%	13%
Engineering and Manufacturing Technologies	15%	11%	7%	5%	7%	6%
Construction, Planning and Built Environment	20%	15%	10%	8%	10%	7%
Information and Communication Technology	23%	18%	15%	13%	16%	13%
Retail and Commercial Enterprise	26%	21%	18%	15%	19%	15%
Leisure, Travel and Tourism	25%	21%	16%	14%	17%	14%
Arts, Media and Publishing	46%	42%	32%	33%	35%	33%
Languages, Literature and Culture	39%	32%	28%	24%	28%	21%
Education and Training	16%	11%	12%	8%	12%	7%
Preparation for Life and Work	33%	29%	24%	22%	26%	21%
Business, Administration and Law	14%	10%	9%	7%	9%	7%
All	20%	15%	12%	10%	13%	9%

Frontier analysis of FE-HMRC/DWP data. FL2 FE achievers.

Finally, we show the differences in benefit claims by demographic group in the tables below. The emerging findings are:

- Females are more likely to claim benefits than males. On average 14% of females claimed benefits pre-learning compared to 11% of males. This is true in almost all subject areas except Leisure, Travel and Tourism and Arts, Media and Publishing

- Ethnic minorities are more likely to be on benefits than white British learners. 16% of ethnic minority achievers claim benefits post-learning compared with 12% of white British achievers. This pattern is true in almost all subject areas except Information and Communication Technology and Languages, Literature and Culture

- Perhaps unsurprisingly, learners living in deprived areas are the most likely group to be on benefits, with an average of 18% of achievers claiming at some point in the 12 months pre-learning. These disadvantaged learners are twice as likely to be claiming benefits post-learning as those who live in non deprived areas

Table 51: Benefit claims by demographic group (FE FL2)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	14%	20%	12%	14%	-5%	-8%	-5%	-4%
Science and Mathematics	8%	24%	7%	8%	0%	-1%	0%	1%
Agriculture, Horticulture and Animal Care	13%	24%	11%	13%	-2%	-7%	-1%	-1%
Engineering and Manufacturing	10%	15%	10%	10%	-1%	-4%	-1%	0%
Construction, Planning and Built Environment	14%	20%	14%	34%	-2%	-5%	-2%	-8%
Information and Communication	11%	23%	9%	14%	0%	-5%	2%	-3%
Retail and Commercial Enterprise	16%	26%	13%	17%	-2%	-5%	-2%	-2%
Leisure, Travel and Tourism	9%	25%	10%	8%	0%	-4%	-1%	0%
Arts, Media and Publishing	8%	46%	8%	8%	2%	-4%	2%	1%
Languages, Literature and Culture	13%	39%	10%	14%	-1%	-7%	0%	0%
Education and Training	16%	16%	21%	16%	-6%	-5%	-9%	-6%
Preparation for Life and Work	16%	33%	11%	21%	1%	-4%	1%	0%
Business, Administration and Law	11%	14%	8%	12%	-2%	-4%	-1%	-2%
All	13%	20%	11%	14%	-2%	-5%	-1%	-2%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 52: Benefit claims by demographic group (FE FL2)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	13%	17%	18%	10%	-5%	-4%	-4%	-4%
Science and Mathematics	8%	8%	9%	6%	0%	0%	0%	1%
Agriculture, Horticulture and Animal Care	12%	14%	20%	10%	-1%	0%	-1%	-2%
Engineering and Manufacturing Technologies	9%	14%	14%	8%	-1%	-2%	-2%	-1%
Construction, Planning and Built Environment	13%	25%	21%	11%	-2%	-5%	-2%	-2%
Information and Communication Technology	11%	11%	15%	9%	1%	0%	0%	0%
Retail and Commercial Enterprise	15%	23%	24%	12%	-2%	-2%	-3%	-1%

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Leisure, Travel and Tourism	9%	11%	14%	6%	0%	0%	0%	0%
Arts, Media and Publishing	8%	9%	12%	6%	1%	2%	2%	1%
Languages, Literature and Culture	14%	11%	16%	10%	0%	-2%	0%	-1%
Education and Training	15%	20%	27%	12%	-5%	-8%	-10%	-4%
Preparation for Life and Work	14%	22%	23%	11%	1%	-1%	1%	0%
Business, Administration and Law	10%	14%	16%	8%	-2%	-2%	-3%	-2%
All	12%	16%	18%	10%	-2%	-2%	-2%	-2%

Source: Frontier analysis of ILR-HMRC/DWP data

Comparing achiever outcomes at provider level

In this section we analyse whether it is possible to make comparisons of economic outcomes by subject area and provider. We have shown that the characteristics of learners vary a great deal across subject areas. This is why, when comparing outcomes at provider level, we can only compare achievers who fall under the same subject area.

The key determinant of whether such comparisons can be made in a meaningful way is sample size. This is a particular concern when we focus on our 'reliable earnings' sample, which excludes learners not in work and those working part time from the sample. As we have shown in previous sections, this has the effect of reducing sample sizes significantly, and this makes comparisons at provider level particularly difficult. Employment and benefits statistics are calculated on the basis of the full sample of FL2 achievers, making sample size less of an issue.

The total number of FL2 achievers is 285,140, studying in 474 providers. Figure 46 shows the distribution of FL2 achievers across colleges. There are 106 colleges where the number of achievers is over 1,000, but the Figure also makes clear that there is a 'long tail' of colleges with very few achievers at this level - there are 147 providers with fewer than 100 achievers.

Figure 46: Total number of achievers by provider (FE FL2)
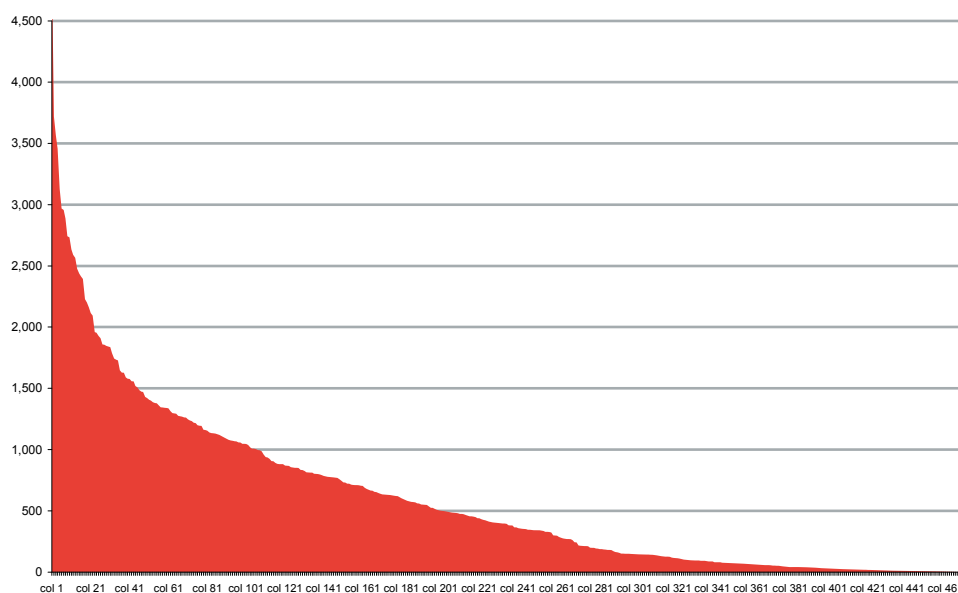
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

As we have already seen, the characteristics of learners vary significantly by subject area. A minimum requirement for fair comparisons in outcomes by provider, then, is that those comparisons be made within subject area. As there are 15 subject areas this reduces the samples available for analysis further. In Table 53 we show the number of providers which have more than 100, 250 and 500 FL2 achievers in the 15 subject areas.

Table 53: Number of providers with sufficient numbers of achievers by subject area (FE FL2)

Subject area	Providers with >100 achievers	Providers with >250 achievers	Providers with >500 achievers
Health, Public Services and Care	207	69	8
Science and Mathematics	0	0	0
Agriculture, Horticulture and Animal Care	32	6	0
Engineering and Manufacturing Technologies	144	43	11
Construction, Planning and Built Environment	125	46	11
Information and Communication Technology	20	2	0
Retail and Commercial Enterprise	197	77	12
Leisure, Travel and Tourism	19	4	3
Arts, Media and Publishing	19	0	0
History, Philosophy and Theology	0	0	0

Subject area	Providers with >100 achievers	Providers with >250 achievers	Providers with >500 achievers
Social Sciences	0	0	0
Languages, Literature and Culture	0	0	0
Education and Training	4	0	0
Preparation for Life and Work	0	0	0
Business, Administration and Law	103	25	7
All	870	272	52

Frontier analysis of FE-HMRC/DWP data. All FL2 achievers.

Our calculations reveal that comparisons by provider may only be possible for some of the subject areas where the number of colleges with sufficiently high samples is large. These subject areas are:

- Health, Public Services and Care

- Engineering and Manufacturing Technologies

- Construction,   Planning and Built Environment

- Retail and Commercial Enterprise

- Business, Administration and Law

While a sample of 100 achievers may be large enough to calculate employment and benefits outcomes, it is too small to allow the calculation of reliable earnings statistics, since the restrictions on the sample (that earnings have to be between £4,800 and £80,000 and that individuals have to have been in work for over 11 months either side of the learning window) reduce sample sizes significantly. Nevertheless, there remain a number of providers with sufficiently high samples to allow some comparisons in the same five subject areas specified above. Figure 47 overleaf shows the subject areas for which earnings comparisons can be made at provider level. As anticipated these include the 5 subject areas with the highest number of achievers discussed above. For example we have 30 providers for which we can calculate reliable earnings (post training) in Engineering and Manufacturing Technologies Health, 25 in Business, Administration and Law, 24 in Health, Public Services and Care etc.

Figure 47: Number of providers with more than 100 achievers with filtered earnings (FE FL2)
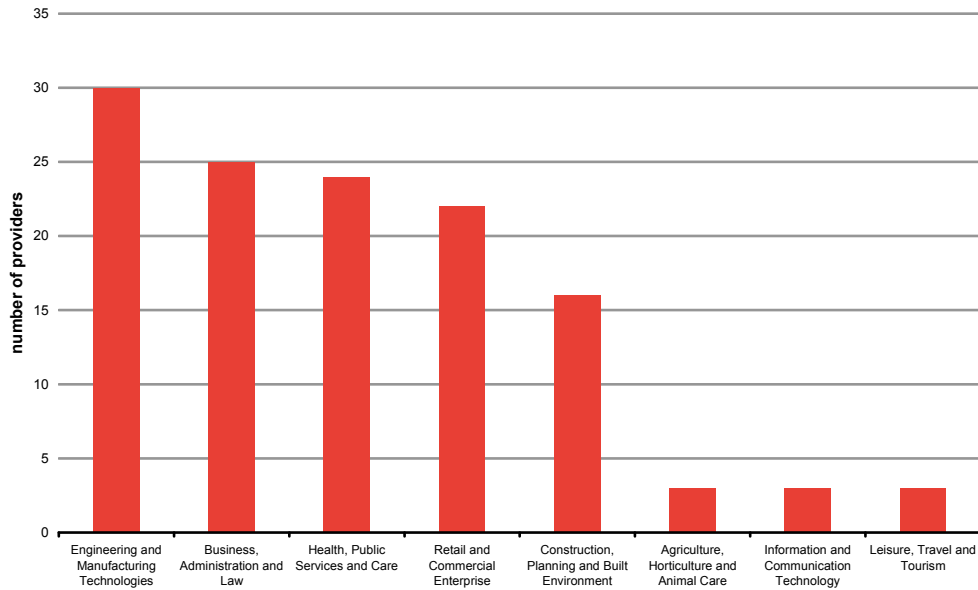
Frontier analysis of FE-HMRC/DWP data. All FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum.

We calculate average and median earnings for each subject area/college with a sample greater than 100 learners. Our findings are presented graphically below starting with Health, Public Services and Care in Figure 48.

All figures reveal remarkable variation in the pay of learners following FE. In Health, Public Services and Care for example the difference between top and bottom is 33%. Mean earnings are £18,250 in the top and £12,280 in the bottom provider.

Figure 48: Earnings by provider- Health, Public Services and Care (FE FL2)
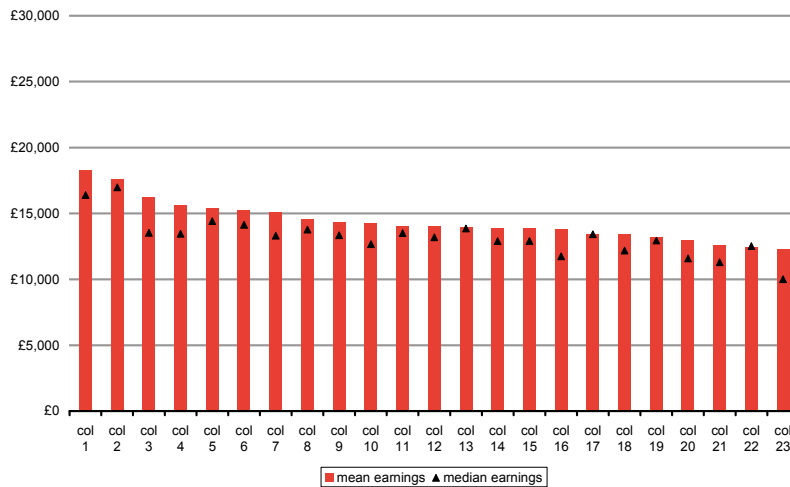
Frontier analysis of FE-HMRC/DWP data. FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum.

The earnings differential between top and bottom colleges is even greater when we compare the earnings of Engineering and Manufacturing Technologies achievers in Figure 49. Here highest mean pay is £27,526 a year which is £12,052 more than mean pay at the bottom.

Again, it is important to note that these enormous differences in earnings can not be interpreted as causal, i.e. there are a multitude of factors (other than the quality of provision) which may drive the differences in economic performance of learners studying at different colleges. Some of the variation may be due to the different types of courses that fall under this category but there are other factors such as geographical location, learner composition, age, ethnicity and gender. The average statistics presented in the figures in this section include men and women. Due to the small samples of learners with reliable earnings data at college level, we are unable to differentiate between different demographic groups. Therefore a significant amount of the variation in earnings between providers may simply be a consequence of the demographic composition of colleges.

Figure 49: Earnings by provider- Engineering and Manufacturing Technologies (FE FL2)
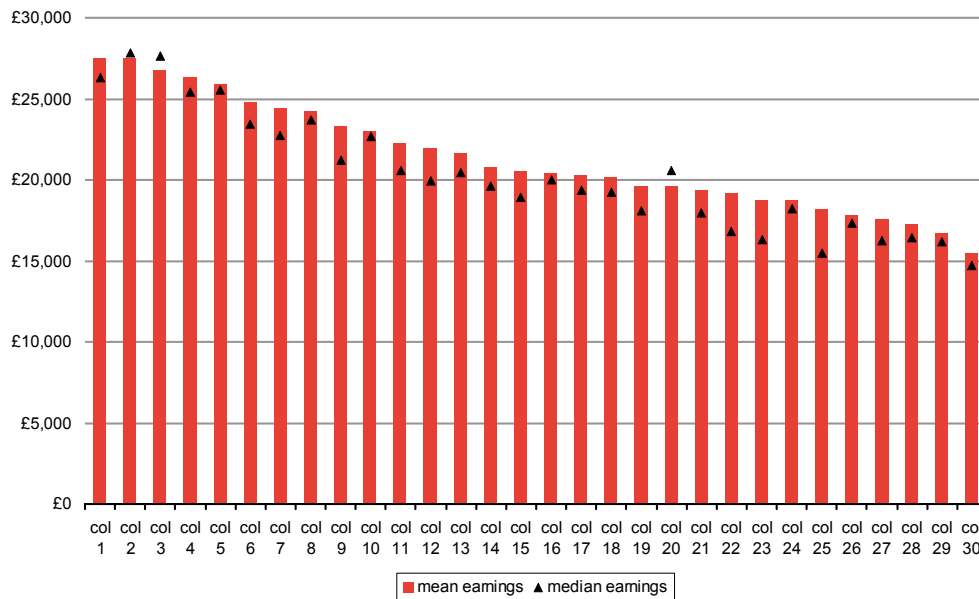
Frontier analysis of FE-HMRC/DWP data. FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum.

Figure 50: Earnings by provider- Construction, Planning and Built Environment (FE FL2)
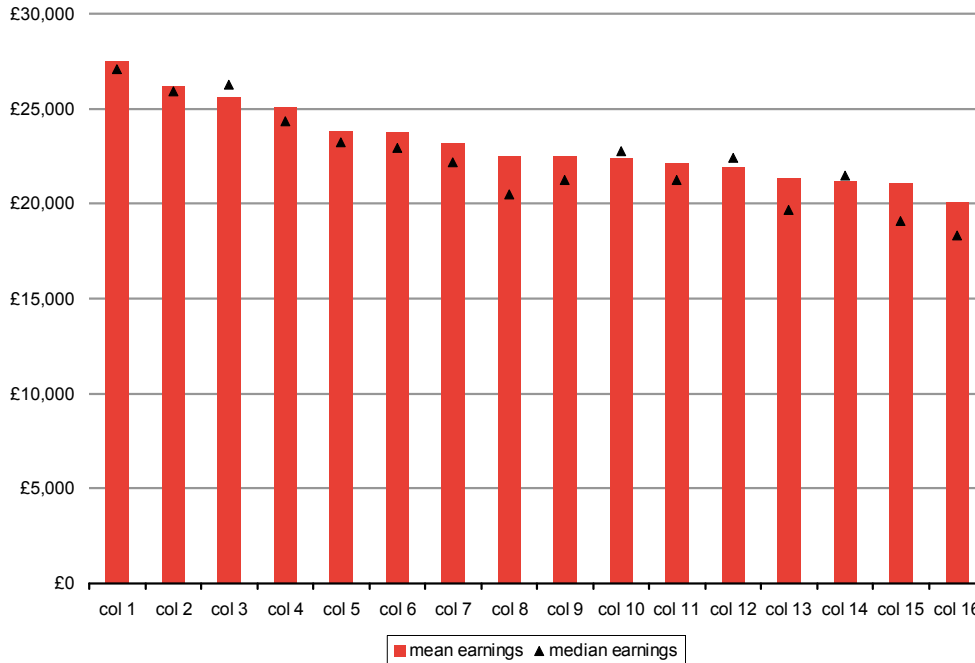
Frontier analysis of FE-HMRC/DWP data. FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum.

In Construction, Planning and Built Environment, the highest annual pay stands at £27,471. At the bottom of the pay distribution average pay is £7,415 lower at £20,056.

Differences in pay by provider are even more pronounced in Retail and Commercial Enterprise and Business, Administration and Law. In both subject areas, the difference between the top and bottom of the provider-level pay distribution is 100% or more. For example, achievers in Retail and Commercial Enterprise graduating from the college at the top of the earnings distribution earn on average £24,018, while graduates of the bottom college earn only £11,849.

A similar picture emerges from our analysis of Business, Administration and Law learners. The best paid graduates earn on average £26,845. The worst paid earn only £13,014. It appears that in both subject areas, there are a small number of providers where average pay is significantly higher than the rest of the sample.

Figure 51: Earnings by provider- Retail and Commercial Enterprise (FE FL2)
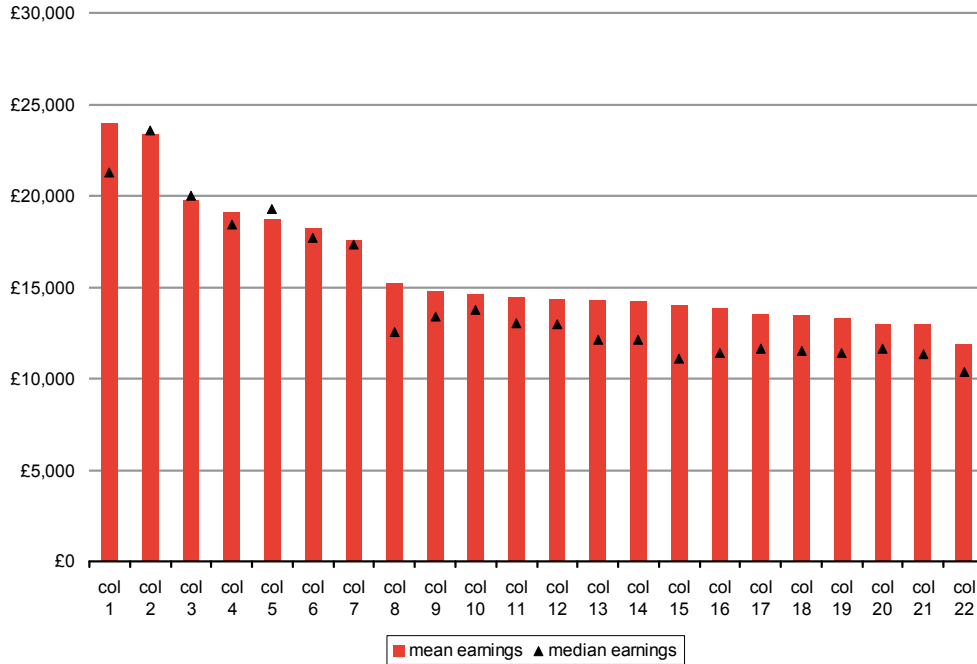
Frontier analysis of FE-HMRC/DWP data. FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum.

Figure 52: Earnings by provider- Business, Administration and Law (FE FL2)
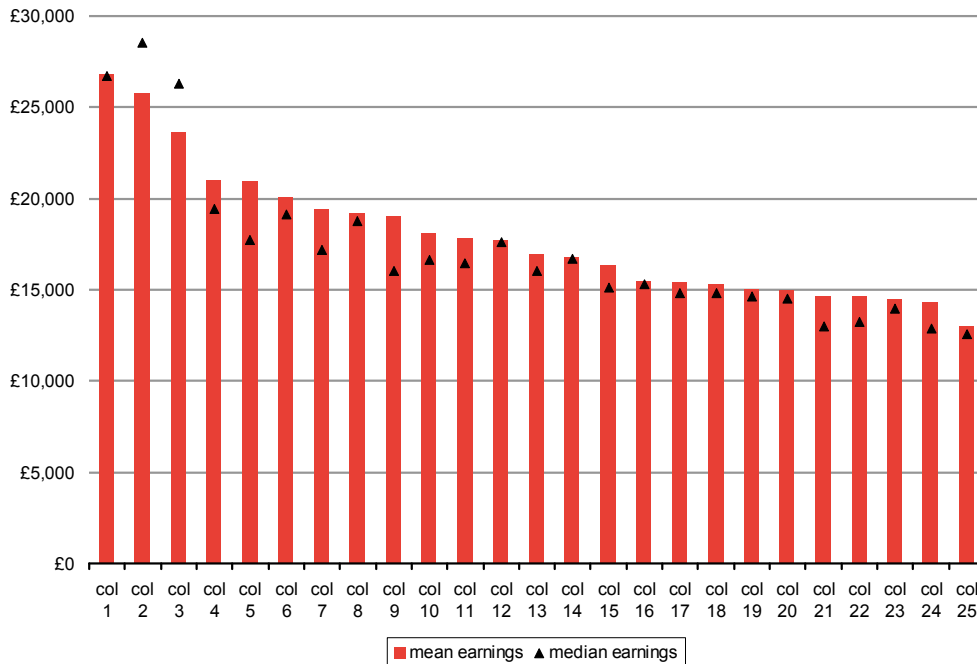
Frontier analysis of FE-HMRC/DWP data. FL2 achievers in continuous work and earnings between £4,800 and £80,000 per annum.

L3 achievers

L3 achievers comprise learners whose notional NVQ level is 3. This category includes learners doing FL3 programmes as well as those doing other part L3 qualifications, such as one AS level. FL3 achievers are learners following aims, the total width of which adds up to 100% or more of L3. Our merged ILR-HMRC/DWP data set contains 631,431 L3 achievers, of which 293,235 are FL3.

We begin this section by providing a brief overview of the key characteristics of L3 achievers as a whole, before focusing on a detailed analysis of the characteristics and labour market performance of FL3 achievers.

L3 achiever demographic characteristics

- *Age*: With an average age of only 26, L3 achievers are much younger than L2 and BL2 learners. More than half of all L3 achievers are aged under 20.

- *Gender*: 40% of L3 achievers are male

- *Ethnicity*: 80% of L3 achievers are white British

- *Deprivation*: 26% of L3 achievers live in deprived areas

Sector subject area concentration

Just over half of L3 achievers are concentrated in 4 subject areas. These are:

- Health, Public Services and Care – 117,672 achievers (19%)

- Arts, Media and Publishing- 92,280 (15%)

- Business, Administration and Law- 64,572 (10%)

- Science and Mathematics - 49,762 (8%)

Prior Attainment

Information on prior attainment is available for 67% of L3 achievers. The most common prior qualification level is L2 (61% of those for whom prior attainment is available). The rest of the sample has prior qualifications at:

- L1 - 11%

- L3 - 12%

- L4+ - 7%

- No qualifications and other - 9%

Earnings

We start by describing the average earnings of L3 achievers, including all observations such as zeros and outliers. These are presented below. Average annual earnings pre-learning stand at £5,903 and post-learning at £7,885 - an increase of 34%. However, as discussed in previous sections, this large increase in mean earnings may be caused by increases in earnings or changes in working patterns.

Table 54: Mean earnings pre-learning (L3 FE)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	117,672	6,773	8,345	40%	27%
Science and Mathematics	49,762	2,321	4,341	60%	24%
Agriculture, Horticulture and Animal Care	13,323	4,507	6,750	52%	27%
Engineering and Manufacturing Technologies	39,429	11,022	13,949	36%	26%
Construction, Planning and Built Environment	22,073	11,780	14,196	31%	28%
Information and Communication Technology	33,047	4,847	7,372	54%	27%
Retail and Commercial Enterprise	41,932	6,211	7,835	41%	29%
Leisure, Travel and Tourism	31,917	3,112	6,456	53%	19%
Arts, Media and Publishing	92,280	2,708	4,775	55%	26%
History, Philosophy and Theology	15,401	3,236	4,634	57%	28%
Social Sciences	19,715	1,871	4,195	59%	23%
Languages, Literature and Culture	32,902	4,690	6,600	55%	24%
Education and Training	38,684	11,669	12,779	25%	22%
Preparation for Life and Work	18,679	5,370	5,152	41%	39%
Business, Administration and Law	64,572	7,702	10,013	40%	21%
All	631,388	5,903	7,885	46%	25%

Frontier analysis of FE-HMRC/DWP data. L3 FE achievers

Annual earnings vary enormously by subject area. They are six times higher in Construction, Planning and Built Environment than in Social Sciences but this huge difference is largely due to composition effects such as age. To illustrate this point we plot average subject area age against mean subject area earnings in Figure 53 on the next page. The data shows a clear linear relationship between age and earnings indicating that earnings are higher in subject areas where learners tend to be older.

Figure 53: Mean earnings and average age by subject area (L3)
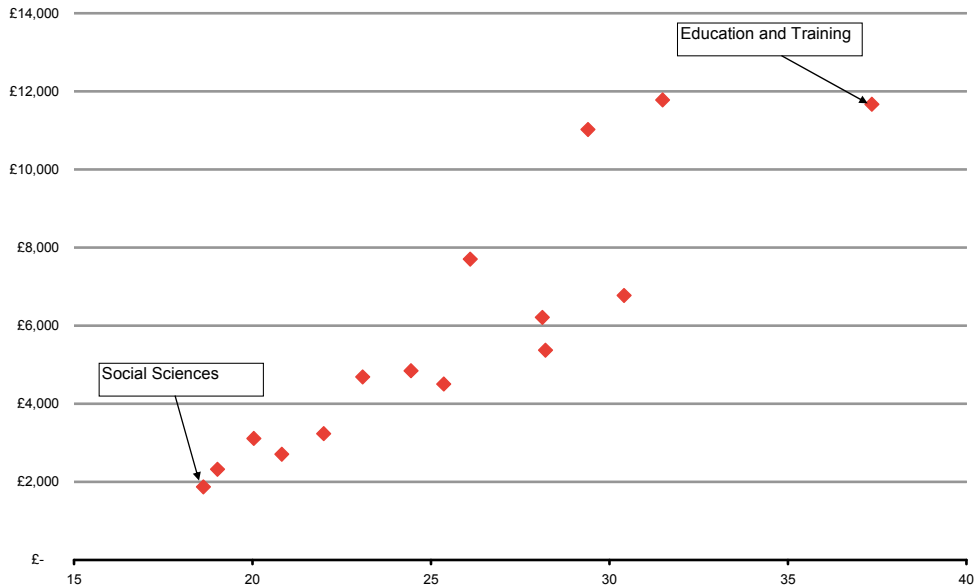
All L3 achievers

L3 achievers are on average much younger than the other groups considered so far, which is reflected in the number of achievers with zero earnings, particularly pre-learning. There are 289,060 L3 achievers with zero earnings before training, but only 160,963 post-training corresponding to 46% and 25% of the sample respectively. Clearly a significant proportion of the change in raw earnings can be explained by learners entering the labour market post FE. This is reflected in the sharp fall of zero earnings in the data.

In order to illustrate this point we present the relationship between mean earnings and proportion of zeros by subject area graphically in Figure 54 overleaf. Not surprisingly, a high proportion of zeros is associated with low average earnings and conversely a low share of zeros is associated with higher earnings. Earnings grow the most in subject areas where the fall in zero earnings is highest.

123

Figure 54: Mean earnings and proportion of achievers with zero earnings pre and post-learning (L3)
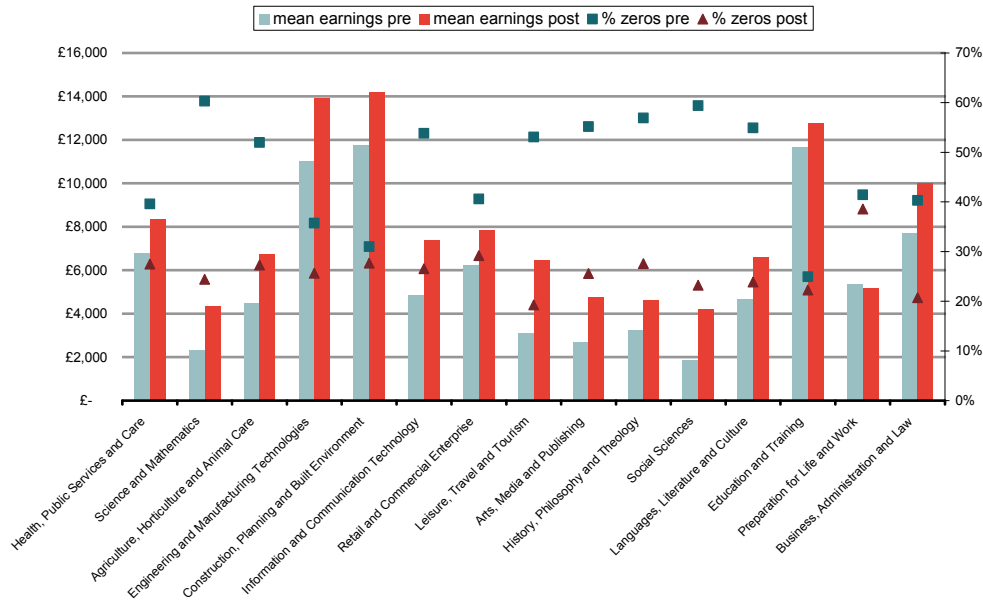
All L3 achievers

Filtered earnings

In order to focus purely on earnings changes, abstracting from changes in employment rates, we now restrict our sample to the same subsample used in previous sections: achievers who were in continuous work both before and after learning took place (for at least 11 months) and whose annual earnings were between £4,800 and £80,000. This restricts the sample to 127,230 L3 achievers pre-learning and 135,807 post-learning.

We present mean and median earnings, and earnings growth for all subject areas in Table 55. Both means and medians show that earnings are highest for achievers in Engineering and Manufacturing Technologies and lowest for achievers in Social Sciences. Strong growth is seen in:

- Construction, Planning and Built Environment (11% mean, 15% median)

- Engineering and Manufacturing Technologies (9% mean, 10% median)

We see negative earnings growth in:

- Leisure, Travel and Tourism (-6% mean, -9% median)

- Arts, Media and Publishing (-4% mean, -6% median)

Table 55: Earnings pre and post-learning (L3)

Subject area	Mean pre	Mean post	% change	Median pre	Median post	% change
Health, Public Services and Care	17,377	17,735	2%	14,836	15,320	3%
Science and Mathematics	16,772	16,597	-1%	14,052	13,666	-3%
Agriculture, Horticulture and Animal Care	16,904	16,910	0%	14,066	14,990	7%
Engineering and Manufacturing Technologies	23,366	25,552	9%	22,365	24,582	10%
Construction, Planning and Built Environment	22,014	24,529	11%	20,291	23,260	15%
Information and Communication Technology	19,234	19,358	1%	17,118	17,355	1%
Retail and Commercial Enterprise	17,406	17,417	0%	14,979	14,644	-2%
Leisure, Travel and Tourism	18,601	17,422	-6%	15,307	13,883	-9%
Arts, Media and Publishing	17,883	17,189	-4%	14,438	13,616	-6%
History, Philosophy and Theology	18,286	17,980	-2%	14,375	14,124	-2%
Social Sciences	14,289	14,144	-1%	11,956	11,540	-3%
Languages, Literature and Culture	22,973	22,253	-3%	19,803	18,530	-6%
Education and Training	18,976	19,828	4%	16,803	17,833	6%
Preparation for Life and Work	14,673	15,470	5%	12,693	13,193	4%
Business, Administration and Law	19,527	20,403	4%	17,568	18,520	5%
All	19,027	19,644	3%	16,442	17,230	5%

L3 achievers in continuous employment pre and post-learning with earnings between £4,800 and £80,000

Employment

We summarise the employment histories and outcomes of L3 achievers below. We present average time in work before and after training, as well as the proportion of achievers in employment for the 12 months before and after training. We also show what proportion of the sample were employed six months before and after learning.

On average, L3 achievers were in work for 5.7 months pre and 8.2 months post-learning with the proportion in continuous employment also increasing from 37% to 55%.

Again there is significant variation in the employment histories and outcomes of L3 achievers by subject area. Education and Training achievers are most likely to be in continuous work both pre and post-learning with 65% and 73% respectively compared with 19% and 44% for Science and Mathematics achievers. These large differences are likely to be caused by differences in learner characteristics such as age. Education and Training

achievers have an average age of 37 compared to Science and Mathematics achievers' average age of only 19.

Table 56: Employment rates before and after learning (FE L3)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	46%	61%	56%	71%	6.81	8.55
Science and Mathematics	19%	44%	29%	60%	3.55	7.30
Agriculture, Horticulture and Animal Care	32%	51%	42%	65%	5.07	7.86
Engineering and Manufacturing Technologies	50%	64%	60%	73%	7.20	8.78
Construction, Planning and Built Environment	57%	64%	66%	73%	7.98	8.72
Information and Communication Technology	29%	53%	39%	65%	4.76	7.92
Retail and Commercial Enterprise	44%	58%	55%	70%	6.65	8.35
Leisure, Travel and Tourism	22%	53%	33%	70%	4.13	8.36
Arts, Media and Publishing	23%	44%	33%	61%	4.12	7.35
History, Philosophy and Theology	24%	42%	34%	58%	4.16	7.08
Social Sciences	18%	44%	28%	61%	3.51	7.41
Languages, Literature and Culture	26%	48%	35%	63%	4.27	7.66
Education and Training	65%	73%	74%	80%	8.83	9.54
Preparation for Life and Work	44%	50%	56%	61%	6.73	7.37
Business, Administration and Law	44%	62%	53%	73%	6.40	8.79
All	37%	55%	47%	68%	5.71	8.16

Frontier analysis of FE-HMRC/DWP data. L3 achievers.

Benefits

We show what proportion of the sample was claiming a benefit at any point in the year before and after learning. We also show the proportion claiming six months before and after learning.

Following achievement, benefit rates decline or remain constant in all subject areas. The proportion of L3 achievers claiming at some point in the 12 months post-learning is 8%, two percentage points lower than the pre-learning rate of 10%.

Preparation for Life and Work learners are by far the most likely to claim benefits. A quarter claimed benefits pre-learning compared with only one in twenty Science and Mathematics learners.

Table 57: Benefit spells before and after learning (FE L3)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	14%	11%	9%	7%	9%	7%
Science and Mathematics	5%	4%	3%	3%	3%	2%
Agriculture, Horticulture and Animal Care	10%	8%	6%	5%	7%	5%
Engineering and Manufacturing Technologies	9%	6%	5%	3%	5%	3%
Construction, Planning and Built Environment	9%	6%	5%	3%	5%	3%
Information and Communication Technology	11%	10%	7%	7%	8%	7%
Retail and Commercial Enterprise	15%	13%	11%	9%	11%	9%
Leisure, Travel and Tourism	5%	5%	3%	3%	3%	2%
Arts, Media and Publishing	7%	7%	4%	5%	5%	5%
History, Philosophy and Theology	8%	7%	5%	5%	5%	4%
Social Sciences	6%	5%	4%	3%	4%	3%
Languages, Literature and Culture	5%	5%	3%	3%	4%	3%
Education and Training	12%	8%	7%	5%	7%	5%
Preparation for Life and Work	25%	19%	16%	12%	18%	11%
Business, Administration and Law	7%	6%	4%	4%	4%	4%
All	10%	8%	6%	5%	6%	5%

Frontier analysis of FE-HMRC/DWP data. L3 FE achievers.

FL3 achievers

FL3 achiever demographic characteristics

Figure 55 plots the key demographic characteristics of FL3 achievers relative to the full FE sample. The most striking difference between the full sample of FE achievers and FL3 achievers is that the latter are much younger than all other groups of FE achievers.

- *Age*: FL3 achievers are the youngest group of learners in the FE sample with an average age of only 22 years. Approximately 2 out of 3 FL3 achievers area aged between 16 and 19

- *Gender*: 37% of FL3 achievers are male

- *Ethnicity*: 82% of FL3 achievers are white British

- *Deprivation*: 27% of FL3 achievers live in deprived areas

.

Figure 55: Key demographic characteristics (FL3)
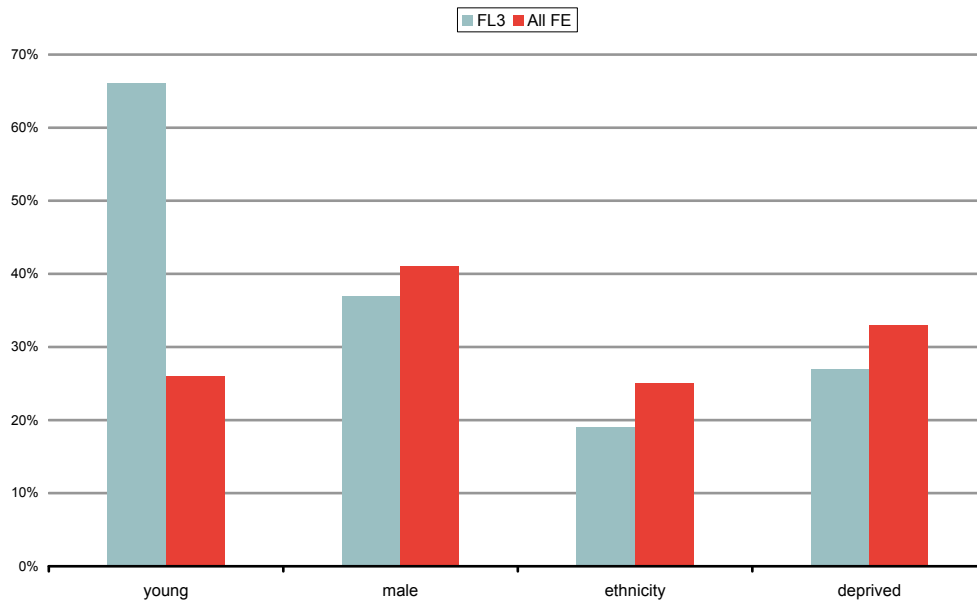
All FL3 achievers

Another interesting feature of this group of learners is that the average achiever age varies significantly between subject areas, as shown in Figure 56. On average, achievers in Education and Training are the oldest, with an average age of 37 years compared with achievers in Languages, Literature and Culture whose mean age is only 17 years.

Figure 56: Mean age by sector subject area FL3

All FL3 achievers

128
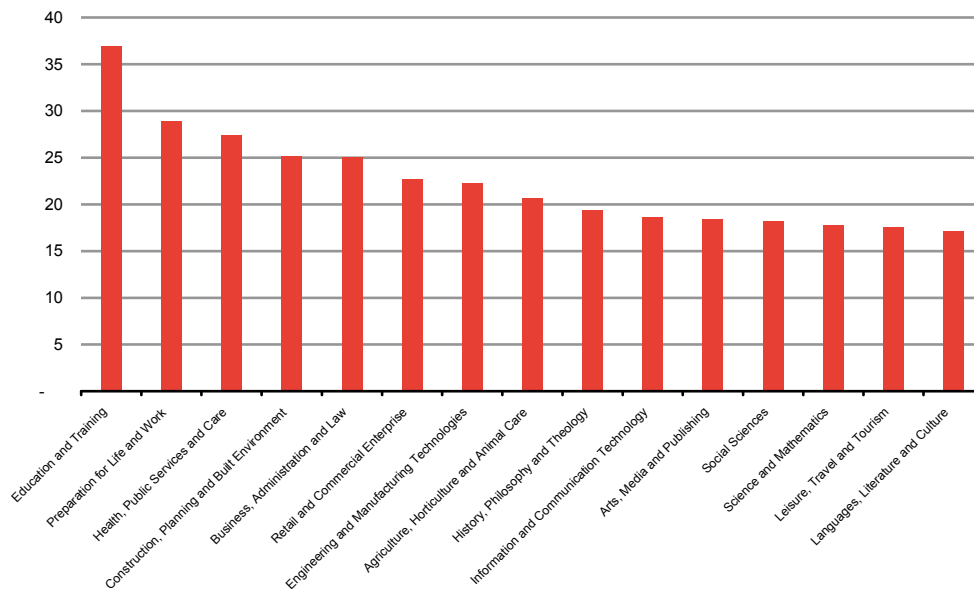
Sector subject area concentration

Just over half of FL3 achievers are concentrated in 4 subject areas. These are:

- Health, Public Services and Care – 117,672 achievers (19%)

- Arts, Media and Publishing- 92,280 (15%)

- Business, Administration and Law- 64,572 (10%)

- Science and Mathematics - 49,762 (8%)

Relative to the other achiever groups in the FE sample, FL3 achievers are distributed more evenly across the subject areas.

Prior Attainment

Prior attainment is available for 3/4 of the FL3 achiever sample. The vast majority of FL3 achievers have a L2 qualification as their highest prior attainment:

- L2 – 71%

- L1 - 12%

- L3 – 9%

- L4+ or higher – 2%

- No qualifications or BL1 – 6%

Earnings

Mean earnings among FL3 achievers are low compared with the other learner groups in our analysis: only £3,411 pre and £6,081 post-training. Again this is in large part a consequence of the large proportion of zero earnings in the sample – FL3 learners are very young and hence a large proportion are unlikely to have been in work, particularly pre-learning. However, the proportion of individuals with zero earnings drops a great deal post-learning from 52% pre-to only 24% post.

Figure 57 shows the average earnings pre and post-learning for our full sample of FL3 achievers, by subject area. Also presented in the figure is the proportion of learners in a subject area whose earnings equal zero before and after FE. Not surprisingly, large shares of zero earnings are associated with low average earnings. Also, high earnings growth appears to be correlated with large drops in the share of zeros. For example the average earnings of graduates in Information and Communication Technology more than treble following achievement in FE. At the same time, the proportion of learners with zero earnings in this subject area falls by almost forty percentage points from 65% to 26%.

Figure 57: Mean earnings by subject area (FL3)
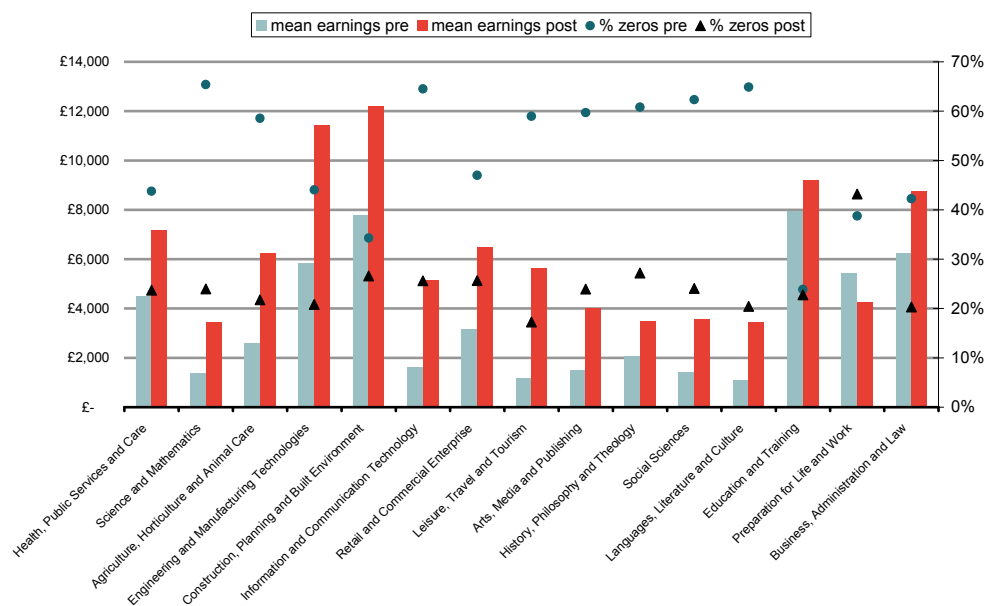
All FL3 achievers

The statistics underlying Figure 57 are shown below.

Table 58: Mean earnings pre-learning (FL3 FE)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	58,805	4,512	7,163	44%	24%
Science and Mathematics	26,686	1,357	3,436	65%	24%
Agriculture, Horticulture and Animal Care	6,190	2,606	6,255	59%	22%
Engineering and Manufacturing Technologies	10,716	5,815	11,408	44%	21%
Construction, Planning and Built Environment	10,058	7,797	12,189	34%	27%
Information and Communication Technology	13,520	1,617	5,121	65%	26%
Retail and Commercial Enterprise	18,931	3,175	6,496	47%	26%
Leisure, Travel and Tourism	18,819	1,164	5,614	59%	17%
Arts, Media and Publishing	48,682	1,486	3,999	60%	24%
History, Philosophy and Theology	8,248	2,052	3,496	61%	27%
Social Sciences	9,230	1,418	3,553	62%	24%
Languages, Literature and Culture	11,976	1,102	3,428	65%	20%
Education and Training	7,336	7,962	9,196	24%	23%
Preparation for Life and Work	13,521	5,427	4,241	39%	43%
Business, Administration and Law	30,496	6,246	8,744	42%	20%
All	293,214	3,411	6,081	52%	24%

Frontier analysis of FE-HMRC/DWP data. FL3 FE achievers

The data reveals that both before and after FE, raw earnings are highest in:

- Engineering and Manufacturing Technologies

- Construction,   Planning and Built Environment

- Education and Training

and lowest in:

- Languages, Literature and Culture

- Science and Mathematics

The differences in raw earnings appear to be driven by a combination of age, gender and likelihood of being in work (reflected in the proportion of zero earnings). For example, Education and Training learners are by far the oldest group of FL3 learners with an average age of 37 (compared with a sample average of 22). They are also the most likely to be in work before learning which is reflected both in the proportion of zero earnings and the employment rate in the 6th month before the course (76% were employed).The learners in the other two subject areas with high earnings have very similar characteristics-they are older than the sample as a whole and significantly more likely to be in work pre-learning.

Filtered Earnings

As in previous sections of this report, we refine our measure of earnings by excluding zeros and earnings that fall outside the £4,800-£80,000 bracket from subsequent analyses. The effect of this exclusion on sample size is demonstrated in Figure 58 overleaf. Of the 293,214 FL3 achievers, only one in seven were in continuous employment and earning between £4,800 and £80,000. Considering the young age of FL3 learners, it is perhaps not surprising that such a small proportion meet these criteria. The complication presented by this relatively large drop in observations is that splitting the data further by subject area and demographic group may result in small samples. We analyse this on the next page.

Figure 58: Effect of filtering earnings on sample size (FL3)
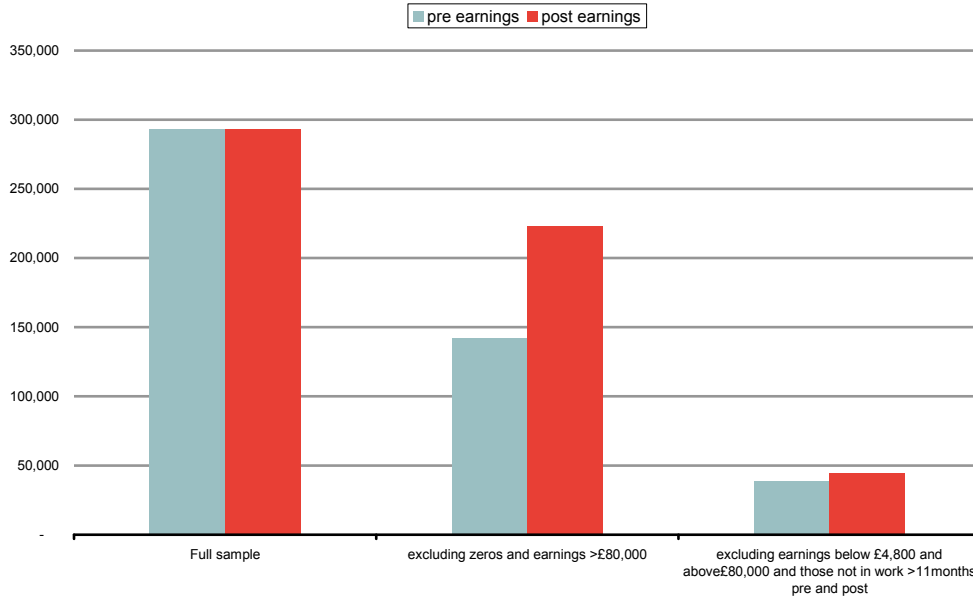
Frontier analysis of FE-HMRC/DWP data. FL3 FE achievers

We show the number of observations used in the calculation of 'filtered' earnings below. Samples appear to be sufficiently large for most demographic groups. One exception is ethnic minorities- there are 4 subject areas with fewer than 100 non-white British learners. These are:

- Agriculture, Horticulture and Animal Care

- History, Philosophy and Theology

- Social Sciences and Languages

- Literature and Culture

Table 59: Sample size for filtered earnings calculation by subject area and demographic group (FE FL3)

Subject	Men	Women	White	Ethnic minority	Not deprived	Deprived	Age 19+	All
Health, Public Services and Care	1,710	11,762	11,081	2,391	9,066	4,406	11,458	13,472
Science and Mathematics	382	709	855	236	802	289	544	1,091
Agriculture, Horticulture and Animal Care	279	429	683	25	614	94	442	708
Engineering and Manufacturing	2,669	149	2,601	217	2,199	619	2,099	2,818
Construction, Planning and Built Environment	3,063	190	3,013	240	2,478	775	2,539	3,253
Information and Communication	602	304	702	204	627	279	425	906
Retail and Commercial Enterprise	659	2,312	2,655	316	2,213	758	1,736	2,971

Subject	Men	Women	White	Ethnic minority	Not deprived	Deprived	Age 19+	All
Leisure, Travel and Tourism	579	592	1,037	134	926	245	176	1,171
Arts, Media and Publishing	1,061	1,419	2,085	395	1,939	541	978	2,480
History, Philosophy and Theology	139	332	405	66	331	140	381	471
Social Sciences	139	286	339	86	297	128	213	425
Languages, Literature and Culture	105	374	422	57	376	103	143	479
Education and Training	468	2,924	3,032	360	2,582	810	3,061	3,392
Preparation for Life and Work	428	1,594	1,600	422	1,317	705	2,480	2,022
Business, Administration and	1,918	6,810	7,529	1,199	6,615	2,113	7,777	8,728
All	14,201	30,186	38,039	6,348	32,382	12,005	34,452	44,387

Frontier analysis of FE-HMRC/DWP data. FL3 achievers in continuous employment and earning between £4,800 and £80,000 per annum

The two tables that follow show how filtered earnings vary by subject area and demographic group both pre and post-learning.

Table 60: Mean filtered earnings by demographic group (FE FL3)

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	13,811	13,830	17,408	13,275	6%	7%	4%	6%
Science and Mathematics	14,377	13,850	15,781	13,615	2%	3%	1%	2%
Agriculture, Horticulture and Animal Care	14,890	14,591	16,508	13,753	4%	8%	1%	7%
Engineering and Manufacturing Technologies	18,036	18,911	18,190	15,481	27%	28%	28%	12%
Construction, Planning and Built Environment	17,214	18,207	17,364	14,784	28%	25%	27%	31%
Information and Communication Technology	14,518	14,760	13,797	15,571	1%	4%	4%	-1%
Retail and Commercial Enterprise	13,736	14,223	17,472	12,474	4%	8%	6%	6%
Leisure, Travel and Tourism	12,820	11,064	12,748	12,901	6%	14%	7%	5%
Arts, Media and Publishing	13,601	13,152	13,268	13,865	1%	6%	5%	-2%
History, Philosophy and Theology	14,109	13,551	15,753	13,493	0%	2%	1%	-1%
Social Sciences	13,542	13,304	14,391	13,192	-3%	-1%	-3%	-3%
Languages, Literature and Culture	14,507	14,119	14,113	14,623	-1%	10%	-2%	0%

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Education and Training	13,912	13,930	29,716	11,047	6%	6%	7%	9%
Preparation for Life and Work	13,527	13,561	15,263	13,067	3%	3%	4%	3%
Business, Administration and Law	16,458	16,638	18,968	15,778	7%	8%	6%	7%
All	14,902	15,088	17,571	13,689	8%	10%	13%	6%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 61: Mean filtered earnings by demographic group (FE FL3)

Study area	Before training				% change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	13,627	14,573	13,897	13,765	6%	7%	7%	6%
Science and Mathematics	14,356	14,443	14,461	14,342	2%	2%	2%	2%
Agriculture, Horticulture and Animal	14,687	19,805	12,709	15,248	5%	-21%	17%	2%
Engineering and Manufacturing	17,981	18,655	16,984	18,344	28%	18%	32%	26%
Construction, Planning and Built	17,144	18,027	17,328	17,177	28%	25%	24%	29%
Information and Communication	14,862	13,486	14,276	14,652	1%	1%	0%	2%
Retail and Commercial	13,679	14,127	14,143	13,580	4%	12%	5%	4%
Leisure, Travel and Tourism	12,936	12,216	12,579	12,893	4%	19%	8%	5%
Arts, Media and Publishing	13,759	12,912	13,534	13,622	0%	7%	5%	0%
History, Philosophy and Theology	14,287	13,202	13,354	14,459	-2%	15%	3%	-1%
Social Sciences	13,390	14,065	14,024	13,318	-3%	-2%	-13%	2%
Languages, Literature and Culture	14,583	14,032	14,905	14,365	-1%	-2%	4%	-2%
Education and Training	13,870	14,260	12,699	14,301	7%	-1%	8%	5%
Preparation for Life and Work	13,378	14,083	13,162	13,729	4%	0%	2%	3%
Business, Administration and	16,524	16,035	16,017	16,601	7%	8%	5%	8%
All	14,909	14,865	14,516	15,057	9%	7%	9%	8%

Source: Frontier analysis of ILR-HMRC/DWP data

On the whole men earn around £4,000 more than women. This is true for 11 of the 15 subject areas although the size of the gender pay gap varies enormously. For example, men achieving in Education and Training earn on average £29,716 while the corresponding number for female achievers in this subject area is only £11,047. Women studying aims under Languages, Literature and Culture earn more than men in the same subject area.

There is little difference in the average earnings of white British achievers and ethnic minorities: the former earn £44 more than the latter. Individuals from deprived areas earn around £500 less than the rest of the sample.

Adult learners (defined as those aged 19 or more) earn more than the rest of the sample.

Earnings also vary a great deal by subject area, but there is a common pattern such that for all demographic groups of interest they are highest in:

- Engineering and Manufacturing Technologies

- Construction,   Planning and Built Environment

- Business, Administration and Law

On the other hand, learners achieving aims that fall under Social Sciences or Leisure, Travel and Tourism earn relatively low wages.

Finally we analyse how earnings change following achievement in FE, focusing on the different demographic groups and subject areas.

Our calculations reveal remarkable differences in the rates at which average earnings grow, particularly by subject area. The overall sample earnings growth rate is 8% but male earnings grow by twice as much as female earnings

The highest earnings growth (by a large margin) is enjoyed by learners in Engineering and Manufacturing Technologies and Construction, Planning and Built Environment whose annual salaries following achievement in FE are on average 27% and 28% higher than their pre-learning levels. In contrast, earnings in the other subject areas grow much more modestly or even decline in the cases of Social Sciences and Languages, Literature and Culture.

Employment

We describe the employment histories and outcomes of FL3 achievers using the same measures of employment as before. First we focus on time in employment before and after learning. Figure 59 overleaf shows average time in employment by subject area and period of observation, i.e. pre and post FE. Employment rates appear to be very different by subject area, particularly before learning.

Figure 59: Number of months worked pre and post-learning (FE FL3)
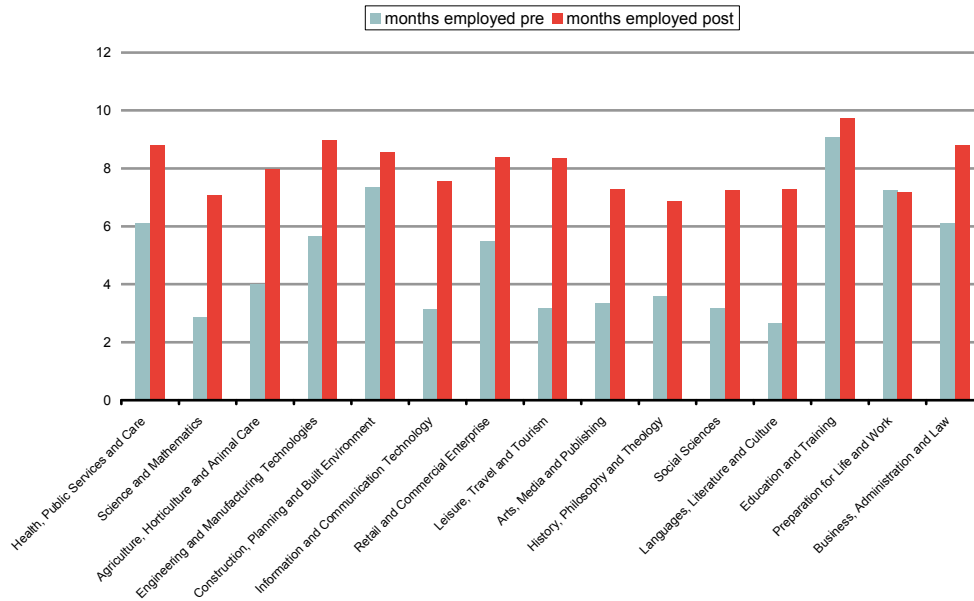
All FL3 achievers

For example, learners in Languages, Literature and Culture were in employment for only 2.7 of the 12 months preceding learning. The corresponding number for achievers in Education and Training is over three times higher at 9 months. Again, these large differences between subject areas are likely to be driven by differences in the characteristics of learners. We illustrate this diagrammatically by plotting subject area specific time in employment against average age as shown below. The data shows that the two variables are highly correlated such that pre-learning time in employment is higher in subject areas with older learners. Employment is highest for Education and Training learners, where average age is 37 years and lowest for Languages, Literature and Culture learners where average age is 17.

Figure 60: Average age and time in employment by subject area (FL3)
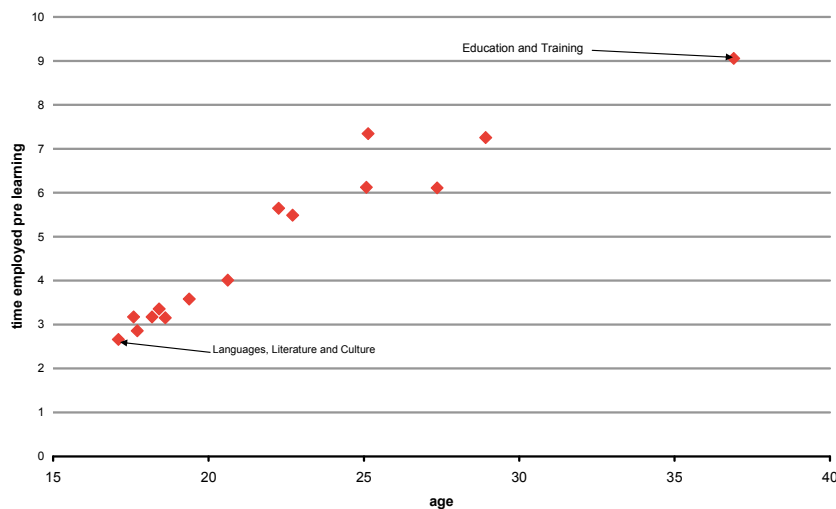
All FL3 achievers

On average FL3 achievers were in employment for 4.8 months pre-learning. Following achievement in FE, the average time in employment increases substantially to just over 8 months. Given that FL3 achievers are very young, and likely to have been in education pre-learning, this large change in employment is not altogether surprising. Our calculations reveal that there is considerable variation in both the level and growth of time in employment by subject area reflecting differences in learner characteristics.

Alternative measures of the employment histories and outcomes of FL3 achievers are presented below. These are the proportion of learners in continuous employment as well as proportion of time worked in the 6th month both before and after learning. All measures appear to show large improvement in employment. This is true for most subject areas with the exception of Preparation for Life and Work where employment rates are relatively stable.

On average, the proportion of FL3 achievers in continuous employment increases from 29% to 52%. For most subject areas, the change in this measure of employment is in the order of 20 percentage points or more. For example, only 14% of Science and Mathematics learners were in continuous work before FE but after FE the proportion increases to 41%. In subject areas, where employment is high before learning the changes are more modest. For example two thirds of Education and Training learners were in continuous employment pre-learning and 76% post-learning, a change of only 9 percentage points.

Table 62: Employment rates before and after learning (FE FL3)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	40%	62%	50%	73%	6.11	8.80
Science and Mathematics	14%	41%	23%	58%	2.86	7.09
Agriculture, Horticulture and Animal Care	23%	50%	33%	66%	4.01	7.96
Engineering and Manufacturing Technologies	37%	65%	46%	74%	5.65	8.97
Construction, Planning and Built Environment	51%	62%	61%	71%	7.35	8.55
Information and Communication Technology	16%	47%	25%	62%	3.15	7.56
Retail and Commercial Enterprise	33%	55%	45%	70%	5.49	8.37
Leisure, Travel and Tourism	14%	52%	25%	70%	3.17	8.36
Arts, Media and Publishing	16%	42%	27%	60%	3.36	7.28
History, Philosophy and Theology	20%	40%	29%	56%	3.58	6.88
Social Sciences	16%	42%	25%	59%	3.17	7.24
Languages, Literature and Culture	12%	41%	21%	60%	2.66	7.30
Education and Training	67%	76%	76%	81%	9.06	9.72
Preparation for Life and Work	47%	49%	60%	59%	7.25	7.16
Business, Administration and Law	41%	61%	51%	73%	6.12	8.80

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
All	29%	52%	39%	67%	4.80	8.04

Frontier analysis of FE-HMRC/DWP data. FL3 achievers.

Table 63: Employment rates before and after learning (FE FL3 19+)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	58%	66%	69%	74%	8.23	8.94
Science and Mathematics	44%	50%	58%	59%	6.97	7.20
Agriculture, Horticulture and Animal Care	46%	55%	59%	68%	7.12	8.13
Engineering and Manufacturing Technologies	58%	70%	69%	77%	8.29	9.24
Construction, Planning and Built Environment	61%	63%	70%	71%	8.42	8.57
Information and Communication Technology	34%	49%	47%	61%	5.68	7.37
Retail and Commercial Enterprise	49%	57%	60%	67%	7.20	8.11
Leisure, Travel and Tourism	34%	50%	51%	65%	6.15	7.79
Arts, Media and Publishing	35%	44%	51%	56%	6.19	6.85
History, Philosophy and Theology	45%	48%	60%	57%	7.08	6.94
Social Sciences	44%	46%	57%	57%	6.95	6.88
Languages, Literature and Culture	50%	51%	61%	62%	7.30	7.46
Education and Training	67%	76%	76%	81%	9.07	9.72
Preparation for Life and Work	49%	49%	62%	59%	7.41	7.13
Business, Administration and Law	65%	73%	74%	80%	8.89	9.61
All	54%	61%	66%	70%	7.86	8.46

Frontier analysis of FE-HMRC/DWP data. FL3 achievers.

Next we analyse how employment rates vary by demographic group. These are shown in the tables overleaf.

Table 64: Employment rate (work 11 months+) by demographic group (FE FL3)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	40%	58%	37%	41%	22%	8%	24%	21%
Science and Mathematics	14%	44%	12%	15%	27%	6%	26%	28%
Agriculture, Horticulture and Animal Care	23%	46%	23%	23%	27%	9%	26%	27%
Engineering and Manufacturing	37%	58%	37%	35%	28%	12%	28%	27%
Construction, Planning and Built Environment	51%	61%	51%	54%	11%	2%	10%	17%
Information and Communication	16%	34%	14%	21%	31%	15%	32%	30%
Retail and Commercial Enterprise	33%	49%	41%	31%	22%	8%	19%	24%
Leisure, Travel and Tourism	14%	34%	14%	15%	38%	16%	36%	40%
Arts, Media and Publishing	16%	35%	16%	16%	26%	9%	25%	28%
History, Philosophy and Theology	20%	45%	16%	22%	20%	3%	19%	20%
Social Sciences	16%	44%	13%	17%	26%	2%	27%	27%
Languages, Literature and Culture	12%	50%	11%	13%	29%	1%	27%	29%
Education and Training	67%	67%	67%	67%	9%	9%	6%	9%
Preparation for Life and Work	47%	49%	38%	50%	2%	0%	5%	1%
Business, Administration and Law	41%	65%	28%	49%	20%	8%	25%	17%
All	29%	54%	24%	32%	23%	7%	24%	23%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 65: Employment rate (work 11 months+) by demographic group (FE FL3)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	40%	41%	41%	40%	23%	18%	20%	23%
Science and Mathematics	14%	13%	15%	14%	28%	26%	28%	26%
Agriculture, Horticulture and	23%	26%	22%	23%	27%	25%	27%	27%
Engineering and Manufacturing	39%	23%	36%	37%	29%	27%	25%	29%
Construction, Planning and Built	52%	42%	50%	51%	11%	10%	7%	12%
Information and Communication	16%	15%	15%	16%	34%	27%	30%	33%
Retail and Commercial	32%	35%	33%	33%	24%	16%	20%	23%
Leisure, Travel and Tourism	14%	14%	13%	15%	39%	32%	37%	38%
Arts, Media and Publishing	16%	16%	16%	16%	27%	24%	25%	27%
History, Philosophy and Theology	20%	18%	26%	18%	20%	20%	16%	21%
Social Sciences	16%	14%	20%	15%	27%	25%	24%	26%
Languages, Literature and	13%	12%	13%	12%	29%	25%	30%	28%
Education and Training	69%	56%	64%	68%	9%	6%	7%	9%
Preparation for Life and Work	50%	40%	45%	49%	0%	9%	4%	0%
Business, Administration and	47%	27%	36%	43%	19%	23%	21%	20%
All	30%	26%	31%	29%	24%	22%	21%	24%

Source: Frontier analysis of ILR-HMRC/DWP data

Around a third of all achievers were in continuous employment pre-learning, increasing to half post-learning. Growth is significantly lower for adult learners but their employment rates are much higher pre-learning: employment increases from 54% pre-learning to 61% post.

Following achievement in FE:

- Women are more likely to be in work than men. This effect is particularly strong in Business, Administration and Law

- White British achievers are more likely to be in work than achievers from ethnic minorities particularly in Education and Training

- Adult learners (aged 19+) are much more likely to be in work than the rest.

Employment is highest in Education and Training and lowest in Science and Mathematics.

Benefits

In this section we describe the benefit histories and outcomes FL3 achievers. The types of benefit included in our measure are Income Support (IS), Job Seeker's Allowance (JSA) and Incapacity Benefit (IB). We measure benefits in terms of number of months on benefits as well as proportion of sample claiming at a point in time.

We begin by considering time spent on benefits pre and post-learning - for the sample as a whole, as well as by sector subject area. On average, FL3 achievers were claiming benefits for just 0.64 months pre and 0.48 months post-learning. A likely explanation for the low averages is the demographic composition of the sample: A-level achievers are mostly young and are likely to have been in education pre-learning and therefore not likely to have claimed benefits. Indeed, Figure 61 shows that time spent on benefit is highest in subject areas where learners tend to be older such as Preparation for Life and Work (average age 29) and Education and Training (average age of 37). Conversely, subject areas where learners are very young such as Languages, Literature and Culture (average age of 17) have extremely small numbers of benefit claimants.

Figure 61: Months on benefits pre and post-learning by subject area (FE FL3)
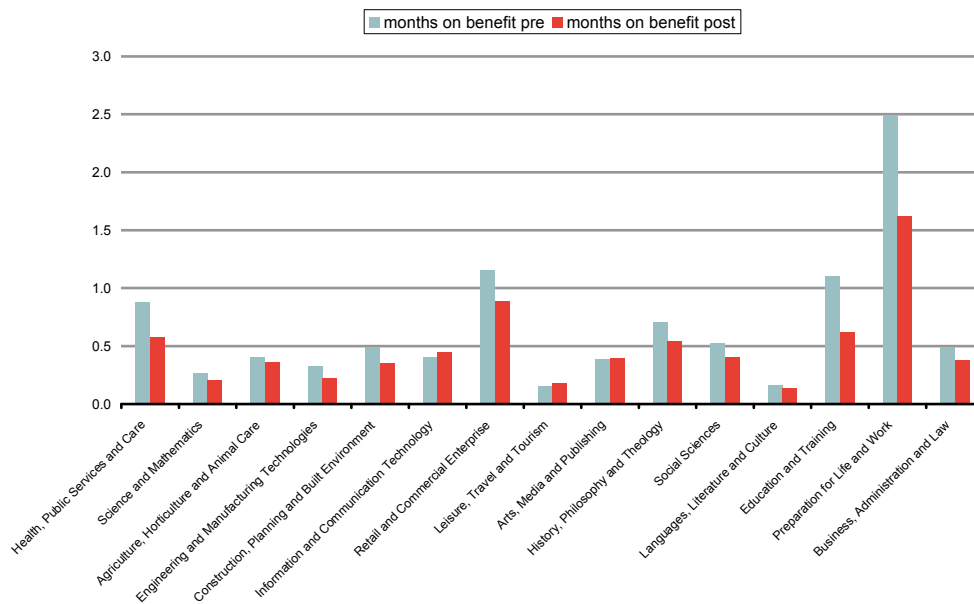
All FL3 achievers

Post-learning, the average time spent on benefits declines for the whole sample as well as most subject areas. The group with the highest average pre-learning – Preparation for Life and Work- see a fall in the average time on benefits from 2.49 to 1.62.

We present alternative measures of benefit histories and outcomes such as proportion of the sample claiming a benefit at any point in the 12 months before and after learning (first two columns) as well as proportion of sample on benefits at fixed time points pre and post-learning. Our calculations are consistent with the trends revealed by the time on benefits variable – they show benefits declining slightly following FE.

141

Preparation for Life and Work achievers are by far the most likely group to have been on benefits pre and post-learning with almost 1 in 3 claiming at some point in the year leading up to the course start. This falls to 22% post-learning. Another subject area with relatively high benefit claim rates is Education and Training – 14% of learners in this subject area claimed a benefit before going into the FE system and only 8% after.

The least likely group of learners to be on benefits both before and after learning are achievers in Languages, Literature and Culture: 2% of this group of learners were on benefits both pre and post-learning.

Table 66: Benefit spells before and after learning (FE FL3)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	11%	8%	7%	5%	7%	5%
Science and Mathematics	4%	3%	2%	2%	2%	2%
Agriculture, Horticulture and Animal Care	6%	5%	3%	3%	4%	3%
Engineering and Manufacturing Technologies	5%	4%	3%	2%	3%	2%
Construction, Planning and Built Environment	9%	6%	4%	3%	4%	3%
Information and Communication Technology	6%	6%	3%	4%	3%	4%
Retail and Commercial Enterprise	13%	12%	9%	8%	10%	7%
Leisure, Travel and Tourism	2%	3%	1%	2%	1%	1%
Arts, Media and Publishing	5%	6%	3%	3%	3%	3%
History, Philosophy and Theology	9%	7%	6%	5%	6%	4%
Social Sciences	6%	5%	4%	3%	4%	3%
Languages, Literature and Culture	2%	2%	1%	1%	1%	1%
Education and Training	14%	8%	9%	5%	9%	5%
Preparation for Life and Work	30%	22%	20%	14%	21%	13%
Business, Administration and Law	7%	5%	4%	3%	4%	3%
All	8%	7%	5%	4%	5%	4%

Frontier analysis of FE-HMRC/DWP data. FL3 FE achievers.

Table 67: Benefit spells before and after learning (FE FL3 19+)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	17%	12%	11%	7%	12%	7%
Science and Mathematics	25%	18%	15%	11%	16%	10%
Agriculture, Horticulture and Animal Care	17%	11%	9%	8%	10%	7%
Engineering and Manufacturing Technologies	10%	6%	5%	3%	5%	3%

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Construction, Planning and Built Environment	12%	8%	6%	4%	6%	4%
Information and Communication Technology	22%	17%	12%	11%	13%	10%
Retail and Commercial Enterprise	27%	21%	20%	15%	20%	14%
Leisure, Travel and Tourism	16%	12%	8%	7%	9%	6%
Arts, Media and Publishing	25%	19%	14%	12%	15%	12%
History, Philosophy and Theology	34%	25%	21%	16%	22%	14%
Social Sciences	41%	31%	27%	19%	29%	18%
Languages, Literature and Culture	24%	17%	17%	12%	18%	10%
Education and Training	14%	8%	9%	5%	9%	5%
Preparation for Life and Work	31%	23%	20%	14%	22%	13%
Business, Administration and Law	12%	8%	7%	5%	7%	5%
All	19%	14%	12%	9%	13%	8%

Frontier analysis of FE-HMRC/DWP data. FL3 FE achievers.

Next we show how benefit histories and outcomes vary by demographic group in the following tables. Clearly age is an important determinant of benefit rates- adult learners are twice as likely to claim as the rest.

Our calculations reveal that women are more likely to claim benefit than men in both periods. On average 9% of female achievers claimed benefits pre-learning compared with 6% of male achievers. The ratios of both groups decline by 1 percentage point post-learning. Relative to white British achievers, ethnic minorities are two times more likely to claim benefits both before and after learning. 14% of achievers who are from an ethnic minority claimed a benefit pre-learning compared with 7% of non ethnic learners. Preparation for Life and Work is the subject area with the highest proportion of learners claiming benefits pre-learning with approximately 1 in 3 achievers being benefit claimants. Post-learning this number decreases significantly for all demographic groups

Table 68: Benefit claims by demographic group (FE FL3)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	11%	17%	9%	11%	-3%	-5%	-3%	-3%
Science and Mathematics	4%	25%	3%	4%	-1%	-7%	-1%	0%
Agriculture, Horticulture and Animal Care	6%	17%	7%	5%	-1%	-6%	-2%	0%

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Engineering and Manufacturing Technologies	5%	10%	5%	8%	-1%	-4%	-1%	-3%
Construction, Planning and Built Environment	9%	12%	8%	12%	-3%	-4%	-2%	-5%
Information and Communication Technology	6%	22%	5%	9%	0%	-5%	1%	0%
Retail and Commercial Enterprise	13%	27%	7%	14%	-1%	-6%	-1%	-1%
Leisure, Travel and Tourism	2%	16%	2%	3%	1%	-4%	1%	1%
Arts, Media and Publishing	5%	25%	7%	5%	1%	-6%	-1%	0%
History, Philosophy and Theology	9%	34%	8%	10%	-2%	-9%	-2%	-2%
Social Sciences	6%	41%	4%	8%	-1%	-10%	-1%	-1%
Languages, Literature and Culture	2%	24%	2%	2%	0%	-7%	0%	0%
Education and Training	14%	14%	14%	14%	-6%	-6%	-7%	-6%
Preparation for Life and Work	30%	31%	30%	31%	-8%	-8%	-14%	-7%
Business, Administration and Law	7%	12%	6%	7%	-2%	-4%	-1%	-1%
All	8%	19%	6%	9%	-1%	-5%	-1%	-1%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 69: Benefit claims by demographic group (FE FL3)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	9%	20%	17%	8%	-3%	-5%	-4%	-2%
Science and Mathematics	3%	5%	7%	3%	0%	-1%	-1%	-1%
Agriculture, Horticulture and Animal Care	6%	11%	11%	5%	-1%	-3%	-1%	-1%
Engineering and Manufacturing Technologies	4%	11%	10%	4%	-1%	-3%	-3%	-1%
Construction, Planning and Built Environment	7%	20%	14%	7%	-2%	-7%	-3%	-3%

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Information and Communication Technology	4%	10%	10%	4%	1%	-1%	0%	1%
Retail and Commercial Enterprise	12%	22%	23%	9%	-1%	-3%	-2%	-1%
Leisure, Travel and Tourism	2%	6%	4%	2%	1%	1%	2%	0%
Arts, Media and Publishing	5%	9%	10%	4%	0%	1%	1%	0%
History, Philosophy and Theology	8%	13%	20%	6%	-1%	-3%	-4%	-1%
Social Sciences	6%	10%	15%	4%	-1%	-3%	-2%	-1%
Languages, Literature and Culture	2%	4%	5%	1%	0%	0%	-1%	0%
Education and Training	12%	27%	24%	10%	-6%	-9%	-9%	-4%
Preparation for Life and Work	29%	34%	39%	25%	-8%	-9%	-10%	-7%
Business, Administration and Law	5%	11%	11%	5%	-1%	-2%	-1%	-1%
All	7%	14%	15%	6%	-1%	-3%	-3%	-1%

Source: Frontier analysis of ILR-HMRC/DWP data

Comparing FL3 achiever outcomes at provider level

In this section we analyse whether it is possible to make comparisons of economic outcomes by subject area and provider. We have shown that the characteristics of learners vary a great deal across subject areas. This is why when comparing outcomes at provider level we can only compare achievers who fall under the same subject area.

The key determinant of whether such comparisons can be made in a meaningful way is sample size. We have shown in previous sections that in order to have reliable earnings summary statistics it is necessary to exclude learners not in work and those working part time from the sample. This has the effect of reducing sample sizes significantly and makes comparisons at provider level particularly difficult. Employment and benefits statistics are calculated on the basis of the full sample of FL3 achievers so sample size is less of an issue there.

The total number of FL3 achievers is 293,214. These follow learning aims in 476 different providers. As a starting point of our provider-level analysis we show the distribution of achievers by college in Figure 62. This can serve as a rough guide as to what comparisons may be possible. The data shows that there are just fewer than 100 colleges where the number of achievers is over 1,000 and around the same number have fewer than 100 achievers. The figure also makes clear that there is a 'long tail' of colleges with very few achievers at this level - there are 85 providers with fewer than 100 achievers.

Figure 62: Total number of achievers by provider (FE FL3)
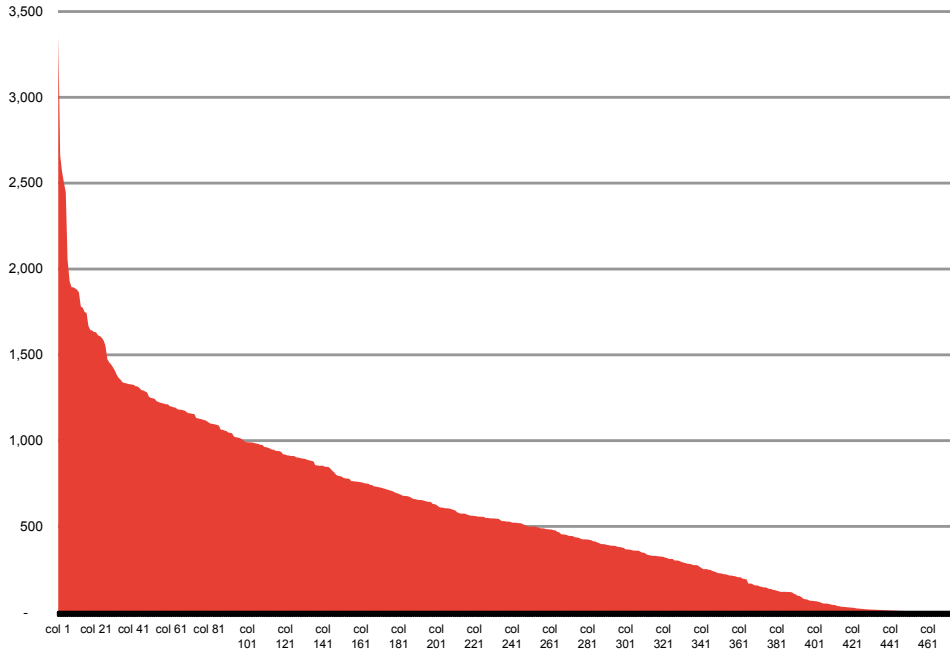
All FL3 achievers

As was pointed out earlier, the characteristics of learners vary significantly by subject area. Therefore comparisons in outcomes by provider are only interesting if they are made within subject area. As there are 15 subject areas this reduces the samples available for analysis further. In the table below we show the number of providers which have more than 100, 250 and 500 achievers in the different subject areas.

Table 70: Number of providers with sufficient numbers of achievers by subject area (FE FL3)

Subject area	Providers with >100 achievers	Providers with >250 achievers	Providers with >500 achievers
Health, Public Services and Care	219	80	5
Science and Mathematics	89	22	5
Agriculture, Horticulture and Animal Care	23	3	0
Engineering and Manufacturing Technologies	21	1	0
Construction, Planning and Built Environment	22	4	0
Information and Communication Technology	14	0	0
Retail and Commercial Enterprise	67	1	0
Leisure, Travel and Tourism	33	0	0
Arts, Media and Publishing	188	50	3

146

Subject area	Providers with >100 achievers	Providers with >250 achievers	Providers with >500 achievers
History, Philosophy and Theology	14	1	1
Social Sciences	21	0	0
Languages, Literature and Culture	36	5	0
Education and Training	13	1	0
Preparation for Life and Work	41	2	0
Business, Administration and Law	110	7	1
All	911	177	15

All FL3 achievers

Our calculations reveal that comparisons by provider may only be possible for some of the subject areas where there are a good number of colleges with sufficiently high samples. Health, Public Services and Care, Science and Mathematics, Arts Media and Publishing and Business Administration and Law appear to be areas where employment and benefits comparisons are possible between providers.

While a sample of 100 achievers may be large enough to calculate employment and benefits outcomes it is too small in order to allow the calculation of reliable earnings statistics. Imposing the restriction that earnings have to be between £4,800 and £80,000 and that individuals have to have been in work for over 11 months either side of the learning window reduces sample sizes significantly. In fact, the number of providers with samples over 100 achievers in Health, Public Services and Care for example is 27. For the other subject areas provider numbers with samples over 100 achievers are smaller. We show the number of providers with sufficiently high samples for earnings comparisons in the figure overleaf. It is clear from our calculations that meaningful earnings comparisons can only be made for learners in Health, Public Services and Care (and possibly Business, Administration and Law) since all other subject areas have either zero or very few colleges with sufficiently high numbers of students for whom reliable earnings statistics can be calculated.

Figure 63: Number of providers with sufficient samples for filtered earnings comparisons (FE FL3)
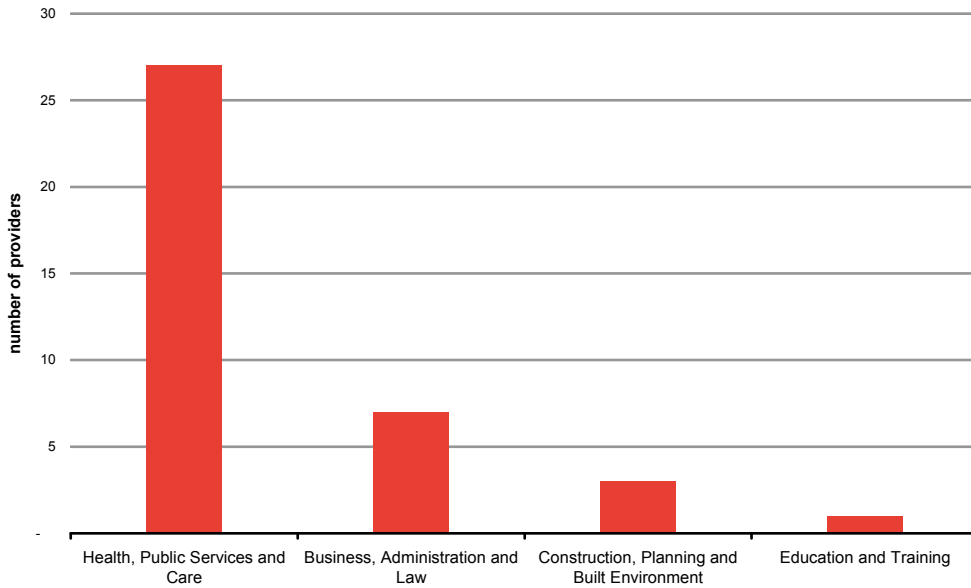
FL3 achievers in continuous employment and earning between £4,800 and £80,000 per annum

We calculate average and median earnings for each subject area/college with a sample greater than 100 learners. Our findings are presented graphically starting with Health, Public Services and Care in Figure 64

At the top of the earnings distribution average pay is £19,031 per annum while the bottom is almost six thousand pounds less at £13,193. Comparing median earnings reveals almost identical results in terms of the differential- the lowest median earnings are £11,986 while the highest are £17,211.

Figure 64: Filtered earnings by provider- Health, Public Services and Care (FE FL3)
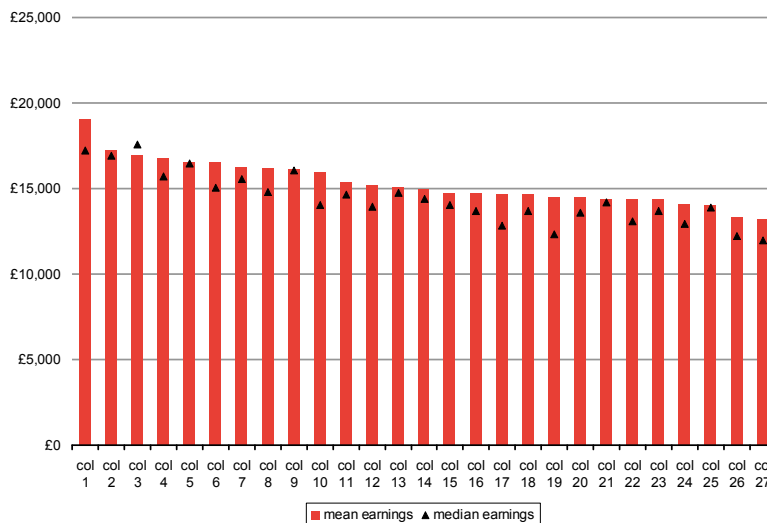
FL3 achievers in continuous employment and earning between £4,800 and £80,000 per annum

Finally, we show the variation in median and median earnings of learners in Business, Administration and Law. We have 7 providers for which we can calculate 'reliable' earnings. The results of our calculations are presented graphically in Figure 65.

Figure 65: Filtered earnings by provider - Business, Administration and Law (FE FL3)
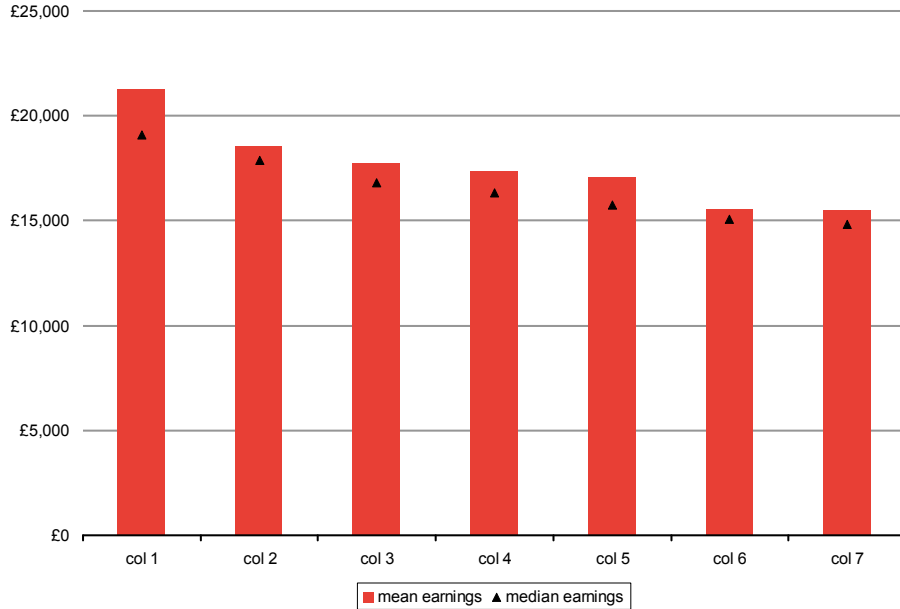
FL3 achievers in continuous employment and earning between £4,800 and £80,000 per annum

The difference in mean earnings in the top and bottom providers is around 6 thousand pounds- the highest average pay is £21,249 and the lowest is £15,508. Median earnings are consistently lower than mean earnings for all providers. Nevertheless, there is broad consistency between the two measures in terms of the hierarchy across providers – both measures rank providers in the same way.

Descriptive analysis— Apprenticeships

In this chapter we focus our attention on Apprenticeship learners who fall under the Work Based Learning funding stream. Our merged ILR- HMRC/DWP data set contains 174,935 Apprenticeship achievers who were in learning during the 2005-06 and 2006-07 academic years and finished their learning on or before 1 August 2007. A large proportion of this group of learners have appeared to have started their study prior 1 August 2004 which is our definition of the learning window. Due to the potential detrimental effect on sample size we have not excluded these learners from the analysis.

Apprenticeship achievers are quite different from FE achievers in a number of ways. Perhaps the most striking difference between the two sets of learners is that Apprenticeship achievers are much younger than their FE counterparts. On average, the achievers in our sample are just under 20 years old, 53% are aged 16 to 19 and 97% are aged below 25. Due to the young age of Apprenticeship learners, obtaining employment and earnings histories may prove rather difficult.

Apprenticeship learners are also more likely to be male, less likely to be from an ethnic minority and less likely to live in a deprived area than FE learners.

All Apprenticeship learners are either FL2 or FL3. Our data set contains 117,337 FL2 achievers and 57,598 FL3 achievers.

We begin by summarising our high level findings before going into our detailed analysis.

Aggregate labour market outcomes

Apprenticeship achievers gain very significantly from training. We see double digit growth in all main indicators following achievement. This holds for the sample as whole as well as adult learners. The gains are larger at FL3. Focusing on adult learners at FL2 we see employment go up by a quarter, benefits fall by a third and earnings increase by 30%. At FL3 all indicators except benefits grow even faster. Employment goes up by 67% and earnings grow by 43%. Benefits on the other hand appear to increase slightly.

Table 71: Key outcome indicators (All Apprenticeships)

		Before training		After training		% change	
		FL2	FL3	FL2	FL3	FL2	FL3
19+	Employment (months)	7.28	5.69	9.04	9.5	24%	67%
	Employment rate (6 months)	61%	47%	75%	79%	24%	68%
	Benefit (months)	0.59	0.17	0.42	0.17	-28%	4%
	Benefit rate (6 months)	5%	1%	3%	1%	-32%	-1%

		Before training		After training		% change	
		FL2	FL3	FL2	FL3	FL2	FL3
	Earnings (filtered)	£12,294	£12,903	£15,932	£18,397	30%	43%
All	Employment (months)	5.81	5.56	8.88	9.45	53%	70%
	Employment rate (6 months)	48%	46%	74%	79%	54%	72%
	Benefit (months)	0.38	0.15	0.34	0.16	-9%	7%
	Benefit rate (6 months)	3%	1%	3%	1%	-13%	3%
	Earnings (filtered)	£12,221	£12,735	£15,855	£18,189	30%	43%

Frontier analysis of WBL-HMRC/DWP data

Apprenticeships FL2 achievers

Demographic characteristics

The key demographic features of FL2 Apprenticeship achievers are summarised below:

- *Age*: On average FL2 achievers are 19 years old , less than a quarter are adults (19+)

- *Gender*: 49% of FL2 achievers are male

- *Ethnicity*: 8% are from an ethnic minority

- *Deprivation*: 29% live in a deprived area

The table below shows how their key demographic characteristics vary by subject area. There is little difference in the average age of achievers by subject area but there are remarkable differences in the gender composition of the subjects. Virtually all achievers in Construction, Planning and Built Environment are male but only 1 in 7 achievers in Health, Public Services and Care are. In terms of ethnicity, the latter is the subject area with the largest concentration of ethnic minorities at 12% while the former has the fewest with only 3%.

Achievers in Health, Public Services and Care are also the most likely to live in a deprived area and to have claimed benefit at some point between 2003 and 2009. In terms of continuous employment, achievers in Information and Communication Technology have the highest post-learning – 72% were employed for 11 months or longer in the 12 months post-learning.

Table 72: Achievers characteristics and labour market history (Apprenticeships FL2)

Subject area	Male	Ethnic minority	Aged 19+	Deprived area	Ever on benefits	Worked 11+months pre
Health, Publ ic Services a nd Care	14%	12%	55%	38%	26%	60%

151

Subject area	Male	Ethnic minority	Aged 19+	Deprived area	Ever on benefits	Worked 11+months pre
Agriculture, Horticulture and Animal Care	58%	3%	47%	15%	16%	56%
Engineering and Manufacturing Technologies	95%	6%	54%	23%	18%	66%
Construction, Planning and Built Environment	99%	3%	49%	27%	17%	54%
Information and Communication Technology	80%	9%	43%	16%	16%	72%
Retail and Commercial Enterprise	35%	7%	53%	28%	21%	58%
Leisure, Travel and Tourism	55%	8%	64%	22%	18%	61%
Business, Administration and Law	26%	10%	60%	34%	23%	66%
All	49%	8%	55%	29%	21%	30%

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers

Subject area concentration

The largest groups of FL2 Apprenticeship achievers are Retail and Commercial Enterprise and Business, Administration and Law with 27% and 25% of all FL2 achievers. There 6 other subject areas with substantial numbers of achievers. These are:

- Construction, Planning and the Built Environment (13%)

- Health, Public Services and Care (12%)

- Engineering and Manufacturing Technologies (12%)

- Information and Communication Technology (5%)

- Leisure, Travel and Tourism (3%)

- Agriculture, Horticulture and Animal Care (3%)

The remaining 7 subject areas have either zero or very few (less than 100) achievers and are therefore omitted from subsequent analyses. We show the distribution of achievers by subject area in Figure 66 overleaf.

Figure 66: Number of achievers by subject area (Apprenticeships FL2)
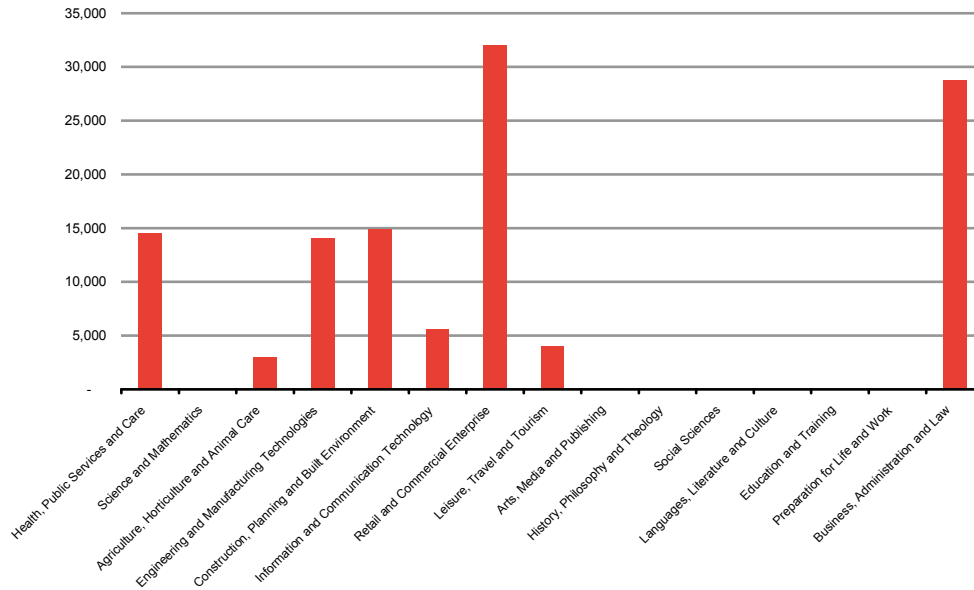
All FL2 achievers

Prior Attainment

Prior learner attainment is well recorded for Apprenticeship learners relative to FE learners. We have information on the level of previous qualifications held for 86% of FL2 Apprenticeship achievers. Just under half have prior qualifications at L1 with another 33% at L2 while 7% have no qualifications. 4% have prior qualifications at L3 and 7% BL1.

Earnings

We begin by analysing the earnings histories and outcomes of FL2 achievers including all observations. On average, FL2 Apprenticeship learners earn £4,168 pre-learning and £9,602 post. The large increase in average earnings following training is at least partly caused by a significant drop in the number of zero earnings in the sample. The differences in employment patterns pre-learning (reflected in the number of zeros) explain some of the variation in raw earnings by subject area too. Looking at the figure below, it appears that raw earnings are higher in subject areas with relatively low proportions of zeros such as Leisure, Travel and Tourism and low in subject areas with high proportion of zeros like Agriculture, Horticulture and Animal Care.

Figure 67: Mean earnings by subject area (Apprenticeships FL2)
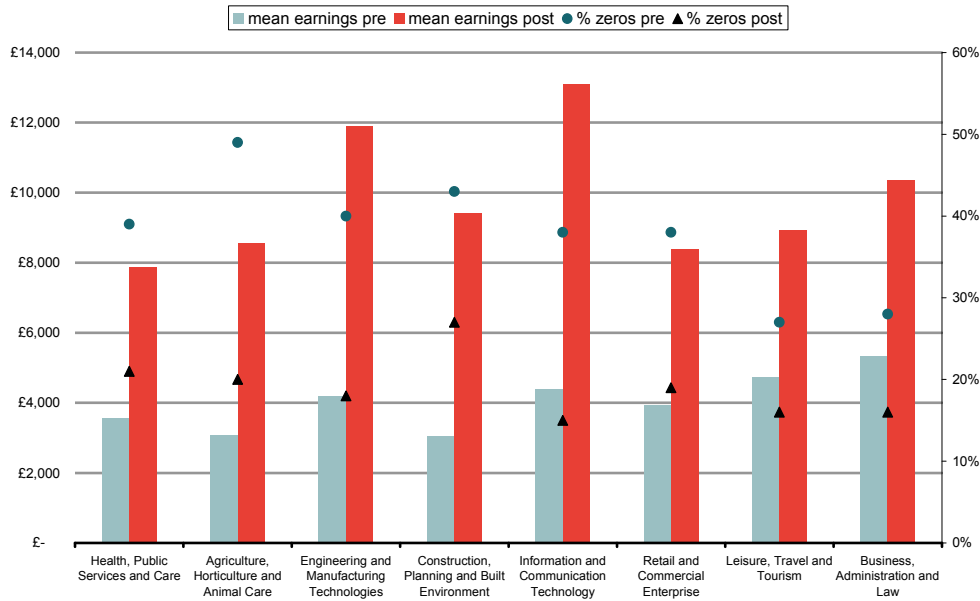
All FL2 achievers

In the table below we show how the proportion of learners with zero earnings in a subject area relates to employment rates. The subject areas with the highest proportion of individuals in continuous employment are the subject areas with the lowest proportion of zero earnings. For example, 40% of Leisure, Travel and Tourism achievers were employed for the whole year before going into the education system. The proportion of zero earnings in the same subject area is 27%. In comparison only 21% of Construction, Planning and Built Environment learners were in continuous work pre-learning. This is associated with a 43% share of zero earnings in our data.

As employment rates surge post training for all subject areas, the proportion of zero earnings drops significantly. Hence, the increase in the raw earnings average is a combination of higher employment rates and fewer people not in continuous work.

Only 30% of Apprenticeship achievers at FL2 were working the full year pre-learning but this ratio more than doubles post-learning.

Table 73: Mean earnings pre-learning (Apprenticeships FL2)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	14,566	3,546	7,869	39%	21%
Agriculture, Horticulture and Animal Care	2,971	3,072	8,551	49%	20%
Engineering and Manufacturing Technologies	14,111	4,179	11,887	40%	18%
Construction, Planning and Built Environment	14,917	3,037	9,395	43%	27%
Information and Communication Technology	5,585	4,394	13,095	38%	15%
Retail and Commercial Enterprise	32,036	3,930	8,369	38%	19%

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Leisure, Travel and Tourism	4,039	4,733	8,935	27%	16%
Business, Administration and Law	28,781	5,310	10,356	28%	16%
All	117,006	4,168	9,602	36%	19%

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers

Filtered earnings

Excluding zero earnings and earnings under £4,800 and over £80,000 as well as individuals who are not continuously employed from the sample reduces the number of observations dramatically but increases the reliability of summary statistics. The number of individuals in work pre and post-learning with earnings that fall in the bracket £4,800-£80,000 are 18,107 and 21,849 respectively. We show how these individuals are distributed by subject area and demographic group in the table below, highlighting cells with samples below 100 in grey. The data reveals that 'reliable' earnings can be calculated for most demographic group/subject area combinations although samples of ethnic minority learners are very small in half of the subject areas. There are also very few women learners in Construction, Planning and Built Environment (10) while the number of deprived learners in Agriculture, Horticulture and Animal Care is also low (49). Nonetheless, samples are sufficiently large to allow us to make comparisons between the earnings of most demographic groups.

Table 74: Sample size for filtered earnings calculation by subject area and demographic group (Apprenticeships FL2)

Subject	Men	Women	White	Ethnic minority	Not deprived	Deprived	Age 19+	All
Health, Public Services and Care	391	1,419	1,646	164	1,228	582	1,479	1,810
Agriculture, Horticulture and Animal Care	207	121	-	-	294	34	-	328
Engineering and Manufacturing	1,925	179	1,990	114	1,695	409	258	2,104
Construction, Planning and Built Environment	1,355	10	1,321	44	1,063	302	1,521	1,365
Information and Communication Technology	512	308	742	78	662	158	903	820
Retail and Commercial Enterprise	2,202	2,422	4,325	299	3,416	1,208	612	4,624
Leisure, Travel and Tourism	463	336	753	46	644	155	3,687	799
Business, Administration and Law	1,645	4,612	5,812	445	4,318	1,939	683	6,257
All	8,700	9,407	-	-	13,320	4,787	-	18,107

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum. Cells which are potentially disclosive have been marked with "-".

We show how 'filtered' earnings pre and post-learning vary by demographic group in the tables that follow. Again, we highlight cells with samples smaller than 100 learners in grey.

155

Our calculations show that earnings vary both between demographic group and subject area, but differences are much smaller than is the case for other learner groups considered in this report. Pre-learning:

- Men earn more than women; the average gender pay gap is 10%

- White British achievers earn less than those from ethnic minorities- the gap is 7%

- Learners from deprived areas earn around 2% less than those who live in non-deprived areas

- Adult learners earn around 1% more than the sample as a whole

There is variation in the earnings of all demographic groups by subject area but in general earnings are highest in:

- Information and Communication Technology

- Engineering and Manufacturing Technologies

and lowest in:

- Health, Public Services and Care

- Leisure, Travel and Tourism

Earnings grow on average by 30% for the sample as a whole, with male earnings growing by 39% and female earnings growing by 25%. There is little difference in the growth rates of the other demographic groups.

Learners in Construction, Planning and Built Environment experience the largest proportional increase in earnings. On average, their earnings grow by 53% while the earnings of Health, Public Services and Care learners grow more modestly by 21%.

Table 75: Mean filtered earnings by demographic group (Apprenticeships FL2)

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	11,527	11,407	13,702	10,928	21%	22%	40%	16%
Agriculture, Horticulture and Animal Care	11,735	-	12,037	11,218	38%	-	44%	29%
Engineering and Manufacturing Technologies	13,331	11,329	13,294	13,734	36%	37%	36%	29%
Construction, Planning and Built Environment	11,810	13,665	11,799	13,174	53%	35%	53%	24%
Information and Communication Technology	13,902	11,799	14,124	13,532	35%	57%	39%	27%

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Retail and Commercial Enterprise	11,698	13,885	12,590	10,887	26%	33%	31%	23%
Leisure, Travel and Tourism	11,422	11,669	11,488	11,331	30%	28%	35%	24%
Business, Administration and Law	12,426	11,588	13,219	12,144	26%	30%	45%	26%
All	12,221	12,294	12,816	11,670	30%	30%	39%	25%

Source: Frontier analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Table 76: Mean filtered earnings by demographic group (Apprenticeships FL2)

Study area	Before training				% change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	11,494	11,865	11,054	11,752	22%	16%	17%	23%
Agriculture, Horticulture and Animal Care	-	-	9,803	11,959	-	-	39%	39%
Engineering and Manufacturing Technologies	13,214	15,377	13,359	13,324	36%	22%	26%	38%
Construction, Planning and Built Environment	11,790	12,394	11,514	11,893	53%	39%	54%	52%
Information and Communication Technology	13,752	15,321	13,191	14,071	36%	21%	28%	36%
Retail and Commercial Enterprise	11,667	12,142	11,555	11,749	26%	27%	22%	28%
Leisure, Travel and Tourism	11,393	11,897	12,033	11,275	31%	23%	25%	32%
Business, Administration and Law	12,360	13,293	12,292	12,487	26%	25%	25%	27%
All	12,160	13,048	12,040	12,255	26%	25%	25%	27%

Source: Frontier analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Employment

We describe the employment histories and outcomes of FL2 Apprenticeship achievers by counting the number of months worked as well as calculating the proportion of time worked in a given month. Our calculations are presented below. The table overleaf shows how time in employment changes pre and post-learning by subject area.

The average time in employment is 5.8 months pre-learning but increases by 3 full months following achievement to 8.8 months. Given that FL2 achievers are very young, and likely to have been in education pre-learning, this large change in employment is not altogether surprising. Our calculations reveal that there is some variation in both the level and growth of time in employment by subject area. Pre-learning Leisure, Travel and Tourism learners had the longest employment spells spending just over 7 of the 12 months preceding learning in work. Learners in Agriculture, Horticulture and Animal care worked for 4.6 months before going into education.

Table 77: Employment rates before and after learning (Apprenticeships FL2)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	27%	60%	46%	73%	5.59	8.72
Agriculture, Horticulture and Animal Care	23%	56%	37%	71%	4.60	8.45
Engineering and Manufacturing Technologies	25%	66%	43%	77%	5.24	9.27
Construction, Planning and Built Environment	21%	54%	39%	67%	4.83	7.94
Information and Communication Technology	24%	72%	40%	81%	4.89	9.73
Retail and Commercial Enterprise	29%	58%	49%	72%	5.84	8.65
Leisure, Travel and Tourism	40%	61%	59%	76%	7.04	9.00
Business, Administration and Law	38%	66%	57%	78%	6.82	9.36
All	29%	61%	48%	74%	5.81	8.88

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers.

Table 78: Employment rates before and after learning (Apprenticeships FL2 19+)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	36%	63%	59%	75%	7.10	8.96
Agriculture, Horticulture and Animal Care	35%	61%	53%	74%	6.52	8.79
Engineering and Manufacturing Technologies	32%	68%	52%	78%	6.30	9.33
Construction, Planning and Built Environment	27%	55%	46%	67%	5.74	7.98
Information and Communication Technology	41%	71%	61%	80%	7.38	9.56
Retail and Commercial Enterprise	41%	62%	63%	74%	7.46	8.90
Leisure, Travel and Tourism	48%	63%	69%	77%	8.13	9.10
Business, Administration and Law	50%	68%	69%	79%	8.19	9.47
All	40%	64%	61%	75%	7.28	9.04

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers.

The proportion of FL2 Apprenticeship achievers in continuous employment increases by around 30 percentage points from 29% to 61% following achievement. More males than

females are in continuous employment pre-learning. Employment rates are also higher for adult learners than the sample as a whole. Pre-learning 40% of adults were in continuous work compared with 29% of the sample as a whole. There is little difference in the employment rates of the other demographic groups of interest. In terms of subject area, employment rates appear highest in Leisure, Travel and Tourism and Business, Administration and Law.

Following achievement employment increases by 32 percentage points for the sample as a whole. Growth is lower for adult learners than the sample as a whole but there is little difference in the aggregate growth rates of the other demographic groups of interest.

Engineering and Manufacturing Technologies and Information and Communication Technologies are the subject areas experiencing the strongest growth.

Table 79: Employment rate (work 11 months+) by demographic group (Apprenticeships FL2)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	27%	36%	34%	26%	33%	27%	36%	32%
Agriculture, Horticulture and Animal Care	23%	35%	23%	23%	33%	26%	37%	28%
Engineering and Manufacturing	25%	32%	25%	40%	41%	36%	41%	29%
Construction, Planning and Built Environment	21%	27%	21%	25%	33%	28%	33%	32%
Information and Communication Technology	24%	41%	20%	43%	48%	30%	51%	29%
Retail and Commercial Enterprise	29%	41%	35%	26%	29%	21%	26%	30%
Leisure, Travel and Tourism	40%	48%	40%	38%	21%	15%	21%	23%
Business, Administration and Law	38%	50%	37%	38%	28%	18%	27%	28%
All	29%	40%	28%	31%	32%	24%	34%	29%

Source: Frontier analysis of WBL-HMRC/DWP data

Table 80: Employment rate (work 11 months+) by demographic group (Apprenticeships FL2)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	28%	22%	25%	29%	32%	31%	31%	33%
Agriculture, Horticulture and Animal Care	23%	16%	20%	23%	33%	35%	31%	34%
Engineering and Manufacturing Technologies	25%	23%	24%	26%	41%	41%	35%	43%

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Construction, Planning and Built Environment	21%	23%	18%	22%	33%	27%	31%	33%
Information and Communication Technology	24%	28%	33%	23%	49%	29%	26%	51%
Retail and Commercial Enterprise	30%	27%	28%	30%	28%	31%	26%	29%
Leisure, Travel and Tourism	41%	27%	34%	41%	21%	25%	22%	21%
Business, Administration and Law	39%	28%	36%	40%	27%	30%	26%	27%
All	30%	26%	28%	30%	31%	31%	28%	32%

Source: Frontier analysis of WBL-HMRC/DWP data

Benefits

In this section we describe the benefit histories and outcomes FL2 achievers. The types of benefit included in our measure are Income Support (IS), Job Seeker's Allowance (JSA) and Incapacity Benefit (IB). The overall picture that emerges from the data is that FL2 Apprenticeship learners are very unlikely to be benefit claimants. All our measures appear to show low claim rates across the subject areas.

On average, FL2 Apprenticeship achievers claimed benefits for 0.38 months pre and 0.34 months post-learning. Relative to the other learner groups considered in this report, these rates are low. As the diagram overleaf shows there is some variation by subject areas with achievers in Health, Public Services and Care being the most likely to claim benefits. In the table overleaf, we also show the proportion of achievers claiming benefits at a point in time as well as the proportion claiming at any point during the year before and after learning. The data shows that around 3% of FL2 Apprenticeships achievers claimed benefits 6 months pre and post-learning. 7% of the sample claimed benefits during the year following achievement which is 2 percentage points lower than the pre-learning base.

Achievers in Health, Public Services and Care are slightly more likely to claim benefits before and after learning than the rest of the sample with 5% pre and 4% post training. Learners in Engineering and Manufacturing Technologies are the least likely to be on benefits- this group of learners claim for only 2% of the time.

Adult learners are more likely to be on benefits than the rest of the sample. 15% claimed in the year pre-learning but this decreased significantly to 9% post.

Figure 68: Months on benefits pre and post-learning by subject area (Apprenticeships FL2)
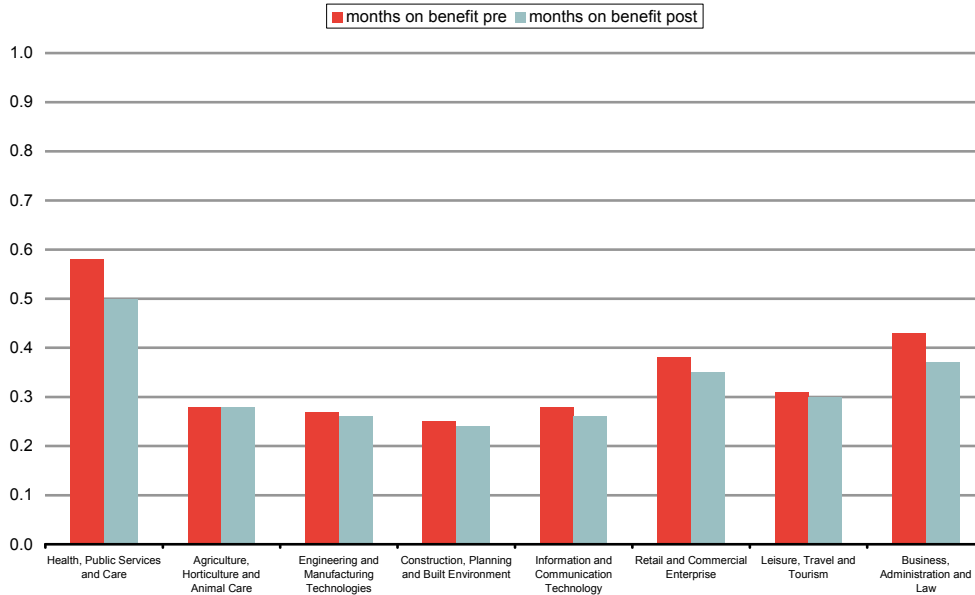
All FL2 achievers

Table 81: Benefit spells before and after learning (Apprenticeships FL2)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	13%	9%	5%	4%	5%	4%
Agriculture, Horticulture and Animal Care	7%	6%	2%	2%	3%	3%
Engineering and Manufacturing Technologies	8%	6%	2%	2%	2%	2%
Construction, Planning and Built Environment	7%	6%	2%	2%	2%	2%
Information and Communication Technology	8%	5%	3%	2%	3%	2%
Retail and Commercial Enterprise	9%	7%	3%	3%	3%	3%
Leisure, Travel and Tourism	8%	7%	3%	3%	2%	2%
Business, Administration and Law	11%	8%	4%	3%	4%	3%
All	9%	7%	3%	3%	3%	3%

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers.

Table 82: Benefit spells before and after learning (Apprenticeships FL2 19+)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	21%	11%	9%	5%	8%	5%
Agriculture, Horticulture and Animal Care	14%	8%	4%	3%	5%	3%

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Engineering and Manufacturing Technologies	12%	7%	4%	3%	4%	3%
Construction, Planning and Built Environment	12%	8%	4%	3%	4%	3%
Information and Communication Technology	15%	7%	5%	3%	5%	3%
Retail and Commercial Enterprise	15%	9%	6%	4%	5%	4%
Leisure, Travel and Tourism	12%	8%	4%	3%	3%	2%
Business, Administration and Law	15%	9%	5%	3%	5%	3%
All	15%	9%	5%	3%	5%	3%

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers.

Next we examine how benefit claim rates post-learning vary by demographic group and subject area. The calculations shown in the two tables below show that:

- Females are slightly more likely to claim benefits than males

- Achievers from ethnic minorities are more likely to claim benefits than white British achievers

- Achievers from deprived areas are the most likely to be claiming benefits. 14% did pre-learning

- Adult learners are significantly more likely to claim benefits than the sample as a whole

The benefit rates of all demographic groups decline following achievement. The effect is by far strongest for adult learners.

Table 83: Benefit claims by demographic group (Apprenticeships FL2)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	13%	21%	12%	13%	-4%	-10%	-6%	-4%
Agriculture, Horticulture and Animal Care	7%	14%	8%	7%	-1%	-6%	-3%	-1%
Engineering and Manufacturing	8%	12%	8%	9%	-2%	-5%	-2%	-2%
Construction, Planning and Built Environment	7%	12%	7%	13%	-1%	-4%	-1%	3%
Information and Communication	8%	15%	7%	10%	-3%	-8%	-2%	-4%
Retail and Commercial Enterprise	9%	15%	11%	8%	-2%	-6%	-3%	-1%
Leisure, Travel and Tourism	8%	12%	9%	8%	-1%	-4%	-2%	-2%
Business, Administration and Law	11%	15%	11%	10%	-3%	-6%	-3%	-2%
All	9%	15%	9%	10%	-2%	-6%	-2%	-2%

Source: Frontier analysis of WBL-HMRC/DWP data

Table 84: Benefit claims by demographic group (Apprenticeships FL2)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	13%	16%	17%	11%	-4%	-4%	-5%	-4%
Agriculture, Horticulture and Animal Care	7%	9%	11%	7%	-1%	-6%	4%	-3%
Engineering and Manufacturing	8%	9%	12%	6%	-2%	-1%	-2%	-2%
Construction, Planning and Built Environment	6%	13%	11%	5%	0%	-3%	-2%	0%
Information and Communication	7%	13%	15%	6%	-3%	-3%	-2%	-3%
Retail and Commercial Enterprise	9%	9%	14%	8%	-2%	-2%	-2%	-3%
Leisure, Travel and Tourism	8%	12%	11%	8%	-1%	-4%	0%	-2%
Business, Administration and Law	10%	16%	14%	9%	-3%	-5%	-3%	-3%
All	9%	13%	14%	8%	-2%	-3%	-3%	-3%

Source: Frontier analysis of WBL-HMRC/DWP data

Apprenticeships FL3 achievers

The merged ILR–HMRC/DWP data set we constructed contains 57,532 Apprenticeships achievers who are FL3 (henceforth FL3)

Demographic characteristics

The key demographic features of FL3 Apprenticeship achievers are summarised below:

- *Age*: On average FL3 achievers are 21 years old

- *Gender*: 62% of FL3 achievers are male

- *Ethnicity*: 6% are from an ethnic minority

- *Deprivation*: 24% live in a deprived area

We show how the key demographic characteristics vary by subject area. Please note that we only report on subject areas where achiever numbers are greater than zero. We shade cells with small samples in grey. There is little difference in the average age of achievers by subject area but there are remarkable differences in the gender composition of the subjects. Virtually all achievers in Construction, Planning and Built Environment and Engineering and Manufacturing Technologies are male while 95% of achievers in Health, Public Services and Care are female. In terms of ethnicity, Information and Communication Technologies and Health, Public Services and care are the subject area with the highest concentration of ethnic minority learners with 9% non-white British learners.

Achievers in Health, Public Services and Care are the most likely to live in a deprived area and to have claimed benefit at some point between 2003 and 2009. In terms of continuous employment pre-learning, half of Business, Administration and Law were employed for 11 months or longer in the 12 months before learning compared with only 16% of Engineering and Manufacturing Technologies achievers.

Table 85: Achievers characteristics and labour market history (Apprenticeships FL3)

Subject area	Male	Ethnic minority	Aged 19+	Deprived area	Ever on benefits	Worked 11+months pre
Health, Public Services and Care	5%	9%	89%	34%	18%	37%
Science and Mathematics	65%	5%	91%	35%	7%	9%
Agriculture, Horticulture and Animal Care	37%	6%	94%	10%	10%	40%
Engineering and Manufacturing Technologies	98%	4%	92%	18%	8%	16%
Construction, Planning and Built Environment	99%	3%	89%	23%	11%	33%
Information and Communication Technology	87%	9%	91%	13%	13%	39%
Retail and Commercial Enterprise	32%	5%	90%	24%	16%	40%
Leisure, Travel and Tourism	47%	7%	49%	21%	9%	26%
Arts, Media and Publishing	92%	2%	94%	19%	12%	17%
Education and Training	17%	16%	72%	21%	12%	40%
Preparation for Life and Work	29%	7%	99%	34%	21%	37%
Business, Administration and Law	26%	6%	88%	29%	17%	51%
All	62%	6%	88%	24%	13%	33%

Frontier analysis of WBL-HMRC/DWP data. FL3 achievers

Subject area concentration

The distribution of FL3 achievers is very uneven with 90% of learners concentrated in the following subject areas:

- Engineering and Manufacturing Technologies (31%)

- Business, Administration and Law (20%)

- Construction, Planning and the Built Environment (16%)

- Health, Public Services and Care (13%)

- Retail and Commercial Enterprise (10%)

There are 3 subject areas with zero achievers and 3 subject areas with samples in the low hundreds. We plot the distribution of FL3 Apprenticeship achievers by subject area in Figure 69. The small sample sizes in some of the subject areas limit the amount of analysis possible in subsequent sections.

Figure 69: Number of achievers by subject area (Apprenticeships FL3)
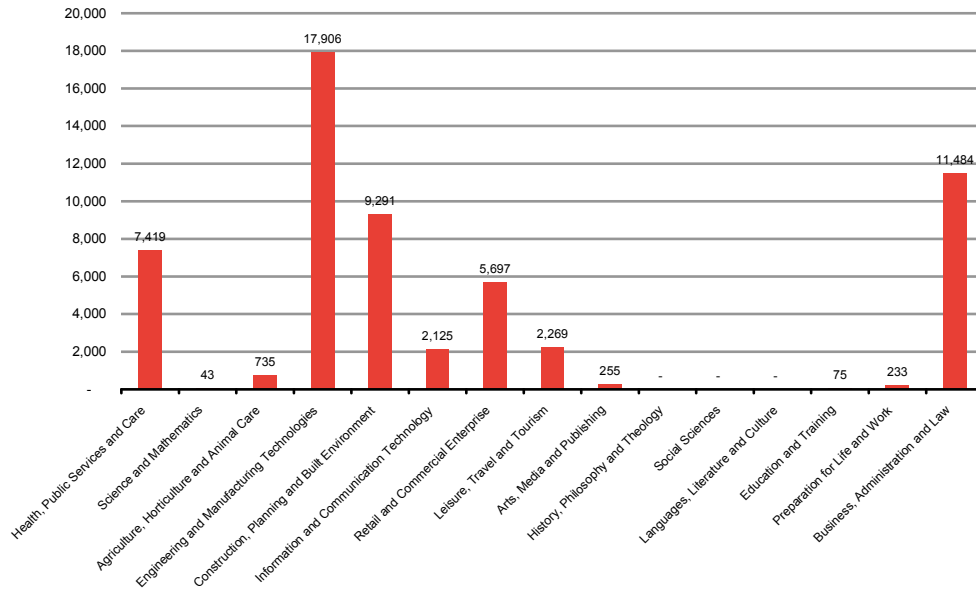
All FL3 achievers

Prior Attainment

Prior learner attainment is well recorded for Apprenticeship learners relative to FE learners. We have information on the level of previous qualifications held for 80% of FL3 Apprenticeship achievers. 62% have previous qualifications at L2, with 20% at L1 and another 11% at L3. The remaining 7% have either no or lower level qualifications.

Earnings

We begin by analysing the earnings histories and outcomes of FL3 achievers including all observations.

On average, FL3 Apprenticeship learners earn £4,270 pre-learning and £13,799 post. The large increase in average earnings following training is at least partly caused by a significant drop in the number of zero earnings in the sample (which reflect among other things the number of individuals not in work).

In the table overleaf we show average earnings pre and post-learning as well as the proportion of zero earnings and proportion of individuals in continuous employment by subject area. It is clear that average earnings are very small in areas where large numbers of individuals have zero earnings pre-learning. For example, average earnings pre-learning are £2,363 for learners in Engineering and Manufacturing Technologies but 65% of this group have zero earnings pre-learning. This reflects the low number of individuals in continuous employment in this group – only 16 % were in work for at least 11 months pre-learning.

Table 86: Mean earnings pre and post-learning (Apprenticeships FL3)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	7,419	4,153	8,940	36%	20%
Science and Mathematics	43	1,653	14,307	70%	19%
Agriculture, Horticulture and Animal Care	735	4,678	10,214	45%	25%
Engineering and Manufacturing Technologies	17,906	2,363	16,880	65%	16%
Construction, Planning and Built Environment	9,291	4,265	16,134	53%	21%
Information and Communication Technology	2,125	6,749	16,034	42%	18%
Retail and Commercial Enterprise	5,697	4,890	9,885	39%	23%
Leisure, Travel and Tourism	2,269	3,100	11,270	50%	19%
Arts, Media and Publishing	255	2,876	18,399	58%	17%
Education and Training	75	3,061	7,494	28%	17%
Preparation for Life and Work	233	5,552	13,063	39%	19%
Business, Administration and Law	11,484	6,733	12,436	27%	15%
All	57,532	4,270	13,799	47%	18%

Frontier analysis of WBL-HMRC/DWP data. FL3 FE achievers

As employment rates increase, the proportion of zero earnings drops significantly increasing average earnings. We plot the growth of earnings and zero earnings below. Note that we only include subject areas where samples are larger than 100 achievers. The pattern that emerges from the figure is that high earnings growth (raw earnings) is associated with large drops in the number of learners with zero earnings.

Figure 70: Mean earnings by subject area (Apprenticeships FL3)
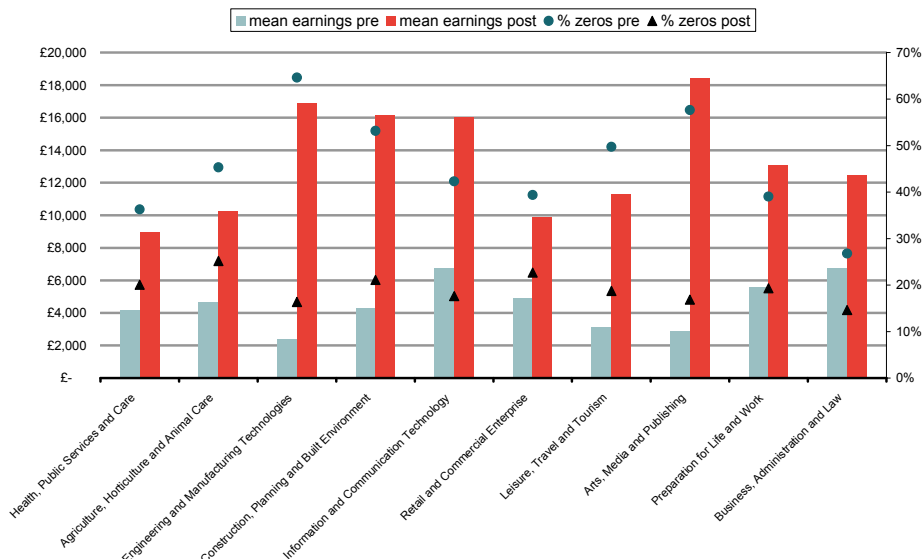
All FL3 achievers

166

Filtered Earnings

Excluding zero earnings and earnings under £4,800 and over £80,000 as well as individuals who are not continuously employed from the sample reduces the number of observations dramatically but increases the reliability of summary statistics.

The numbers of individuals in work pre and post-learning with earnings that fall in the bracket £4,800-£80,000 are 10,737 and 12,798 respectively. We show how these individuals are distributed by subject area and demographic group in the tables below highlighting cells with samples below 100 in grey.

Sample sizes are small in a number of cells indicating that earnings comparisons by demographic group are only possible for a handful of subject areas with large enough samples.

We can calculate filtered earnings for adult learners in 8 subject areas.

For the other demographic groups, fewer comparisons are possible. For example a comparison of average earnings between men and women can be done for 4 subject areas where samples are larger than 100 achievers. Comparing earnings by ethnicity can only be done for two subject areas.

Table 87: Sample size for filtered earnings calculation by subject area and demographic group (Apprenticeships FL2)

Subject	Men	Women	White	Ethnic minority	Not deprived	Deprived	Age 19+	All
Health, Public Services and Care	94	1,540	1,514	120	1,107	527	1,244	1,634
Science and Mathematics	-	-	-	-	-	-	-	-
Agriculture, Horticulture and Animal Care	49	145	-	-	164	30	169	194
Engineering and Manufacturing Technologies	2,090	43	2,051	82	1,751	382	1,593	2,133
Construction, Planning and Built Environment	1,854	12	1,810	56	1,489	377	1,522	1,866
Information and Communication Technology	535	106	599	42	566	75	544	641
Retail and Commercial Enterprise	481	902	1,330	53	1,068	315	1,105	1,383
Leisure, Travel and Tourism	140	250	378	12	322	68	234	390
Arts, Media and Publishing	-	-	-	-	-	-	-	-
Education and Training	-	-	-	-	-	-	-	-
Preparation for Life and Work	23	38	-	-	43	18	45	61
Business, Administration and Law	1,040	3,370	4,158	252	3,198	1,212	3,513	4,410
All	6,335	6,425	12,136	624	9,744	3,016	10,041	12,760

Frontier analysis of WBL-HMRC/DWP data. FL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum. Cells which are potentially disclosive have been marked with "-".

167

We explore the variation in filtered earnings by subject area and demographic group in the tables overleaf. We only present findings for subject areas with sufficiently high samples. Our calculations show that pre-learning men earn more than women in all subject areas where this comparison is possible:

- Information and Communication Technology

- Retail and Commercial Enterprise

- Leisure, Travel and Tourism

- Business, Administration and Law

Ethnic minorities earn more than white British achievers in the 2 subject areas where comparisons can be made:

- Health, Public Services and Care

- Business, Administration and Law

Achievers from deprived areas earn less than the rest in 4 of the 5 subject areas for which comparisons are possible:

- Health, Public Services and Care

- Engineering and Manufacturing Technologies

- Business, Administration and Law

- Retail and Commercial Enterprise

A number of points are worth noting:

- Adult learners earn more than the sample as a whole.

- Earnings growth is strong for FL3 Apprentices but in general earnings grow most for achievers in Construction, Planning and the Built Environment and Engineering and Manufacturing Technologies.

- Mean earnings grew by 43% for the sample as a whole. Growth for adult learners is identical at 43%. Male earnings grew faster than female earnings.

- There is little difference in both levels of pay pre-learning and growth rates following achievement for the other demographic groups of interest.

Table 88: Mean filtered earnings by demographic group (Apprenticeships FL3)

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	10,824	10,862	13,289	10,679	28%	28%	32%	28%
Agriculture, Horticulture and Animal Care	12,089	12,089	14,677	11,338	37%	38%	28%	40%
Engineering and Manufacturing	12,987	13,155	13,008	11,817	63%	63%	63%	68%
Construction, Planning and Built Environment	13,153	13,306	13,154	12,939	80%	81%	80%	80%
Information and Communication	16,631	16,778	16,728	16,155	28%	29%	29%	26%
Retail and Commercial Enterprise	12,265	12,347	14,077	11,281	29%	29%	34%	26%
Leisure, Travel and Tourism	12,004	11,900	13,711	10,798	33%	37%	33%	35%
Business, Administration and Law	12,686	12,974	12,935	12,612	31%	29%	37%	29%
All	12,735	12,903	13,508	11,959	43%	43%	56%	28%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 89: Mean filtered earnings by demographic group (Apprenticeships FL3)

Study area	Before training				% change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	10,774	11,404	10,377	11,047	28%	31%	27%	28%
Agriculture, Horticulture and Animal Care	-	-	10,858	12,333	-	-	46%	36%
Engineering and Manufacturing Technologies	12,965	13,514	12,376	13,121	63%	74%	67%	62%
Construction, Planning and Built Environment	13,123	14,154	13,084	13,170	79%	115%	84%	79%
Information and Communication Technology	16,637	16,556	13,176	17,068	28%	40%	45%	27%
Retail and Commercial Enterprise	12,246	12,720	11,633	12,446	29%	28%	25%	30%
Leisure, Travel and Tourism	12,079	9,514	9,896	12,387	32%	71%	45%	31%
Business, Administration and Law	12,637	13,494	12,730	12,669	31%	27%	27%	32%
All	12,708	13,243	12,171	12,912	43%	44%	40%	44%

Source: Frontier analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Employment

The employment histories and outcomes of FL3 Apprenticeship achievers are described using 3 different summary statistics:

- Average number of months worked before and after learning

- Proportion of achievers in employment for at least 11 months

- Proportion of sample in employment at a fixed point in time before and after course (6 months before/after course)

We present the summary statistics in the tables below. Our calculations show that Apprenticeships achievers at FL3 were in work for 5.56 months pre and 9.45 months post-learning. A third were in continuous employment pre-learning, rising to 70% post-learning.

Pre-learning:

- adult achievers have higher employment rates than the sample as a whole

- women are significantly more likely to be in work than men

There are no significant differences in the growth rates of the other demographic groups of interest.

The employment rate (continuous employment) increases by around 38 percentage points for the sample as a whole. Male employment goes up by 44 percentage points compared with 26 for women.

Growth appears strongest in:

- Arts, Media and Publishing

- Engineering and Manufacturing Technologies

Table 90: Employment rates before and after learning (Apprenticeships FL3)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	37%	67%	57%	77%	6.79	9.19
Agriculture, Horticulture and Animal Care	40%	62%	51%	71%	6.22	8.63
Engineering and Manufacturing Technologies	16%	73%	25%	81%	3.27	9.73
Construction, Planning and Built Environment	33%	65%	42%	74%	5.08	8.94
Information and Communication Technology	39%	74%	52%	81%	6.28	9.77
Retail and Commercial Enterprise	40%	62%	57%	73%	6.83	8.73

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Leisure, Travel and Tourism	26%	60%	39%	75%	4.84	8.93
Arts, Media and Publishing	17%	78%	40%	85%	4.56	10.22
Preparation for Life and Work	37%	71%	60%	78%	6.88	9.34
Business, Administration and Law	51%	76%	68%	84%	8.04	10.05
All	32%	70%	46%	79%	5.56	9.45

Frontier analysis of ILR-HMRC/DWP data. FL3 achievers.

Table 91: Employment rates before and after learning (Apprenticeships FL3 19+)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	39%	68%	60%	78%	7.07	9.28
Agriculture, Horticulture and Animal Care	41%	64%	53%	72%	6.36	8.75
Engineering and Manufacturing Technologies	16%	73%	25%	81%	3.25	9.74
Construction, Planning and Built Environment	33%	65%	41%	75%	4.98	8.98
Information and Communication Technology	40%	75%	55%	81%	6.49	9.80
Retail and Commercial Enterprise	42%	62%	60%	73%	7.07	8.77
Leisure, Travel and Tourism	40%	65%	59%	77%	7.08	9.25
Arts, Media and Publishing	18%	79%	41%	86%	4.65	10.30
Preparation for Life and Work	37%	71%	60%	78%	6.91	9.32
Business, Administration and Law	53%	76%	70%	84%	8.29	10.06
All	34%	70%	47%	79%	5.70	9.50

Frontier analysis of ILR-HMRC/DWP data. FL3 achievers.

Table 92: Employment rate (work 11 months+) by demographic group (Apprenticeships FL3)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	37%	39%	38%	37%	30%	29%	32%	29%
Agriculture, Horticulture and Animal Care	40%	41%	26%	48%	22%	23%	35%	15%
Engineering and Manufacturing Technologies	16%	16%	16%	16%	57%	57%	57%	59%
Construction, Planning and	33%	33%	33%	29%	32%	32%	32%	36%

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Built Environment								
Information and Communication Technology	39%	40%	37%	50%	35%	35%	37%	26%
Retail and Commercial Enterprise	40%	42%	42%	39%	22%	20%	21%	22%
Leisure, Travel and Tourism	26%	40%	23%	29%	34%	25%	30%	38%
Arts, Media and Publishing	17%	18%	17%	24%	61%	61%	63%	28%
Preparation for Life and Work	37%	37%	46%	33%	34%	34%	26%	38%
Business, Administration and Law	51%	53%	47%	53%	25%	23%	27%	23%
All	32%	34%	26%	43%	38%	36%	44%	26%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 93: Employment rate (work 11 months+) by demographic group (Apprenticeships FL3)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	37%	39%	38%	37%	30%	29%	32%	29%
Agriculture, Horticulture and Animal Care	40%	41%	26%	48%	22%	23%	35%	15%
Engineering and Manufacturing Technologies	16%	16%	16%	16%	57%	57%	57%	59%
Construction, Planning and Built Environment	33%	33%	33%	29%	32%	32%	32%	36%
Information and Communication Technology	39%	40%	37%	50%	35%	35%	37%	26%
Retail and Commercial Enterprise	40%	42%	42%	39%	22%	20%	21%	22%
Leisure, Travel and Tourism	26%	40%	23%	29%	34%	25%	30%	38%
Arts, Media and Publishing	17%	18%	17%	24%	61%	61%	63%	28%
Preparation for Life and Work	37%	37%	46%	33%	34%	34%	26%	38%
Business, Administration and Law	51%	53%	47%	53%	25%	23%	27%	23%
All	32%	34%	26%	43%	38%	36%	44%	26%

Source: Frontier analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Benefits

In this section we describe the benefit histories and outcomes FL3 achievers. The types of benefit included in our measure are Income Support (IS), Job Seeker's Allowance (JSA) and Incapacity Benefit (IB).

We present our summary statistics in the table below. They reveal that Apprenticeship achievers at FL3 are rather unlikely to be claiming benefits either before or after learning with sample averages of 1% in both periods. In other words only 1 in every 100 Apprenticeship achievers at FL3 is a benefit claimant. These low averages are also reflected in the number of months spent on benefits. On average, this group of achievers claim benefits for just less than 5 days in the year following training.

As the diagram below shows there is some variation by subject areas with achievers in Health, Public Services and Care being the most likely to claim benefits.

Achievers in Health, Public Services and Care are the least likely to claim benefits before learning while achievers in Engineering and Manufacturing Technologies are the least likely to be on benefits.

Figure 71: Months on benefits pre and post-learning by subject area (Apprenticeships FL3)
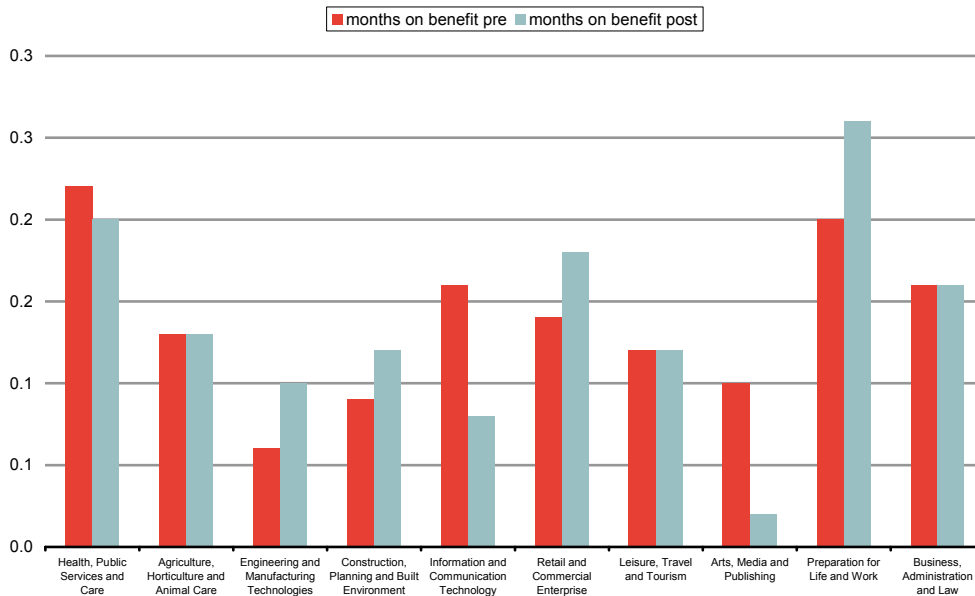
All FL3 achievers

Table 94: Benefit spells before and after learning (Apprenticeships FL3)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	8%	5%	2%	2%	3%	2%
Agriculture, Horticulture and Animal Care	3%	2%	1%	1%	1%	1%

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Engineering and Manufacturing Technologies	2%	2%	1%	1%	1%	1%
Construction, Planning and Built Environment	3%	3%	1%	1%	1%	1%
Information and Communication Technology	5%	3%	2%	1%	2%	1%
Retail and Commercial Enterprise	4%	5%	1%	2%	1%	2%
Leisure, Travel and Tourism	4%	3%	1%	1%	1%	1%
Arts, Media and Publishing	4%	2%	1%	0%	1%	0%
Preparation for Life and Work	9%	6%	2%	2%	2%	3%
Business, Administration and Law	6%	4%	2%	1%	2%	2%
All	4%	3%	1%	1%	1%	1%

Frontier analysis of WBL-HMRC/DWP data. FL3 achievers.

Table 95: Benefit spells before and after learning (Apprenticeships FL319+)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	9%	5%	3%	2%	3%	2%
Agriculture, Horticulture and Animal Care	3%	3%	1%	1%	1%	1%
Engineering and Manufacturing Technologies	3%	2%	1%	1%	1%	1%
Construction, Planning and Built Environment	3%	3%	1%	1%	1%	1%
Information and Communication Technology	5%	3%	2%	1%	2%	1%
Retail and Commercial Enterprise	5%	5%	2%	2%	2%	2%
Leisure, Travel and Tourism	8%	5%	1%	1%	1%	2%
Arts, Media and Publishing	4%	1%	1%	0%	1%	0%
Preparation for Life and Work	9%	6%	2%	2%	2%	3%
Business, Administration and Law	7%	5%	2%	2%	2%	2%
All	5%	4%	1%	1%	1%	1%

Frontier analysis of WBL-HMRC/DWP data. FL3 achievers.

Finally, we examine how benefit claim rates post-learning vary by demographic group and subject area. The data shows that on average:

- Females are more likely to claim benefits than males

- Achievers from ethnic minorities are more likely to claim benefits than white British learners

- Learners from deprived areas are more likely to be claiming benefits than the rest

Benefit rates decline or remain static for all demographic groups. The rate falls by two percentage points for women and remains constant for men. There is little difference in the change in benefit claims for the other demographic groups of interest.

Table 96: Benefit claims by demographic group (Apprenticeships FL3)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	8%	9%	8%	8%	-3%	-4%	-4%	-3%
Agriculture, Horticulture and Animal Care	3%	3%	3%	3%	-1%	0%	-2%	0%
Engineering and Manufacturing	2%	3%	2%	3%	0%	-1%	0%	-1%
Construction, Planning and Built Environment	3%	3%	3%	3%	0%	0%	0%	2%
Information and Communication	5%	5%	5%	4%	-2%	-2%	-2%	-2%
Retail and Commercial Enterprise	4%	5%	5%	4%	1%	0%	-1%	1%
Leisure, Travel and Tourism	4%	8%	3%	5%	-1%	-3%	0%	-1%
Arts, Media and Publishing	4%	4%	3%	5%	-2%	-3%	-2%	5%
Preparation for Life and Work	9%	9%	10%	8%	-3%	-3%	-4%	-2%
Business, Administration and Law	6%	7%	7%	6%	-2%	-2%	-2%	-2%
All	4%	5%	3%	6%	-1%	-1%	0%	-2%

Source: Frontier analysis of ILR-HMRC/DWP data

Table 97: Benefit claims by demographic group (Apprenticeships FL3)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	7%	12%	11%	6%	-2%	-5%	-5%	-2%
Agriculture, Horticulture and Animal Care	3%	2%	5%	3%	-1%	0%	-1%	-1%
Engineering and Manufacturing Technologies	2%	5%	4%	2%	0%	-1%	0%	0%
Construction, Planning and Built Environment	3%	6%	4%	3%	0%	-3%	1%	0%
Information and Communication Technology	5%	9%	12%	4%	-3%	-3%	-6%	-2%

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Retail and Commercial Enterprise	4%	4%	6%	4%	1%	4%	2%	0%
Leisure, Travel and Tourism	4%	3%	5%	4%	-1%	-1%	0%	-1%
Arts, Media and Publishing	4%	4%	6%	3%	-2%	-2%	0%	-1%
Preparation for Life and Work	-	-	13%	7%	-	-	-5%	-2%
Business, Administration and Law	6%	9%	8%	5%	-2%	-2%	-2%	-1%
All	4%	8%	7%	4%	-1%	-2%	-1%	-1%

Source: Frontier analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Descriptive analysis- Train to Gain

This section 6 describes the demographic characteristics and labour market histories and outcomes of TTG learners. Our merged TTG-HMRC/DWP data set contains 41,983 achievers. All TTG learners in our data set were observed during the 2006-07 academic year and finished their learning on or before 1 August 2007. The vast majority of TTG students study towards FL2 qualifications with only 3% studying towards FL3 qualifications. TTG learners are significantly older than Apprenticeship and FE learners with an average age of 38. They are also more likely to live in an economically deprived area- just under half of TTG achievers do compared with 27% of Apprentices and 33% of FE learners.

Aggregate labour market outcomes

TTG achievers gain from training mainly in terms of benefits. Relative to the period pre-learning, time on benefits for this group of learners is around a quarter lower in the period post-learning. There are also gains in terms of employment but these are more modest, in the order of three percent. On the other hand earnings appear to decline by 2% at FL2 and 4% at FL3. Overall, outcomes appear better for FL2 achievers than FL3 achievers.

Table 98: Key outcome indicators (All TTG)

		Before training		After training		% change	
		FL2	FL3	FL2	FL3	FL2	FL3
19+	Employment (months)	9.05	9.55	9.32	9.62	3%	1%
	Employment rate (6 months)	76%	80%	78%	81%	3%	1%
	Benefit (months)	0.60	0.39	0.45	0.37	-25%	-5%
	Benefit rate (6 months)	5%	3%	4%	3%	-20%	0%
	Earnings (filtered)	£18,497	£19,541	£18,186	£18,821	-2%	-4%
All	Employment (months)	9.05	9.55	9.32	9.62	3%	1%
	Employment rate (6 months)	75%	80%	78%	81%	3%	1%
	Benefit (months)	0.60	0.39	0.45	0.37	-25%	-5%
	Benefit rate (6 months)	5%	3%	4%	3%	-20%	0%
	Earnings (filtered)	£18,492	£19,541	£18,187	£18,821	-2%	-4%

Frontier analysis of TTG-HMRC/DWP data

TTG FL2 achievers

Demographic characteristics

The key demographic features of FL2 TTG achievers are summarised below:

- *Age*: On average FL2 achievers are 38 years old, with 75% aged 45 or less

- *Gender*: 56% of FL2 achievers are male

- *Ethnicity*: 17% are from an ethnic minority

- *Deprivation*: 45% live in a deprived area

The table below shows how the key demographic characteristics vary by subject area. Sample sizes are very small for two subject areas which are excluded from subsequent analyses. These are:

- Science and Mathematics (69)

- Arts, Media and Publishing (12)

Sample sizes are also small (fewer than 1000 observations) in 4 other subject areas where detailed breakdowns of the data will be difficult. These are:

- Education and Training (261)

- Preparation for Life and Work (687)

- Information and Communication Technology (497)

- Agriculture, Horticulture and Animal Care (658)

There is little difference in the average age of achievers by subject area but there are remarkable differences in the gender composition of the subjects. All achievers in Construction, Planning and Built Environment are male while 98% of achievers in Education and Training are female.

Ethnic minorities make up a quarter of Engineering and Manufacturing Technologies achievers but only 5% of Agriculture, Horticulture and Animal Care.

Achievers in Construction, Planning and Built Environment are most likely to have claimed benefit at some point between 2003 and 2009 (38%). Education and Training learners are the most likely to be in continuous employment post training, 87% of this group of learners worked for at least 11 months following achievement.

Table 99: Achievers characteristics and labour market history (TTG FL2)

Subject area	Male	Ethnic minority	Aged 19+	Deprived area	Ever on benefits	Worked 11+months pre
Health, Public Services and Care	12%	21%	100%	49%	36%	73%
Science and Mathematics	14%	38%	100%	43%	28%	77%
Agriculture, Horticulture and Animal Care	96%	5%	100%	44%	34%	70%
Engineering and Manufacturing Technologies	79%	24%	100%	46%	27%	71%
Construction, Planning and Built Environment	100%	11%	99%	43%	38%	58%
Information and Communication Technology	32%	18%	100%	33%	19%	80%
Retail and Commercial Enterprise	48%	15%	100%	49%	31%	72%
Leisure, Travel and Tourism	80%	22%	100%	44%	35%	63%
Arts, Media and Publishing	100%	17%	100%	33%	8%	83%
Education and Training	2%	12%	100%	24%	17%	87%
Preparation for Life and Work	34%	19%	100%	49%	33%	71%
Business, Administration and Law	37%	13%	99%	40%	27%	75%
All	56%	17%	100%	45%	32%	70%

Frontier analysis of TTG-HMRC/DWP data. FL2 achievers

Subject area concentration

The vast majority of TTG learners (94%) follow courses that fall under the following 5 subject areas:

- Health, Public Services and Care (21%)

- Engineering and Manufacturing Technologies (20%)

- Construction, Planning and Built Environment (20%)

- Retail and Commercial Enterprise (16%)

- Business, Administration and Law (15%)

- Leisure, Travel and Tourism (3%)

The remaining 9 subject areas have either zero or small numbers of achievers. Subject areas with fewer than 100 achievers have been omitted from subsequent analyses. We show the distribution of achievers by subject area in the figure overleaf.

Figure 72: Number of achievers by subject area (TTG FL2)
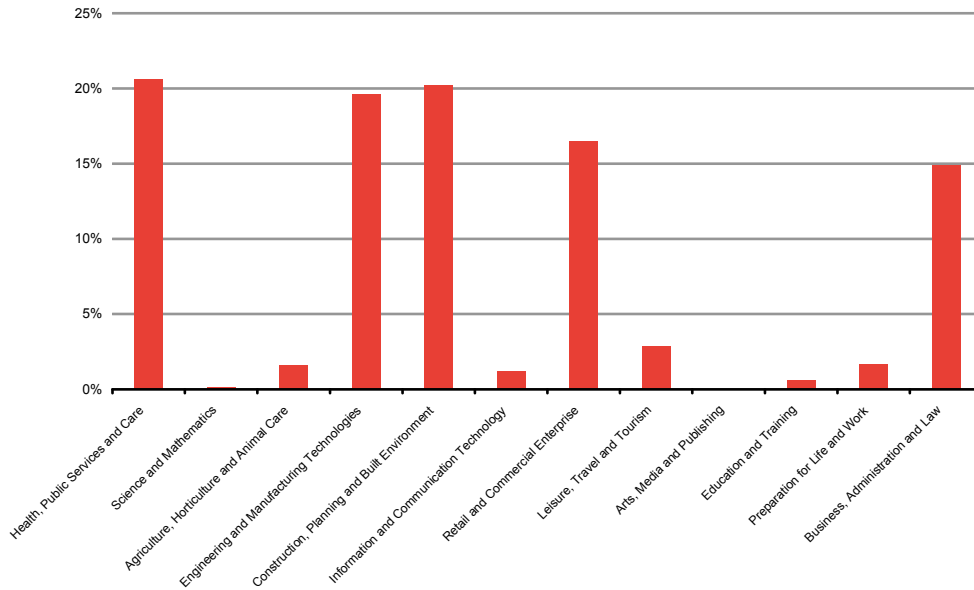
All FL2 achievers

Prior Attainment

Prior learner attainment is well recorded for TTG learners relative to the other groups of learners studied in this report. We have information on the level of previous qualifications held for 97% of TTG achievers. The figure below reveals that TTG learners have either no qualifications or prior attainment at level 1 or below.

Figure 73: Prior attainment (TTG FL2)
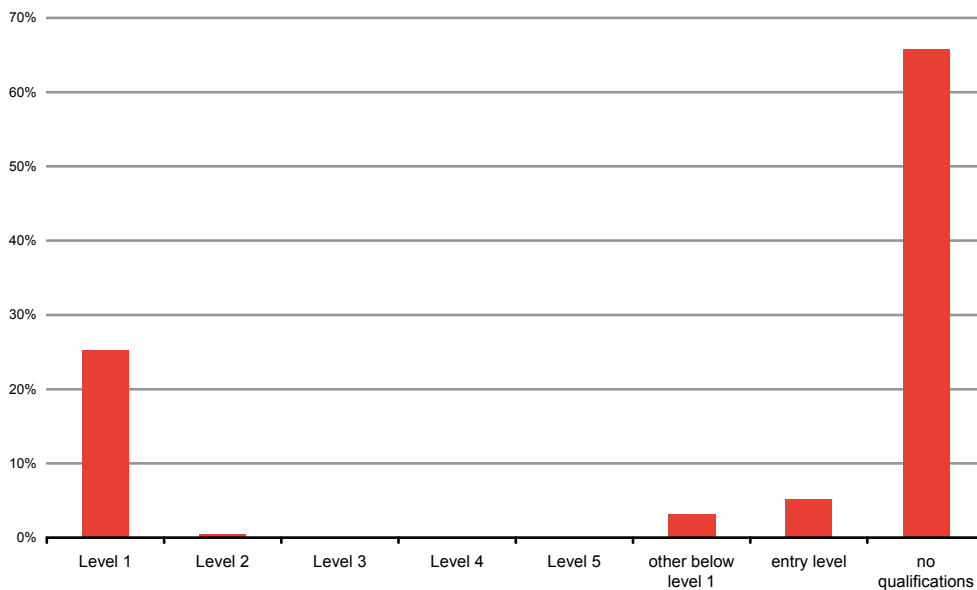
All FL2 achievers

Earnings

We begin by analysing the earnings histories and outcomes of FL2 TTG achievers including all observations. We present a full tabulation of earnings by subject area below. On average, this group of learners earned £11,914 pre-learning and £11,637 post-learning, a decline of 2.3% in real terms. Earnings are highest in Engineering and Manufacturing Technologies pre-learning and Information and Communication Technology post-learning. They are lowest in Education and Training both before and after learning.

We show the variation in real earnings by subject area below. The figure reveals that earnings are declining in some subject areas and increasing in others. It appears that earnings are falling in the subject areas where the proportion of learners with recorded zero earnings is increasing. This could be due to number of reasons such as people moving out of employment/becoming self employed or others. We discuss the presence of zero earnings in some detail in previous sections of this report.

Figure 74: Mean earnings by subject area (TTG FL2)
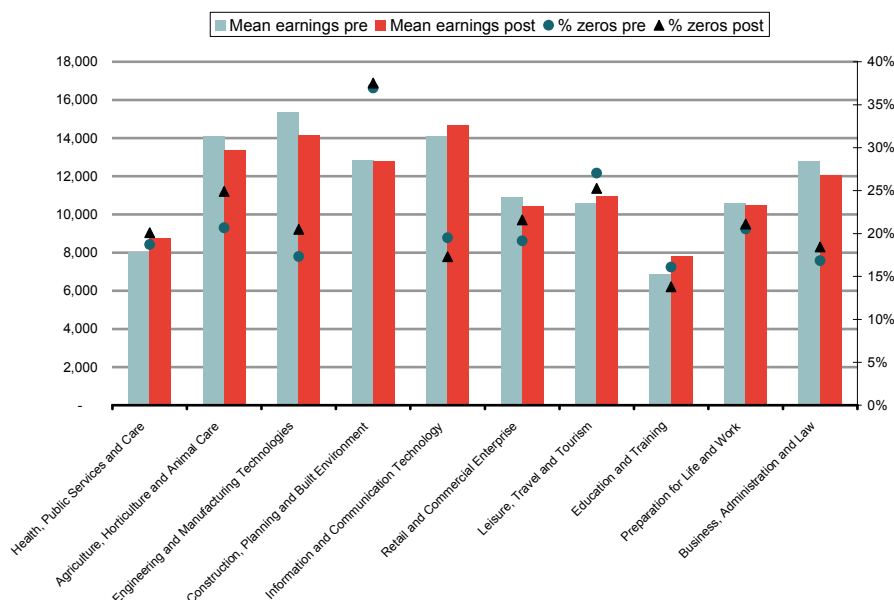
All FL2 achievers

Table 100: Mean earnings pre and post-learning (TTG FL2)

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Health, Public Services and Care	8,414	8,022	8,744	19%	20%
Agriculture, Horticulture and Animal Care	658	14,105	13,354	21%	25%
Engineering and Manufacturing Technologies	7,995	15,346	14,142	17%	20%
Construction, Planning and Built Environment	8,238	12,862	12,800	37%	38%
Information and Communication Technology	497	14,114	14,675	20%	17%
Retail and Commercial Enterprise	6,725	10,886	10,416	19%	22%

Subject area	Sample size	Earnings pre	Earnings post	% zero earnings pre	% zero earnings post
Leisure, Travel and Tourism	1,176	10,574	10,978	27%	25%
Education and Training	261	6,864	7,827	16%	14%
Preparation for Life and Work	687	10,567	10,503	21%	21%
Business, Administration and Law	6,072	12,801	12,067	17%	18%
All	40,723	11,914	11,637	22%	24%

Frontier analysis of TTG-HMRC/DWP data. FL2 achievers

Filtered Earnings

Excluding zero earnings and earnings under £4,800 and over £80,000 as well as individuals who are not continuously employed from the sample reduces the number of observations significantly but increases the reliability of summary statistics. The numbers of individuals in work pre and post-learning with earnings that fall in the bracket £4,800-£80,000 are 18,741 and 18,085 respectively. We show how these individuals are distributed by subject area and demographic group in the tables below highlighting cells where samples are small (below 100 learners) in grey. Because TTG learners are predominantly white British, the calculation of reliable earnings for ethnic minority learners is not possible for a number of subject areas. Virtually all TTG achievers are adults so we are not able to calculate filtered earnings for young learners (aged 16-18). We present a detailed breakdown of sample sizes by demographic groups and subject areas in the table below.

Table 101: Sample size for filtered earnings calculation by subject area and demographic group (TTG FL2)

Subject	Men	Women	White	Ethnic minority	Not deprived	Deprived	Age 19+	All
Health, Public Services and Care	422	2,973	2,750	645	1,774	1,591	3,387	3,395
Agriculture, Horticulture and Animal Care	330	14	329	15	188	146	344	344
Engineering and Manufacturing Technologies	3,380	883	3,446	817	2,363	1,827	4,255	4,263
Construction, Planning and Built Environment	2,886	16	2,708	194	1,788	1,031	2,890	2,902
Information and Communication Technology	89	215	262	42	207	92	303	304
Retail and Commercial Enterprise	1,628	1,645	2,915	358	1,755	1,457	3,266	3,273
Leisure, Travel and Tourism	336	71	344	63	254	149	407	407
Education and Training	-	-	122	21	105	36	143	143
Preparation for Life and Work	134	183	273	44	170	142	317	317
Business, Administration and Law	1,246	2,147	3,055	338	2,096	1,263	3,387	3,393
All	-	-	16,204	2,537	10,700	7,734	18,699	18,741

Frontier analysis of TTG-HMRC/DWP data. FL2 achievers in continuous employment and earning between £4,800 and £80,000 per annum. Cells which are potentially disclosive have been marked with "-".

Next we show the real earnings of the different demographic groups of FL2 TTG achievers pre and post-learning. We show earnings in the year before learning and their percentage change following achievement.

The patterns that emerge from the data are:

- Men earn substantially more than women-the pay gap pre-training is 70%

- White British achievers earn more than those from ethnic minorities- the gap is 5% pre-training

- Learners from deprived areas earn 10% less than those who live in non-deprived areas pre-learning

There is a great deal of variation in the earnings of all demographic groups by subject area. In general earnings are highest in:

- Construction,   Planning and Built Environment

- Engineering and Manufacturing Technologies

Earnings are lowest in:

- Education and Training

- Health, Public Services and Care

Following achievement, earnings decline by 2% for the sample as a whole.

Male earnings decline by 3% in real terms. In fact male earnings fall across all subject areas. On the other hand, female earnings grow albeit by a very modest 1%. Female earnings increase in:

- Health, Public Services and Care (2%)

- Education and Training (1%)

- Retail and Commercial Enterprise (1%)

- Business, Administration and Law (1%)

The earnings of white British achievers fall by 2% while those of achievers from ethnic minorities increase by 1%.

Earnings decline in virtually all subject areas except Health, Public Services and Care where there is growth of 2% albeit from a relatively low base.

Table 102: Mean filtered earnings by demographic group (TTG FL2)

Study area	Before training				% change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	12,765	12,766	16,187	12,280	2%	2%	0%	2%
Agriculture, Horticulture and Animal Care	20,258	20,258	20,503	14,474	-3%	-3%	-3%	1%
Engineering and Manufacturing	20,921	20,919	22,168	16,151	-2%	-2%	-2%	-4%
Construction, Planning and Built Environment	25,267	25,289	25,305	18,425	-1%	-1%	-2%	20%
Information and Communication	19,534	19,555	24,495	17,480	0%	0%	0%	0%
Retail and Commercial Enterprise	16,284	16,295	21,118	11,499	-2%	-2%	-4%	1%
Leisure, Travel and Tourism	20,265	20,265	21,323	15,258	-3%	-2%	-3%	-1%
Education and Training	10,250	10,250	-	-	1%	1%	-	-
Preparation for Life and Work	16,893	16,893	21,659	13,404	-3%	-3%	-5%	-1%
Business, Administration and Law	17,525	17,530	22,590	14,586	-3%	-3%	-7%	1%
All	18,492	18,497	22,610	13,313	-2%	-2%	-3%	1%

Source: Frontier analysis of TTG-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Table 103: Mean filtered earnings by demographic group (TTG FL2)

Study area	Before training				% change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	12,406	14,298	12,661	12,836	2%	2%	3%	1%
Agriculture, Horticulture and Animal	20,458	15,875	20,152	20,218	-3%	11%	-6%	-1%
Engineering and Manufacturing	21,177	19,845	19,364	22,001	-3%	-2%	-2%	-3%
Construction, Planning and Built Environment	25,470	22,429	24,145	25,875	-2%	9%	-1%	-2%
Information and Communication	18,996	22,888	20,003	19,344	0%	0%	-5%	2%
Retail and Commercial Enterprise	16,292	16,214	15,100	17,142	-3%	0%	-2%	-3%
Leisure, Travel and Tourism	20,643	18,198	19,728	20,564	-5%	12%	-4%	-2%
Education and Training	10,135	10,921	9,816	10,398	1%	5%	2%	1%
Preparation for Life and Work	16,373	20,121	16,479	17,245	-4%	3%	-6%	-1%
Business, Administration and Law	17,556	17,245	17,023	17,841	-3%	0%	-3%	-2%
All	18,617	17,699	17,376	19,203	-2%	1%	-1%	-2%

Source: Frontier analysis of TTG-HMRC/DWP data

Employment

In general, the employment rates of TTG learners are high relative to the UK population as a whole and the other groups of learners studied in this report- the sample average is 75% pre and 78% post-training six months either side of the learning window. Time in employment is over 9 months both before and after training.

The overall trend is that of improvement in the employment indicators both for the sample as a whole and by subject area. Employment observed at a point in time (6 months either side of the learning window) is increasing by around 3 percentage points to 78%. Time in employment also increases by around 0.27 of a month (approximately a week).

Employment after training is highest in Information and Communication Technology (84%) and lowest in Construction, Planning and Built Environment (68%).

Table 104: Employment rates before and after learning (TTG FL2)

Subject area	Worked 11months + pre	Worked 11months + post	In work 6 months pre	In work 6 months post	Months worked pre	Months worked post
Health, Public Services and Care	59%	73%	74%	81%	8.87	9.70
Agriculture, Horticulture and Animal Care	66%	70%	74%	77%	9.00	9.19
Engineering and Manufacturing Technologies	71%	71%	81%	79%	9.64	9.49
Construction, Planning and Built Environment	56%	58%	66%	68%	7.98	8.15
Information and Communication Technology	75%	80%	84%	84%	9.96	10.17
Retail and Commercial Enterprise	68%	72%	79%	80%	9.41	9.59
Leisure, Travel and Tourism	53%	63%	67%	72%	7.91	8.64
Education and Training	76%	87%	83%	89%	9.95	10.67
Preparation for Life and Work	65%	71%	77%	80%	9.19	9.53
Business, Administration and Law	72%	75%	80%	82%	9.63	9.83
All	65%	70%	75%	78%	9.05	9.32

Frontier analysis of TTG-HMRC/DWP data. FL2 achievers.

There are also differences in the employment patterns of the demographic groups of interest:

- Women have higher employment rates than men. Pre-learning 66% of women were in continuous employment compared with 63% of men

- White British learners have a higher probability of being in employment (66%) than ethnic minority learners (56%)

- Students living in deprived areas are less likely to be employed (61%) than the rest of the sample (67%)

Employment rates increase for all demographic groups. Growth is highest for achievers from ethnic minorities (9%) and women (8%). In terms of subjects, growth rates are best in Health, Public Services and Care and Education and Training.

Table 105: Employment rate (work 11 months+) by demographic group (TTG FL2)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	59%	59%	55%	59%	14%	14%	14%	14%
Agriculture, Horticulture and Animal Care	66%	66%	66%	72%	4%	5%	4%	0%
Engineering and Manufacturing Technologies	71%	71%	71%	72%	0%	-1%	0%	-1%
Construction, Planning and Built Environment	56%	56%	56%	70%	2%	2%	2%	-9%
Information and Communication Technology	75%	75%	70%	78%	5%	5%	11%	2%
Retail and Commercial Enterprise	68%	68%	66%	70%	4%	4%	5%	4%
Leisure, Travel and Tourism	53%	53%	52%	55%	10%	10%	11%	7%
Education and Training	76%	76%	83%	76%	11%	11%	0%	11%
Preparation for Life and Work	65%	65%	71%	62%	6%	6%	3%	8%
Business, Administration and Law	72%	72%	70%	72%	3%	3%	2%	4%
All	65%	65%	63%	66%	5%	5%	3%	8%

Source: Frontier analysis of TTG-HMRC/DWP data

Table 106: Employment rate (work 11 months+) by demographic group (TTG FL2)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	60%	54%	57%	60%	13%	16%	15%	13%
Agriculture, Horticulture and Animal Care	66%	69%	65%	68%	5%	-8%	3%	4%
Engineering and Manufacturing Technologies	74%	63%	69%	73%	-2%	4%	0%	-1%
Construction, Planning and Built Environment	58%	43%	51%	60%	2%	3%	3%	2%
Information and Communication Technology	77%	66%	71%	77%	5%	6%	10%	3%
Retail and Commercial Enterprise	70%	56%	65%	71%	3%	12%	6%	3%

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Leisure, Travel and Tourism	56%	40%	46%	58%	6%	23%	12%	8%
Education and Training	76%	75%	78%	75%	10%	19%	11%	11%
Preparation for Life and Work	68%	55%	63%	67%	5%	9%	7%	5%
Business, Administration and Law	73%	63%	68%	74%	2%	6%	4%	2%
All	66%	56%	61%	67%	4%	9%	6%	4%

Source: Frontier analysis of TTG-HMRC/DWP data

Benefits

In this section we describe the benefit histories and outcomes for FL2 TTG achievers. We present our calculations graphically below. The figure shows the average number of months during which benefit claims were made. Taking the whole sample, this stands at 0.6 of a month. Leisure, Travel and Tourism learners tend to claim benefits for longer than learners in the other subject areas, more than twice as long as the sample average. Overall, time on benefits is declining for the sample as a whole (from 0.60 to 0.45) and across the subject areas.

Figure 75: Months on benefits pre and post-learning by subject area (TTG FL2)
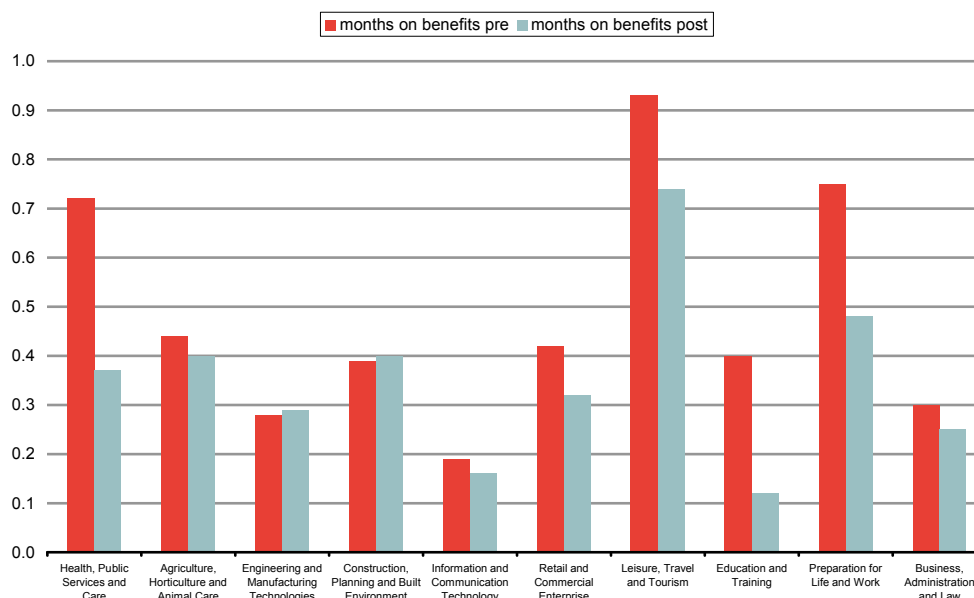
All FL2 achievers

We show alternative measures of benefit claims in the table below. These include the proportion of the sample claiming a benefit at any point in the 12 months pre and post-learning as well as the rate at a point in time.

Benefit claims are high in Leisure, Travel and Tourism and Health, Public Services and Care. Regardless of which measure is used, the number of benefit claimants post-training is between 1 and 3 percentages lower relative to the baseline.

Overall, all our measures show that benefit claims are either falling or remain constant across all subject areas.

Our calculations show that the proportion of learners claiming benefits post training is roughly the same for all demographic groups of interest.

Table 107: Benefit spells before and after learning (TTG FL2)

Subject area	Benefit before	Benefit after	3 months before	3 months after	6 months before	6 months after
Health, Public Services and Care	16%	7%	9%	3%	8%	3%
Agriculture, Horticulture and Animal Care	12%	7%	4%	4%	5%	3%
Engineering and Manufacturing Technologies	8%	7%	3%	3%	3%	3%
Construction, Planning and Built Environment	12%	12%	5%	4%	4%	4%
Information and Communication Technology	6%	4%	3%	1%	2%	2%
Retail and Commercial Enterprise	11%	8%	6%	3%	5%	4%
Leisure, Travel and Tourism	20%	15%	11%	9%	11%	9%
Education and Training	8%	3%	5%	2%	5%	2%
Preparation for Life and Work	14%	8%	8%	4%	7%	4%
Business, Administration and Law	8%	7%	4%	3%	4%	3%
All	11%	8%	6%	3%	5%	4%

Frontier analysis of TTG-HMRC/DWP data. FL2 achievers.

Table 108: Benefit claims by demographic group (TTG FL2)

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Health, Public Services and Care	16%	16%	16%	16%	-7%	-8%	-9%	-9%
Agriculture, Horticulture and Animal Care	12%	12%	12%	7%	-4%	-5%	-5%	-4%
Engineering and Manufacturing Technologies	8%	8%	8%	8%	0%	0%	-1%	0%
Construction, Planning and Built Environment	12%	12%	12%	9%	0%	0%	0%	0%
Information and Communication Technology	6%	6%	11%	4%	0%	-2%	-5%	-1%

Study area	Before training				% point change			
	All	19+	Men	Women	All	19+	Men	Women
Retail and Commercial Enterprise	11%	11%	11%	11%	-2%	-3%	-3%	-3%
Leisure, Travel and Tourism	20%	20%	20%	17%	-4%	-5%	-5%	-3%
Education and Training	8%	8%	0%	8%	-5%	-5%	0%	-5%
Preparation for Life and Work	14%	14%	11%	16%	-5%	-6%	-4%	-7%
Business, Administration and Law	8%	8%	9%	8%	-1%	-1%	-2%	-1%
All	11%	11%	11%	12%	-3%	-3%	-2%	-5%

Source: Frontier analysis of TTG-HMRC/DWP data

Table 109: Benefit claims by demographic group (TTG FL2)

Study area	Before training				% point change			
	White	Ethnic minority	Deprived	Not deprived	White	Ethnic minority	Deprived	Not deprived
Health, Public Services and Care	17%	11%	19%	13%	-9%	-6%	-10%	-7%
Agriculture, Horticulture and Animal Care	12%	6%	14%	10%	-5%	-3%	-6%	-4%
Engineering and Manufacturing Technologies	8%	7%	10%	6%	-1%	1%	-1%	0%
Construction, Planning and Built Environment	12%	11%	15%	9%	0%	-2%	0%	0%
Information and Communication	5%	9%	9%	4%	-2%	-3%	-5%	0%
Retail and Commercial	11%	13%	14%	8%	-3%	-5%	-3%	-2%
Leisure, Travel and Tourism	21%	15%	26%	15%	-6%	-1%	-6%	-4%
Education and Training	9%	3%	13%	7%	-6%	-3%	-7%	-5%
Preparation for Life and Work	14%	15%	16%	13%	-5%	-10%	-7%	-5%
Business, Administration and Law	8%	10%	12%	6%	-1%	-3%	-2%	-1%
All	12%	10%	15%	9%	-3%	-3%	-4%	-2%

Source: Frontier analysis of TTG-HMRC/DWP data

TTG FL3 achievers

Our merged TTG-HMRC/DWP data set contains only 1,179 Train to Gain achievers at FL3. The small number of observations considerably limits our ability to analyse in any detail the demographic characteristics and labour market performance of this group of learners.

Consider the sample sizes presented in the table below.

- There are no learners in 4 subject areas

- There are fewer than 100 learners in 8 subject areas

- There are fewer than 500 learners in the remaining 3 subject areas

Due to the small sample size of this group of learners we only present a brief, high level summary of the main variables of interest not distinguishing between demographic groups.

Table 110: Achiever characteristics (TTG FL3)

Subject area	Sample size
Health, Public Services and Care	496
Agriculture, Horticulture and Animal Care	-
Engineering and Manufacturing Technologies	89
Construction, Planning and Built Environment	205
Information and Communication Technology	-
Retail and Commercial Enterprise	52
Leisure, Travel and Tourism	-
Arts, Media and Publishing	-
Education and Training	49
Preparation for Life and Work	33
Business, Administration and Law	238
All	1,179

All FL3 achievers. Cells which are potentially disclosive have been marked with "-".

Demographic characteristics

- *Age*: On average FL3 achievers are 39 years old, with 75% aged 45 or less

- *Gender*: 40% are male

- *Ethnicity*: 89% are white British

- *Deprivation*: 37% live in a deprived area

Prior attainment

Prior attainment is known for 93% of this group of students:

- Just over half have no previous qualifications (51%)

- 43% have qualifications up to L1

- 5% have L2 qualifications

- The remaining 1% have qualifications at L3 and L4+

Labour market performance

The variables we present in the table below are:

- Proportion of learners in employment 6 months before and after learning

- Proportion of learners on benefits 6 months before and after learning

- Real earnings of learners earning between £4,800 and £80,000 per annum and in work for at least 11 months before and after learning

In summary our calculations show:

- Employment for this group of learners is high (80% are employed before the course) and increases by 1 percentage point post training

- There is no change in the benefit claims, it is constant and low at 3%

- Earnings decline by 4% in real terms in the year after training from their pre training level of £19,541 to £18,821

Table 111: Key economic outcomes (TTG FL3)

Study area	Before training			% point change		
	Employment	Benefits	Earnings	Employment	Benefits	Earnings*
Health, Public Services and Care	78%	5%	15,436	1%	-1%	1%
Construction, Planning and Built Environment	74%	2%	30,168	3%	-1%	-4%
Business, Administration and Law	85%	2%	19,131	0%	-1%	-3%
All	80%	3%	19,541	1%	0%	-4%

Source: Frontier analysis of TTG-HMRC/DWP data. FL3 achievers. *Percentage change for earnings

Comparing economic outcomes by funding stream

Due to the differences in age distributions between the funding streams, comparisons between funding streams are only possible if restricted to the same age group. As the figure below shows virtually all TTG learners are adults (aged 19+). For this reason, we focus our analysis on learners aged over 19 years. As in previous sections, due to differences in learner distribution by subject area we can only compare subject areas with sufficiently high sample sizes.

Figure 76: Age distributions of FE, TTG and Apprenticeship achievers

Learner age distributions
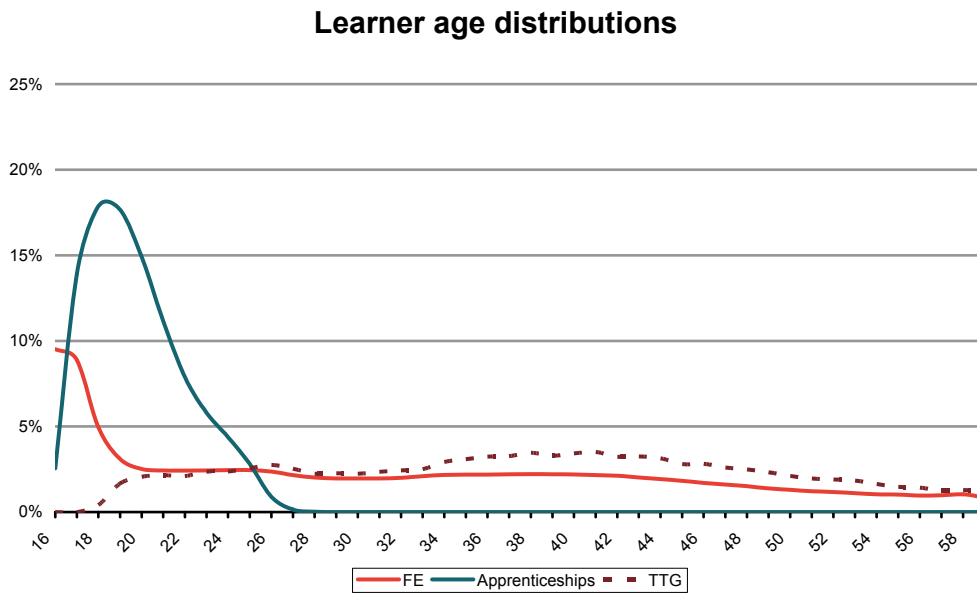
Source: Frontier analysis of ILR-HMRC/DWP data.

FL2

As a starting point we examine economic performance before learning took place. TTG learners have the highest earnings pre-learning. This is presumably due to the fact that they are significantly older than the rest. At the other end are Apprenticeship learners who are all under the age of 30 and earn the least pre-learning.

The gains from training are strongest for Apprenticeship learners. Their earnings grow by 30% compared with 5% for FE and a decline of 2% for TTG. Generally, earnings grow most in Construction, Planning and Development and least in Leisure, Travel and Tourism.

Table 112: Filtered earnings by funding stream (FL2 aged 19+)

Subject area	Earnings pre-learning			% change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Health, Public Services and Care	11,407	12,875	12,766	22%	6%	2%
Agriculture, Horticulture and Animal Care	12,088	16,765	20,258	74%	2%	-3%
Engineering and Manufacturing Technologies	11,329	20,093	20,919	37%	7%	-2%

Subject area	Earnings pre-learning			% change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Construction, Planning and Built Environment	13,665	21,020	25,289	35%	8%	-1%
Information and Communication Technology	11,799	17,641	19,555	57%	3%	0%
Retail and Commercial Enterprise	13,885	14,621	16,295	33%	4%	-2%
Leisure, Travel and Tourism	11,669	20,263	20,265	28%	-1%	-2%
Business, Administration and Law	11,588	17,265	17,530	30%	3%	-3%
All	12,294	16,913	18,497	30%	5%	-2%

Source: Frontier analysis of ILR-HMRC/DWP data. FL2 achievers aged 19+ in continuous employment and earning between £4,800 and £80,000

In terms of employment we see a similar pattern where gains are highest for Apprenticeship learners followed by FE and TTG learners. Again, both Apprenticeships and FE learners have lower employment rates than TTG learners before learning commenced.

Following achievement employment increases by a quarter in Apprenticeships, 7% in FE and 3% in TTG.

Growth is strongest in Engineering and Manufacturing Technologies for apprentices. In FE and TTG, the subject areas with the highest employment growth are Health, Public Services and Care and Leisure, Travel and Tourism.

Table 113: Employment by funding stream (FL2 aged 19+)

Subject area	Months employed pre-learning			% change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Health, Public Services and Care	7.10	8.14	8.87	26%	13%	9%
Agriculture, Horticulture and Animal Care	6.52	7.48	9.00	35%	8%	2%
Engineering and Manufacturing Technologies	6.30	8.67	9.64	48%	3%	-2%
Construction, Planning and Built Environment	5.74	7.54	7.98	39%	3%	2%
Information and Communication Technology	7.38	8.14	9.96	30%	6%	2%
Retail and Commercial Enterprise	7.46	7.98	9.41	19%	6%	2%
Leisure, Travel and Tourism	8.13	7.43	7.91	12%	10%	9%
Business, Administration and Law	8.19	9.08	9.63	16%	6%	2%
All	7.28	8.15	9.05	24%	7%	3%

Source: Frontier analysis of ILR-HMRC/DWP data. FL2 achievers aged 19+

Finally we examine the evolution of benefit claim rates before and after learning. Pre-learning benefit claims are highest in FE followed by Apprenticeships and TTG. Here again Apprenticeship learners appear to have the highest reductions, and from a lower base

than FE learners for example. On the whole, benefit claims fall or remain constant in all subject areas.

Table 114: Benefits by funding stream (FL2 aged 19+)

Subject area	Proportion claiming pre-learning			% point change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Health, Public Services and Care	21%	20%	16%	-10%	-8%	-8%
Agriculture, Horticulture and Animal Care	14%	24%	12%	-6%	-7%	-5%
Engineering and Manufacturing Technologies	12%	15%	8%	-5%	-4%	0%
Construction, Planning and Built Environment	12%	20%	12%	-4%	-5%	0%
Information and Communication Technology	15%	23%	6%	-8%	-5%	-2%
Retail and Commercial Enterprise	15%	26%	11%	-6%	-5%	-3%
Leisure, Travel and Tourism	12%	25%	20%	-4%	-4%	-5%
Business, Administration and Law	15%	14%	8%	-6%	-4%	-1%
All	15%	20%	11%	-6%	-5%	-3%

Source: Frontier analysis of ILR-HMRC/DWP data. FL2 achievers aged 19+

FL3

The differences in outcomes between apprentices and the rest are consistent at FL3 (due to small samples comparisons with TTG learners are only possible in several subject areas). Pre-learning earnings are highest in TTG followed by FE and Apprenticeships.

Following achievement apprentices gain the most with wage increases ranging from 28% to 81%. FE learners too see their mean wages increase significantly by an average 10%. Due to small samples we have only been able to compute reliable earnings statistics for a handful of TTG learners and even there averages are based on less than 100 individuals in certain cases (Construction, Planning and Built Environment for example). Nevertheless, the results appear consistent with the overall trend. TTG earnings either decline or at best remain static albeit from a much higher base than the other two learner groups. On average TTG earnings fall by 4%.

Table 115: Filtered earnings by funding stream (FL3 aged 19+)

Subject area	Earnings pre-learning			% change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Health, Public Services and Care	10,862	13,830	15,436	28%	7%	1%
Agriculture, Horticulture and Animal Care	12,089	14,591		38%	8%	
Engineering and Manufacturing Technologies	13,155	18,911		63%	28%	
Construction, Planning and Built Environment	13,306	18,207	30,168	81%	25%	-4%
Information and Communication Technology	16,778	14,760		29%	4%	

Subject area	Earnings pre-learning			% change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Retail and Commercial Enterprise	12,347	14,223		29%	8%	
Leisure, Travel and Tourism	11,900	11,064		37%	14%	
Business, Administration and Law	12,974	16,638	19,131	29%	8%	-3%
All	12,903	15,088	19,541	43%	10%	-4%

Source: Frontier analysis of ILR-HMRC/DWP data. FL3 achievers aged 19+ in continuous employment and earning between £4,800 and £80,000

We see exactly the same pattern in the table below examining employment rates. Pre-learning employment is highest in TTG, followed by FE and Apprenticeships. Again, employment rates increase dramatically for apprentices followed by good increases for FE and modest gains for TTG learners.

Table 116: Employment by funding stream (FL3 aged 19+)

Subject area	Months employed pre-learning			% change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Health, Public Services and Care	7.07	8.23	9.23	31%	9%	1%
Agriculture, Horticulture and Animal Care	6.36	7.12		38%	14%	
Engineering and Manufacturing Technologies	3.25	8.29		200%	11%	
Construction, Planning and Built Environment	4.98	8.42	8.86	80%	2%	3%
Information and Communication Technology	6.49	5.68		51%	30%	
Retail and Commercial Enterprise	7.07	7.2		24%	13%	
Leisure, Travel and Tourism	7.08	6.15		31%	27%	
Business, Administration and Law	8.29	8.89	10.13	21%	8%	1%
All	5.70	7.86	9.38	67%	8%	2%

Source: Frontier analysis of ILR-HMRC/DWP data. FL3 achievers aged 19+

In terms of benefit rates, FE learners appear to benefit the most from learning. It must be stressed though that on average their starting point is significantly higher than the other two learner groups. Almost one in five FE achievers claimed benefits pre-learning compared with only one in twenty Apprenticeship learners for example.

Table 117: Benefits by funding stream (FL3 aged 19+)

Subject area	Proportion claiming pre-learning			% point change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Health, Public Services and Care	9%	17%	9%	-4%	-5%	-2%
Agriculture, Horticulture and Animal Care	3%	17%		0%	-6%	

Subject area	Proportion claiming pre-learning			% point change post-learning		
	Appr.	FE	TTG	Appr.	FE	TTG
Engineering and Manufacturing Technologies	3%	10%		-1%	-4%	
Construction, Planning and Built Environment	3%	12%	5%	0%	-4%	1%
Information and Communication Technology	5%	22%		-2%	-5%	
Retail and Commercial Enterprise	5%	27%		0%	-6%	
Leisure, Travel and Tourism	8%	16%		-3%	-4%	
Business, Administration and Law	7%	12%	4%	-2%	-4%	-1%
All	5%	19%	7%	-1%	-5%	-2%

Source: Frontier analysis of ILR-HMRC/DWP data. FL3 achievers aged 19+

Impact analysis

This section presents our analysis of the 'impact' of training on subsequent outcomes. We divide this discussion into the following subsections:

- We begin by describing our approach to estimating a counterfactual ('what would individuals' outcomes have been if they had not entered training') when the data we have relates only to learners.

- We summarise and comment on the results of this analysis, separately covering earnings, employment and time on benefit.

- We provide more detailed results by gender, ethnicity, age and social deprivation.

Methodology for impact analysis

In order to determine the true causal effects of any form of treatment on an individual's outcomes we need to know two things:

- what an individual's outcomes were before and after the treatment

- what an individual's outcomes would have been without the treatment

The former is observable and can therefore be measured with a good degree of accuracy. The latter, also known as the counterfactual, is unobservable and needs to be constructed.

The traditional approach of the impact evaluation literature is to compare the outcomes of two groups of individuals also known as the control and treatment groups. The treatment group is the one that undergoes the treatment while the control group does not. Provided the individuals in the control group have exactly the same characteristics as those in the treatment group, we can assume that their outcomes are an approximation of the outcomes the individuals in the treatment group would have in the absence of a treatment. So any observable changes in outcomes of the treatment group relative to the control group can be attributed to the treatment.

Unfortunately, the data we have available for analysis only includes participants in FE, Apprenticeships or TTG – specifically, it includes the earnings and benefit claims of all individuals who undertake publicly funded learning and have an Individualised Learner Record. What the data does not cover is the earnings/employment histories and outcomes of individuals who do not undertake such learning. This makes the construction of a counterfactual considerably more challenging.

An interesting comparison that can be made is between individuals completing their studies with those who drop out on the same courses. However, this is likely to give biased results. Individuals who do not complete a training course are likely to differ from achievers in numerous unobservable ways (motivation, 'ability', etc.) which may lead them to have worse outcomes in the labour market. This would lead us to overestimate the gains from training, possibly substantially. The bias could also work in the opposite direction, of

course – if highly motivated individuals fail to complete training because they receive early job offers, for example, that could bias our estimates of the impact of training downwards. In either case, unobserved factors which are associated with both completion and earnings may lead to biased estimates of the impact of training.

We might also consider comparing achievers who undertake different sorts of training, such as different qualification levels or subject levels. However, this would only reveal the relative impact of training for one group of participants compared to another, not the impact of training per se. Moreover, this analysis would again be severely confounded by any unobserved influences that determine both the courses people enrol for and their earnings in the labour market.

In the absence of a clear control group we use an alternative approach to evaluate the impact of training on economic outcomes: comparing the outcomes of individuals who have completed training with the outcomes of those same individuals before they had embarked upon training. This is known in the programme evaluation literature as a before-after comparison[16] (for obvious reasons), and our view is that it is the best comparison that can be made given the current data sources.

We exploit the longitudinal information on labour market outcomes to compare the employment and earnings of the learners before and after training took place, after taking into account inflation and macroeconomic factors which may also have affected earnings. In this approach the control group is the learners themselves, pre-treatment. We consider comparing the pre-course histories with post-completion outcomes appropriate given the availability of a long time series and the lack of another control group. A graphical illustration of our approach is illustrated in Figure 77, overleaf.

---

[16] For more details on this and other approaches to evaluation, see Blundell, R. & M. Costas Dias, "Alternative approaches to evaluation in empirical microeconomics", CEMMAP working paper 10/02 (http://cemmap.ifs.org.uk/wps/cwp0210.pdf)

Figure 77: Approach to impact analysis
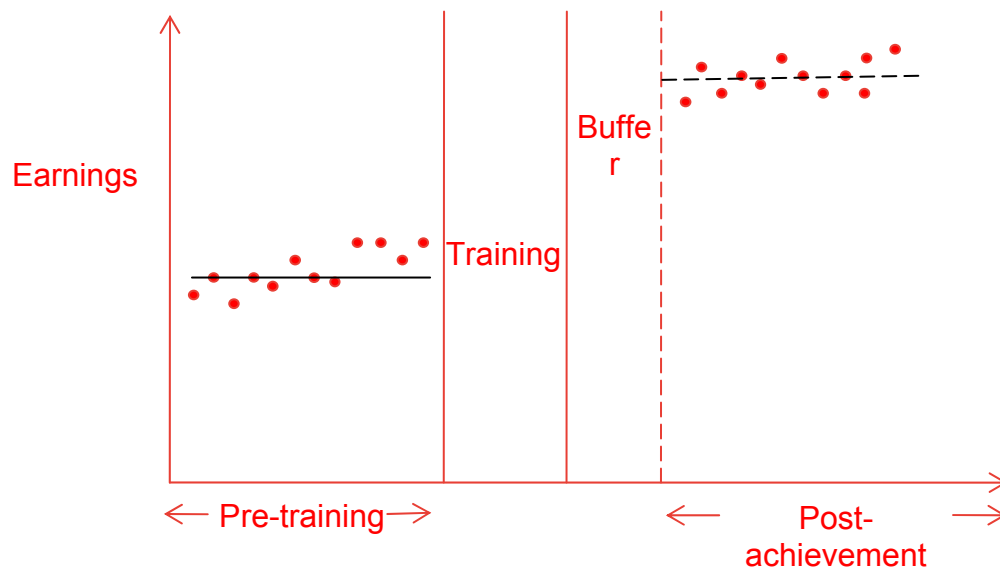
Our data is arranged into three periods:

- Pre-training – the 12 months before an individual enters training, in which we measure their employment, earnings and benefits history.

- Training and buffer – the period spent in training, and a three month 'buffer' period after completing training. We do not measure outcomes during this period, since we are interested in the post¬-treatment outcomes.

- Post-achievement – the 12 months after completing training (and after the buffer period), in which we again measure individuals' employment, earnings and benefits outcomes.

One measure of the 'impact' of training is simply the raw difference between pre and post-training outcomes. However, a crucial issue here is whether there any unobserved factors that (a) influence labour market outcomes and (b) change over time. Any such factors (aggregate economic fluctuations, earnings inflation, etc.) need to be separately accounted for in order to prevent them from contaminating the estimated impact of training.

To do this we put in year dummy variables (binary variables equal to one if an observation occurs in a given financial year, and zero otherwise) which capture underlying yearly variation in labour market conditions in a flexible way. This should absorb as much of the variation in outcomes caused by changes in overall economic conditions as possible[17]. We are able to do this with our data as the before and after periods vary by individual, and

---

[17] We also adjust the earnings information for inflation in order to focus on real-terms earnings.

hence for a number of years we observe individuals both before and after training. This allows us to separately identify the impact of the training program as well as macroeconomic year effects.

Fixed effects

In most labour market evaluations it is also very important to control for individual-specific characteristics that might have a role to play in determining wages, especially if these characteristics are also statistically associated with the training in question (such as ethnicity, gender, region, etc.). For example, it might be that females are more likely to enrol on a particular course than males. If females also tend to earn less than males, then we might (falsely) conclude that the economic return to that particular course is low or even negative.

Controlling for characteristics that are relevant to outcomes can help mitigate this risk, but it is clearly not possible to observe every single relevant characteristic. A potentially more effective technique is to strip out the effect of all individual characteristics (both observed and unobserved) that do not vary over time, such as demographics or underlying "ability". This is known in the evaluation literature as a 'fixed effect' approach as it attempts to control for all fixed individual-specific effects on outcomes.

In a sense, this can be thought of as examining the impact of training upon the growth rate of an individual's labour market outcomes, rather than the level, and can therefore be done if the same individuals are observed repeatedly – as is the case here. Furthermore, in datasets such as the ones we use, which contain relatively simple measures of individual characteristics (and no information on time-varying characteristics), this technique is likely to be far more effective than trying to control for outcome-relevant characteristics 'manually'. This method is also more parsimonious from a computing perspective, as it does not require these characteristics to be included in the derived dataset or the statistical model.

Clustering

Finally, our statistical models also allow for any remaining unobserved factors (after stripping out the aforementioned time-invariant ones) to be correlated with each other over time for the same individual. This is a more flexible way of specifying the remaining uncertainty in our model: it allows the 'shocks' that a person receives in each time period to their labour market status to be persistent over time, rather than necessarily completely independent of each other. For example, if someone has unexpectedly low wages this month because of a negative occurrence, our methodology allows this shock to persist to the next month.

This technique, known as 'clustering', is applied to the standard errors in our models. It does not therefore affect our estimates of the impact of training, but does affect the significance levels of the estimates and any resulting hypothesis tests. In particular, it will reduce the statistical significance of any estimated impacts and therefore make the resulting inference more cautious or conservative.

Empirical Results

In this Chapter we present an example of the impact analysis described earlier to estimate the impact of Further Education training on labour market and benefit outcomes. We consider the Further Education stream, rather than Work Based Learning or Train to Gain, to provide the best testing ground for this analysis, since the FE data includes a large number of individuals with reliable pre-training labour market and benefits histories. The Work Based Learning sample contains many young individuals (see above), whose pre-training labour market histories are unlikely to provide a reliable indication of their pre-training earnings potential (if they have any pre-training labour market history at all). While the Train to Gain sample does not suffer from this problem (with a much higher average age of learner), as a relatively new programme, it offers far smaller sample sizes than the FE sample.

In the sections that follow, we estimate the impact of Further Education training on three outcomes, in each case comparing the twelve months before an individual entered training with the twelve months after they completed their qualification (allowing for a three month 'buffer' period following training – see Chapter 7). The three outcomes analysed are:

- Average monthly earnings (when in employment)

- Proportion of the year spent in employment

- Proportion of the year spent on benefits (JSA, IB or ESA)

For each of these outcomes, we use two alternative specifications for our estimates, one with and without year indicator variables (to control for changes over time – see Chapter 7).

We repeat again that all these results must be interpreted with caution, and that they do not constitute truly 'causal' estimates of the impact of training. If earnings tend to rise with age and unemployment tends to decline with age, these results will overstate the impact of training. Much of our sample is likely to be on the steep upwards slope of the age-earnings profile, in which case we would incorrectly be ascribing all of this gain to the training. The normal approach to removing this upward bias would be to conduct a difference-in-difference analysis with age-matched controls. This is not possible with the dataset we currently have, however.

Our general findings are:

- The effect on monthly earnings depends very much on which specification is used. When the raw differences are estimated, the impact is generally positive and significant. However, when we include year dummies there is much less of a clear pattern.

- If we assess the impact on monthly earnings only for individuals in work for at least 11 months and earning between £4,800 and £80,000 before and after the course, we find more consistency between results from the two specifications. We now see

201

a positive impact on pay. Taking a weighted average across all individuals fitting this definition, there is an increase in earnings of around £32 per month, when estimated with year dummies (£67 per month when estimated without).

- The impact on the proportion of the year spent in employment is positive and significant. This is true under either specification and true for the vast majority of study areas and levels, male and female. The effects are not as large when the year dummies are used, however (3-4 percentage points with year dummies as opposed to 12-13 percentage points without).

- The impact of courses on the proportion of the year spent on benefits is negative (i.e. reduced probability). This is generally true across study areas, levels, specifications, for men and for women. The effect is almost always statistically significant. The weighted impact is a reduction in the benefit rate of around 1.4 percentage points.

Analysis by study area and qualification level gives the following results:

- BL2: Employment and earnings improve substantially for both men and women learners in Preparation for Life and Work. Drops in benefit rates are large and significant in Health, Public Services and Care.

- FL2: The largest earnings improvements are in Retail and Commercial Enterprise and Health, Public Services and Care while employment increases are highest in Science and Mathematics and Arts, Media and Publishing for both men and women.

- FL3: Our results on earnings are often statistically insignificant and do not reveal a clear pattern. On the other hand, there are large reductions in benefit rates for both men and women studying Health, Public Services and Care, Education and Training and Preparation for Life and Work. Employment increases are highest for both men and women in Information and Communication Technology

Taking these results together, they raise several further points:

- The results seem most plausible for benefits and least plausible for monthly pay across all individuals. This is consistent with our observation that the NBD data is the most accurate and needed the least cleaning, whereas the monthly pay variable is derived through lengthy calculations from three data sources that do not fully reconcile with each other. This will inevitably be a source of measurement error.

- When we focus only on individuals in work for at least 11 months and earning between £4,800 and £80,000 before and after the course, we remove a number of cases for which we have various data concerns (such as cases with earnings information in the P14 dataset, but no corresponding employment spells in the P45 dataset).

- The impact estimates vary to an appreciable extent with the use of the yearly indicator variables, but we consider the analyses that include them to be less sensitive to the specification chosen.

Detailed analysis by Level and gender

In the tables that follow we focus on groups defined by gender and achievement level and compare impacts of different study areas. In each table we report the number of individuals in that group studying for that qualification; the average pre-education outcome; and the impact of the course estimated in two ways. First we give the difference between before and after (with fixed effects used to control for time-constant unobserved heterogeneity between individuals). Secondly, we control for year-specific effects using year dummies. We place greater weight on the second of these approaches, but it is instructive also to look at the raw differences between outcomes before and after.

We focus on groups in the following order:

- Men – BL2;

- Women – BL2;

- Men – L2;

- Women – L2;

- Men – FL2;

- Women – FL2

- Men – L3;

- Women – L3;

- Men – FL3;

- Women – FL3.

For each of these we analyse the following outcomes:

- Monthly pay (whole sample);

- Monthly pay (individuals working at least 11 months and earning between £4,800 and £80,000 before and after);

- Fraction of year in employment (whole sample);

- Fraction of year on benefit (whole sample).

For each impact we also test the hypothesis that the coefficient is different from zero. Standard errors are estimated clustering on each individual. We use the conventional system of asterisks to report these results for each coefficient:

* - significant at the 10% level;

** - significant at the 5% level;

*** - significant at the 1% level.

Men – BL2

The highest increases in pay come from Preparation for Life and Work and from Construction – a result which holds true regardless of whether or not year dummies are included in the estimation. Indeed, these two areas are the only ones to show a positive, significant impact after year dummies are added to the specification. In the case of Leisure, Travel and Tourism, the impact estimate becomes negative after the addition of year dummies, showing how sensitive these results are to the specification used.

Table 118: Effect on monthly pay rate for men (whole sample), BL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	65,631	1,243	70.84***	10.42
Science and Mathematics	481	651	40.69	-157.88
Agriculture, Horticulture and Animal Care	4,601	740	5.7	-42.99
Engineering and Manufacturing Technologies	22,218	1,006	94.89***	-36.43
Construction, Planning and Built Environment	22,607	571	143.84***	32.75***
Information and Communication Technology	38,225	834	2.37	-42.28**
Retail and Commercial Enterprise	8,572	679	97.68***	34.16
Leisure, Travel and Tourism	29,593	1,474	53.73***	-50.36**
Arts, Media and Publishing	11,071	865	.32	-24.81
History, Philosophy and Theology	583	1,095	-24.68	21.62
Social Sciences	468	916	12.66	-79.56
Languages, Literature and Culture	19,843	1,738	-12.27	-28.86

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	501	833	-77.83	13.85
Preparation for Life and Work	164,626	417	136.13***	62.87***
Business, Administration and Law	5,545	936	26.63**	4.01

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Filtering the sample to include only men working 11 months and earning between £4,800 and £80,000 p.a. before and after, gives much greater consistency between results from the two specifications. Of the study areas with a reasonable sample size, the highest increase is again seen in Construction, Planning and Built Environment. Other study areas seeing large increases under either method are Engineering and Manufacturing Technologies; Retail and Commercial Enterprise; and Preparation for Life and Work.

Table 119: Effect on monthly pay rate for men (filtered), BL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	28,010	2,137	69.42***	32.8***
Science and Mathematics	73	2,324	25.49	-321.05
Agriculture, Horticulture and Animal Care	933	2,124	32.51	-25.8
Engineering and Manufacturing Technologies	5,967	2,139	82.12***	50.33***
Construction, Planning and Built Environment	3,775	2,019	66.38***	75.9***
Information and Communication Technology	9,553	1,966	20.67***	33.79***
Retail and Commercial Enterprise	1,983	1,664	58.06***	52.89**
Leisure, Travel and Tourism	11,009	2,454	25.87***	26.00***
Arts, Media and Publishing	2,543	2,282	37.62**	40.67
History, Philosophy and Theology	166	2,200	79.75	231.95**
Social Sciences	133	2,207	15.13	-106.05
Languages, Literature and Culture	8,351	2,519	49.19***	59.82***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	90	2,007	79.13	-142.71
Preparation for Life and Work	21,677	1,651	93.52***	40.39***
Business, Administration and Law	1,705	2,089	23.14	91.3***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

For all study areas with a reasonable sample size there is a positive and significant impact on the fraction of the year spent in employment. The increases are smaller when using year dummies, however, possibly because these year effects partially control for the tendency of individuals' employment rates to increase over time. The most notable increases are for Construction and Planning and for Preparation for Life and Work. Increased employment may partly drive the upward impact in monthly pay for these groups.

Table 120: Effect on employment rate for men (whole sample), BL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	65,631	0.690	.0388***	.0204***
Science and Mathematics	481	0.418	.1114***	.0485*
Agriculture, Horticulture and Animal Care	4,601	0.514	.0495***	.0261***
Engineering and Manufacturing Technologies	22,218	0.538	.1293***	.0134***
Construction, Planning and Built Environment	22,607	0.411	.202***	.0943***
Information and Communication Technology	38,225	0.524	.0447***	.028***
Retail and Commercial Enterprise	8,572	0.556	.093***	.0294***
Leisure, Travel and Tourism	29,593	0.660	.0618***	.0165***
Arts, Media and Publishing	11,071	0.545	.0324***	.0207***
History, Philosophy and Theology	583	0.574	.0198	-.0099
Social Sciences	468	0.599	.0198	-.0183
Languages, Literature and Culture	19,843	0.714	.0189***	.0112***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	501	0.442	.0863***	.0639**
Preparation for Life and Work	164,626	0.449	.11***	.0664***
Business, Administration and Law	5,545	0.573	.0677***	.0149**

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Interestingly, the impacts on benefits tend to be larger when estimated using year dummies, which was not the case for the other outcomes we focus on. This could be because the year dummies control for a tendency of people to move into benefits over time. The largest impacts on benefits occur for:

- Health, Public Services and Care;

- Engineering and Manufacturing Technologies;

- Construction, Planning and Built Environment;

- Information and Communication Technology;

- Retail and Commercial Enterprise; and

- Business, Administration and Law

Table 121: Effect on benefit rate for men (whole sample), BL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	65,631	0.091	-.0097***	-.013***
Science and Mathematics	481	0.206	.0198**	-.0033
Agriculture, Horticulture and Animal Care	4,601	0.274	.0129***	-.0103*
Engineering and Manufacturing Technologies	22,218	0.063	-.0025**	-.0121***
Construction, Planning and Built Environment	22,607	0.080	-.0036***	-.0143***
Information and Communication Technology	38,225	0.244	-.006***	-.0233***
Retail and Commercial Enterprise	8,572	0.143	.0027	-.0139***
Leisure, Travel and Tourism	29,593	0.055	-.0023***	-.0034***
Arts, Media and Publishing	11,071	0.284	.0032	-.0034

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
History, Philosophy and Theology	583	0.235	-.0143**	-.0183*
Social Sciences	468	0.282	.0129	.0259*
Languages, Literature and Culture	19,843	0.073	-.0082***	-.0084***
Education and Training	501	0.296	-.0363***	-.0586***
Preparation for Life and Work	164,626	0.249	.0084***	-.0057***
Business, Administration and Law	5,545	0.131	-.0078***	-.0208***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Women – BL2

Turning to the results for women, we begin by looking at the effect on monthly pay. As was the case with the results for men in the previous section, impacts tend to be lower when estimated with year dummies, affecting statistical significance and in some cases turning positive coefficients into negative ones. The most notable impacts are for Preparation for Life and Work, Social Sciences, and Leisure and Tourism. History, Philosophy and Theology appears to have a significant negative impact.

Table 122: Effect on monthly pay rate for women (whole sample), BL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	106,362	721	51.72***	5.53*
Science and Mathematics	843	552	39.96	33.93
Agriculture, Horticulture and Animal Care	5,038	727	12.25	-.85
Engineering and Manufacturing Technologies	6,533	788	31.6***	12.24
Construction, Planning and Built Environment	1,730	673	14.92	-212.53
Information and Communication Technology	78,855	566	27.37***	0.79
Retail and Commercial Enterprise	27,186	468	66.3***	12.03
Leisure, Travel and Tourism	14,623	782	76.5***	36.9***
Arts, Media and Publishing	29,882	713	-6.04	-7.16
History, Philosophy and Theology	1,413	748	-40.55*	-70.88**
Social Sciences	1,414	679	68.17***	76.08**

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Languages, Literature and Culture	39,568	1,028	6.89	-15.41
Education and Training	2,042	446	42.28***	35.28*
Preparation for Life and Work	192,581	303	106.28***	51.61***
Business, Administration and Law	12,953	641	62.26***	36.72**

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

When we focus on women in employment for at least 11 months and earning between £4,800 and £80,000 before and after, we find clearer evidence of an upward impact on pay. There is greater consistency between impacts estimated under each method for this subgroup. The study areas with the strongest positive impacts are:

- Health, Public Services and Care;

- Languages, Literature and Culture;

- Retail and Commercial Enterprise; and

- Leisure, Travel and Tourism.

Table 123: Effect on monthly pay rate for women (filtered), BL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	37,438	1,431	50.97***	30.34***
Science and Mathematics	186	1,508	50.97	179.05***
Agriculture, Horticulture and Animal Care	1,370	1,704	-.23	43.75*
Engineering and Manufacturing Technologies	2,125	1,499	42.14***	15.5
Construction, Planning and Built Environment	452	1,613	32.45	70.28*
Information and Communication Technology	20,181	1,353	17.3***	8.88
Retail and Commercial Enterprise	6,443	1,171	55.42***	41.86***
Leisure, Travel and Tourism	4,823	1,681	60.86***	59.33***
Arts, Media and Publishing	7,882	1,728	12.53	62.74***
History, Philosophy and Theology	434	1,608	1.71	22.76
Social Sciences	414	1,538	116.33***	96.53**

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Languages, Literature and Culture	15,098	1,792	40.92***	62.85***
Education and Training	429	1,318	-14.63	15.12
Preparation for Life and Work	24,105	1,275	56.65***	21.16***
Business, Administration and Law	3,900	1,389	26.13***	36.15***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Turning to the impacts on the fraction of the year spent in employment, we find the largest positive effects from Preparation for Life and Work and from Education and Training. There are also large positive impacts for Business, Administration and Law; Construction, Planning and Built Environment and for Information and Communication Technology.

Table 124: Effect on employment rate for women (whole sample), BL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	106,362	0.682	.051***	.0184***
Science and Mathematics	843	0.554	.0789***	.0111
Agriculture, Horticulture and Animal Care	5,038	0.611	.0524***	.0173**
Engineering and Manufacturing Technologies	6,533	0.698	.0347***	.0053
Construction, Planning and Built Environment	1,730	0.589	.0865***	.0403***
Information and Communication Technology	78,855	0.616	.0537***	.0382***
Retail and Commercial Enterprise	27,186	0.593	.0973***	.0255***
Leisure, Travel and Tourism	14,623	0.657	.0707***	.037***
Arts, Media and Publishing	29,882	0.629	.0304***	.0126***
History, Philosophy and Theology	1,413	0.655	.0377***	.0318**
Social Sciences	1,414	0.632	.0471***	.0424**
Languages, Literature and Culture	39,568	0.711	.0302***	.0185***
Education and Training	2,042	0.598	.0798***	.0785***
Preparation for Life and Work	192,581	0.512	.1204***	.073***
Business, Administration and Law	12,953	0.630	.0795***	.0452***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

The largest impacts on the proportion of the year spent on benefits occur with Information and Communication Technology; Retail and Commercial Enterprise; and Business, Administration and Law.

Table 125: Effect on benefit rate for women (whole sample), BL2

Study area	Number	Average before	Impact Raw difference	Year dummies
Health, Public Services and Care	106,362	0.103	-.0127***	-.0143***
Science and Mathematics	843	0.214	-.0056	-.0174
Agriculture, Horticulture and Animal Care	5,038	0.156	-.0009	-.0111***
Engineering and Manufacturing Technologies	6,533	0.097	-.0056**	.0032
Construction, Planning and Built Environment	1,730	0.216	-.0313***	-.0094
Information and Communication Technology	78,855	0.209	-.0249***	-.0267***
Retail and Commercial Enterprise	27,186	0.130	-.0076***	-.0182***
Leisure, Travel and Tourism	14,623	0.086	-.0073***	-.0093***
Arts, Media and Publishing	29,882	0.206	-.015***	-.009***
History, Philosophy and Theology	1,413	0.191	-.0242***	-.0142*
Social Sciences	1,414	0.198	-.0143**	-.0102
Languages, Literature and Culture	39,568	0.076	-.0104***	-.0082***
Education and Training	2,042	0.205	-.0146***	-.0124
Preparation for Life and Work	192,581	0.276	-.0031***	-.0106***
Business, Administration and Law	12,953	0.148	-.0156***	-.0197***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Men – L2

Moving on to L2 qualifications, we first look at the impact estimates for men. The raw differences before and after are large and positive, but when impacts are estimated using year dummies most of the estimated impacts turn negative – suggesting that the impact estimates are highly sensitive to the specification used. The impact can turn from positive significant to negative significant, as with Retail and Commercial Enterprise. The only study areas to see consistent significant positive impacts are Health, Public Services and Care; Science and Mathematics; and Preparation for Life and Work.

Table 126: Effect on monthly pay rate for men (whole sample), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	54,422	871	116.34***	28.05***
Science and Mathematics	7,461	479	167.27***	56.98***
Agriculture, Horticulture and Animal Care	14,256	963	33.07***	-15.31
Engineering and Manufacturing Technologies	44,232	862	162.07***	-28.34
Construction, Planning and Built Environment	40,934	699	182.11***	14.58
Information and Communication Technology	29,032	772	119.13***	-4.47
Retail and Commercial Enterprise	28,312	863	31.42***	-91.04***
Leisure, Travel and Tourism	23,315	828	132.19***	13.15
Arts, Media and Publishing	13,314	521	96.18***	13.9
History, Philosophy and Theology	646	1,158	-10.7	6.35
Social Sciences	454	479	54.55*	-189.74***
Languages, Literature and Culture	11,128	1,211	85.8***	6.15
Education and Training	2,267	1,052	42.62**	-13.78
Preparation for Life and Work	32,270	593	164.16***	41.35***
Business, Administration and Law	18,491	1,150	110.92***	-34.2

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Among the filtered group (those with more reliable earnings information) it is easier to discern a positive and significant impact. For most groups with a reasonable sample size the impact is positive and broadly similar with and without year dummies. However, for four study areas (Engineering and Manufacturing Technologies; Construction, Planning and Built Environment; Business, Administration and Law; and Retail and Commercial Enterprise) the impact is large and significant when estimated with year dummies, though the raw differences are small and insignificant.

Table 127: Effect on monthly pay rate for men (filtered), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	16,652	1,814	63.11***	41.37***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Science and Mathematics	1,232	1,628	123.39***	48.93
Agriculture, Horticulture and Animal Care	4,951	1,736	59.1***	89.59***
Engineering and Manufacturing Technologies	13,241	1,843	96.23***	8.24
Construction, Planning and Built Environment	9,166	1,807	150.75***	21.93
Information and Communication Technology	7,208	1,930	111.44***	46.44***
Retail and Commercial Enterprise	7,698	1,763	39.34***	22.51*
Leisure, Travel and Tourism	4,858	2,029	47.46***	48.94***
Arts, Media and Publishing	1,776	2,077	79.09***	104.23***
History, Philosophy and Theology	221	2,258	64.65	-4.82
Social Sciences	60	1,802	64.34	-115.84
Languages, Literature and Culture	3,325	2,397	29.01*	101.56***
Education and Training	806	1,906	46.07**	50.49
Preparation for Life and Work	6,557	1,814	85.6***	37.81***
Business, Administration and Law	7,824	2,034	48.29***	16.81

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Turning to the impacts on the fraction of the year spent in employment, we see positive and significant impacts in most study areas. The raw differences seem rather too large to be plausible (e.g. Arts, Media and Publishing increases the fraction of the year spent in employment by 18.6 percentage points, from a base of 37.4%), but are significantly reduced when year dummies are included in the specification. Nonetheless, we continue to see large and significant impacts from Languages, Literature and Culture; Science and Mathematics; and Arts, Media and Publishing. A curious result is found for Retail and Commercial Enterprise, which has a negative and significant impact with year dummies.

Table 128: Effect on employment rate for men (whole sample), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	54,422	0.601	.0974***	.0358***
Science and Mathematics	7,461	0.416	.204***	.0969***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Agriculture, Horticulture and Animal Care	14,256	0.630	.0706***	-.0042
Engineering and Manufacturing Technologies	44,232	0.567	.15***	.0271***
Construction, Planning and Built Environment	40,934	0.512	.1419***	.0057
Information and Communication Technology	29,032	0.504	.1251***	.0496***
Retail and Commercial Enterprise	28,312	0.616	.0627***	-.0269***
Leisure, Travel and Tourism	23,315	0.505	.1741***	.0521***
Arts, Media and Publishing	13,314	0.374	.1857***	.0904***
History, Philosophy and Theology	646	0.576	.0286**	.0226
Social Sciences	454	0.418	.1491***	.0299
Languages, Literature and Culture	11,128	0.572	.1096***	.0626***
Education and Training	2,267	0.655	.0471***	.0156
Preparation for Life and Work	32,270	0.467	.1544***	.0472***
Business, Administration and Law	18,491	0.654	.1035***	.0079**

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Impacts on benefits are broadly similar between estimation methods. In most cases the impact is negative and significant. The largest impacts are for Health, Public Services and Care and for Information and Communication Technology.

Table 129: Effect on benefit rate for men (whole sample), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	54,422	0.112	-.0231***	-.0294***
Science and Mathematics	7,461	0.073	-.0038**	-.0124***
Agriculture, Horticulture and Animal Care	14,256	0.068	-.0132***	-.0088***
Engineering and Manufacturing Technologies	44,232	0.053	-.0047***	-.0081***
Construction, Planning and Built Environment	40,934	0.061	-.0067***	-.0047***
Information and Communication Technology	29,032	0.148	-.0127***	-.0262***
Retail and Commercial Enterprise	28,312	0.076	-.0116***	-.0177***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Leisure, Travel and Tourism	23,315	0.063	-.0076***	-.0123***
Arts, Media and Publishing	13,314	0.119	.0037**	-.0094***
History, Philosophy and Theology	646	0.160	-.0095	-.0046
Social Sciences	454	0.158	-.012	-.0202
Languages, Literature and Culture	11,128	0.078	-.008***	-.0107***
Education and Training	2,267	0.125	-.0242***	-.0097*
Preparation for Life and Work	32,270	0.136	-.0017	-.0094***
Business, Administration and Law	18,491	0.055	-.0099***	-.014***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Women –L2

Turning to the impacts of L2 qualifications for women, looking first at the whole sample, we again see estimates which are heavily affected by the addition of year dummies to the specification. The largest positive impacts are for Education and Training; Science and Mathematics; and Business, Administration and Law. However, we also see significant negative impacts for History, Philosophy and Theology, and Retail and Commercial Enterprise.

Table 130: Effect on monthly pay rate for women (whole sample), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	160,970	648	73.71***	10.78***
Science and Mathematics	17,266	495	103.38***	32.39***
Agriculture, Horticulture and Animal Care	8,676	679	41.43***	17.18
Engineering and Manufacturing Technologies	13,825	740	59.57***	9.85
Construction, Planning and Built Environment	2,225	709	149.48***	42.1
Information and Communication Technology	42,387	710	77.41***	4.68
Retail and Commercial Enterprise	67,036	465	85.07***	-19.63***
Leisure, Travel and Tourism	17,939	539	142.11***	3.19
Arts, Media and Publishing	23,504	559	37.05***	1.84

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
History, Philosophy and Theology	1,224	659	-31.37	-135.82**
Social Sciences	1,263	480	53.92***	18.98
Languages, Literature and Culture	19,903	806	58.36***	18.81
Education and Training	20,035	462	96.28***	52.44***
Preparation for Life and Work	57,051	531	97.65***	19.72***
Business, Administration and Law	37,896	704	130.83***	26.66***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Focusing only on women in work for more than 11 months and earning between £4,800 and £80,000 p.a., the impacts on pay are more clearly positive and significant. There are large, consistently positive impacts from Languages, Literature and Culture; Agriculture, Horticulture and Animal Care; and Preparation for Life and Work.

Table 131: Effect on monthly pay rate for women (filtered), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	54,643	1,259	44.12***	32.05***
Science and Mathematics	4,140	1,249	61.99***	15.66
Agriculture, Horticulture and Animal Care	2,126	1,622	38.85**	98.93***
Engineering and Manufacturing Technologies	4,919	1,327	44.52***	28.1**
Construction, Planning and Built Environment	664	1,506	151.77***	63.64
Information and Communication Technology	14,451	1,404	51.43***	-.62
Retail and Commercial Enterprise	14,075	1,235	62.5***	36.38***
Leisure, Travel and Tourism	3,726	1,562	49.78***	9.28
Arts, Media and Publishing	4,602	1,707	2.09	24.41
History, Philosophy and Theology	337	1,564	-21.05	47.44
Social Sciences	254	1,465	30.76	171.95**
Languages, Literature and Culture	6,063	1,752	38.61***	79.05***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	4,713	1,173	42.05***	43.75***
Preparation for Life and Work	15,589	1,281	52.21***	53.13***
Business, Administration and Law	13,865	1,337	76.36***	20.38***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

As with other groups, the raw differences in the proportion of the year spent in employment are much larger than the impacts estimated with year dummies - around twice as large, in most cases. The largest impacts are for Education and Training Arts, Media and Publishing; and Science and Mathematics.

Table 132: Effect on employment rate for women (whole sample), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	160,970	0.676	.0855***	.007***
Science and Mathematics	17,266	0.577	.1214***	.0585***
Agriculture, Horticulture and Animal Care	8,676	0.553	.1078***	.0455***
Engineering and Manufacturing Technologies	13,825	0.704	.0534***	.0367***
Construction, Planning and Built Environment	2,225	0.630	.0897***	.0235
Information and Communication Technology	42,387	0.659	.0798***	.0385***
Retail and Commercial Enterprise	67,036	0.563	.1228***	-.0033
Leisure, Travel and Tourism	17,939	0.527	.1805***	.0485***
Arts, Media and Publishing	23,504	0.511	.1187***	.0656***
History, Philosophy and Theology	1,224	0.627	.0189*	.0046
Social Sciences	1,263	0.521	.1051***	.0295*
Languages, Literature and Culture	19,903	0.627	.0834***	.057***
Education and Training	20,035	0.624	.1385***	.087***
Preparation for Life and Work	57,051	0.607	.107***	.022***
Business, Administration and Law	37,896	0.668	.1026***	.0308***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

The impacts on benefits for women studying at L2 are all significant and negative. For each study area they are also of very similar magnitude between estimation methods. The largest impact is for Education and Training, followed by Social Sciences.

Table 133: Effect on benefit rate for women (whole sample), L2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	160,970	0.085	-.0172***	-.0129***
Science and Mathematics	17,266	0.095	-.013***	-.0192***
Agriculture, Horticulture and Animal Care	8,676	0.088	-.0135***	-.0141***
Engineering and Manufacturing Technologies	13,825	0.080	-.0137***	-.0188***
Construction, Planning and Built Environment	2,225	0.163	-.0277***	-.018**
Information and Communication Technology	42,387	0.129	-.0237***	-.0192***
Retail and Commercial Enterprise	67,036	0.121	-.0144***	-.0179***
Leisure, Travel and Tourism	17,939	0.078	-.0101***	-.0123***
Arts, Media and Publishing	23,504	0.143	-.0097***	-.0103***
History, Philosophy and Theology	1,224	0.162	-.017***	-.0175**
Social Sciences	1,263	0.242	-.0247***	-.0298***
Languages, Literature and Culture	19,903	0.103	-.0148***	-.0133***
Education and Training	20,035	0.155	-.0432***	-.0289***
Preparation for Life and Work	57,051	0.149	-.0128***	-.013***
Business, Administration and Law	37,896	0.091	-.0172***	-.0152***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Men – FL2

We next turn to FL2 qualifications, beginning with the estimated impacts for male earnings, using the whole sample (including zeroes). As in other earnings estimations with the full sample, we see that adding year dummies to the specification significantly weakens the estimated impacts. In several cases a large significant increase becomes small and insignificant, even though the sample size is reasonably large (e.g. Engineering and Manufacturing Technologies, Construction, Planning and Built Environment). The largest impacts estimated with year dummies are for Health, Public Services and Care; Leisure, Travel and Tourism; and Arts, Media and Publishing. The corresponding raw differences are similar, though larger.

Table 134: Effect on monthly pay rate for men (whole sample), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	8,512	450	278.53***	148.91***
Science and Mathematics	581	145	206.16***	68.06
Agriculture, Horticulture and Animal Care	2,879	562	145.48***	69.26**
Engineering and Manufacturing Technologies	31,613	762	198.6***	13.57
Construction, Planning and Built Environment	34,432	618	196.35***	27.56
Information and Communication Technology	6,925	295	181.95***	34.87**
Retail and Commercial Enterprise	10,090	703	190.79***	43.04***
Leisure, Travel and Tourism	9,160	392	188.88***	67.19***
Arts, Media and Publishing	6,416	135	173.96***	80.65***
History, Philosophy and Theology	15	1,224	92.45	112.82
Social Sciences	17	487	30.83	121.69
Languages, Literature and Culture	156	151	203.37***	4.9
Education and Training	160	488	116.71**	-31.02
Preparation for Life and Work	1,784	245	264.62***	35.76
Business, Administration and Law	9,996	969	140.4***	-73.25

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Focusing on the filtered group only, we again see some large significant increases, but again many of them are negated by the use of year dummies (Construction, Planning and Built Environment and Engineering and Manufacturing Technologies for example). The largest consistently positive impacts are for Health, Public Services and Care and for Retail and Commercial Enterprise. For many subjects the sample sizes are too small to draw any robust conclusions. These are highlighted in grey in the table below.

Table 135: Effect on monthly pay rate for men (filtered), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	1,459	1,371	115.45***	93.92***
Science and Mathematics	32	1,332	58.37	-87.79

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Agriculture, Horticulture and Animal Care	651	1,551	67.2***	169.66**
Engineering and Manufacturing Technologies	9,017	1,750	105.19***	-2.39
Construction, Planning and Built Environment	6,710	1,753	156.54***	16.53
Information and Communication Technology	639	1,766	71.85**	67.49
Retail and Commercial Enterprise	2,903	1,602	75.51***	52.71***
Leisure, Travel and Tourism	1,141	1,775	18.19	67.57
Arts, Media and Publishing	218	1,437	108.68**	11.96
History, Philosophy and Theology	-	-	-	-
Social Sciences	-	-	-	-
Languages, Literature and Culture	-	-	-	-
Education and Training	36	1,035	133.61	-79.82
Preparation for Life and Work	101	1,470	5.05	452.94*
Business, Administration and Law	3,809	1,872	43.4***	-17.91

Source: Frontier econometric analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Impacts on employment for men studying at FL2 are all positive and in most cases large and significant. The raw differences are very large and around twice the size of the impacts estimated with year dummies.

Table 136: Effect on employment rate for men (whole sample), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	8,512	0.439	.2537***	.1625***
Science and Mathematics	581	0.213	.3372***	.1943***
Agriculture, Horticulture and Animal Care	2,879	0.455	.2051***	.1085***
Engineering and Manufacturing Technologies	31,613	0.539	.1816***	.0468***
Construction, Planning and Built Environment	34,432	0.482	.1609***	.0223***
Information and Communication Technology	6,925	0.299	.2846***	.1656***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Retail and Commercial Enterprise	10,090	0.563	.1599***	.0207***
Leisure, Travel and Tourism	9,160	0.356	.286***	.1294***
Arts, Media and Publishing	6,416	0.225	.3121***	.2024***
History, Philosophy and Theology	15	0.605	.1194*	.018
Social Sciences	17	0.402	.3566***	.3517
Languages, Literature and Culture	156	0.209	.4413***	.0574
Education and Training	160	0.575	.1355***	.0042
Preparation for Life and Work	1,784	0.280	.3436***	.0538
Business, Administration and Law	9,996	0.609	.1445***	.0232***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Unlike other levels of qualification, FL2 does not appear to have so much impact on the fraction of the year spent claiming benefits. This may be due, in large part, to the fact that this group of learners has low benefit rates to begin with. The use of year dummies makes little difference to these results. The largest reductions are for Retail and Commercial Enterprise and for Health, Public Services and Care.

Table 137: Effect on benefit rate for men (whole sample), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	8,512	0.055	-.0222***	-.044***
Science and Mathematics	581	0.047	.0068	-.0107
Agriculture, Horticulture and Animal Care	2,879	0.059	-.0036	-.0037
Engineering and Manufacturing Technologies	31,613	0.044	-.002**	-.0021
Construction, Planning and Built Environment	34,432	0.061	-.0064***	-.0049**
Information and Communication Technology	6,925	0.059	.0108***	-.013***
Retail and Commercial Enterprise	10,090	0.070	-.0092***	-.0231***
Leisure, Travel and Tourism	9,160	0.060	-.0011	-.0048
Arts, Media and Publishing	6,416	0.050	.014***	-.003
History, Philosophy and Theology	15	0.144	-.0109	-.0132

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Social Sciences	17	0.009	-.0095	.0106
Languages, Literature and Culture	156	0.051	.0155	.0481
Education and Training	160	0.165	-.0454**	-.0405
Preparation for Life and Work	1,784	0.064	.0087*	-.0444**
Business, Administration and Law	9,996	0.037	-.0035**	-.0011

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Women – FL2

Turning to women who achieve a FL2 qualification, and beginning with the earnings impacts for the full sample, we again see impacts which are substantially smaller when estimated with year dummies. However, the impact on pay tends to be positive and significant regardless of the specification. The largest impacts are seen in the areas of Health, Public Services and Care; Agriculture, Horticulture and Animal Care; Arts, Media and Publishing; and for Education and Training. As before, subject areas with small samples are highlighted in grey.

Table 138: Effect on monthly pay rate for women (whole sample), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	43,286	374	160.07***	58.16***
Science and Mathematics	743	210	184.38***	100.81***
Agriculture, Horticulture and Animal Care	2,757	238	172.09***	89.92***
Engineering and Manufacturing Technologies	4,043	840	46.34***	-10.01
Construction, Planning and Built Environment	848	437	160.09***	28.21
Information and Communication Technology	4,011	610	81.86***	-8.15
Retail and Commercial Enterprise	36,103	326	137.15***	24.72***
Leisure, Travel and Tourism	5,047	201	220.1***	57.22***
Arts, Media and Publishing	5,543	110	163.31***	76.73***
History, Philosophy and Theology	-	-	-	-
Social Sciences	18	244	223.99**	257.58**
Languages, Literature and Culture	240	130	294.04***	263.8***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	4,333	368	140.4***	63.12***
Preparation for Life and Work	1,998	277	170.89***	75.98
Business, Administration and Law	19,337	632	146.02***	21.9

Source: Frontier econometric analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Very few women studying at FL2 were in employment for at least 11 months of the windows before and after education and with earnings typical of a full-time worker. Restricting our earnings sample, as we have in previous sections, is therefore problematic, as sample sizes are too small to make meaningful inferences for all but a handful of study areas. There is little by way of clear pattern in the results. The only significant impact which is consistent across specifications is a modest positive impact for Health, Public Services and Care. As we find in other cases, this impact is considerably smaller when we use year dummies.

Table 139: Effect on monthly pay rate for women (filtered), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	8,585	1,049	89.78***	23.69**
Science and Mathematics	91	1,019	131.19**	190.44*
Agriculture, Horticulture and Animal Care	266	1,218	78.41**	-12.94
Engineering and Manufacturing Technologies	1,678	1,350	17.78	26.79
Construction, Planning and Built Environment	132	1,370	161.13**	149.13
Information and Communication Technology	1,242	1,336	50.26***	-10.97
Retail and Commercial Enterprise	5,688	1,079	67.82***	16.45
Leisure, Travel and Tourism	353	1,332	11.88	-128.98**
Arts, Media and Publishing	167	1,299	109.42*	199.35*
History, Philosophy and Theology	-	-	-	-
Social Sciences	-	-	-	-
Languages, Literature and Culture	17	1,008	280.15***	616.36***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	987	877	78.54***	11.48
Preparation for Life and Work	247	1,113	72.06**	277.19**
Business, Administration and Law	6,802	1,225	75.74***	6.98

Source: Frontier econometric analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Turning to the impact on the proportion of the year spent in employment, in almost all study areas there is a positive and significant impact among women studying at FL2. These impacts tend to be very large, especially when calculated as raw differences. Even when year dummies are used, the impacts can still be large, even in cases where the sample size is reasonably large (e.g. 18 percentage points for Leisure, Travel and Tourism; 22 percentage points for Arts, Media and Publishing).

Table 140: Effect on employment rate for women (whole sample), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	43,286	0.514	.2131***	.0985***
Science and Mathematics	743	0.316	.3179***	.2031***
Agriculture, Horticulture and Animal Care	2,757	0.338	.2588***	.1667***
Engineering and Manufacturing Technologies	4,043	0.721	.0527***	.003
Construction, Planning and Built Environment	848	0.498	.1596***	.0679**
Information and Communication Technology	4,011	0.590	.1315***	.0368***
Retail and Commercial Enterprise	36,103	0.479	.1989***	.0665***
Leisure, Travel and Tourism	5,047	0.299	.3559***	.1826***
Arts, Media and Publishing	5,543	0.223	.3415***	.2239***
History, Philosophy and Theology	-	-	-	-
Social Sciences	-	-	-	-
Languages, Literature and Culture	240	0.239	.431***	.352***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	4,333	0.634	.1757***	.1371***
Preparation for Life and Work	1,998	0.445	.2384***	.0296
Business, Administration and Law	19,337	0.649	.1252***	.0396***

Source: Frontier econometric analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

For women studying at FL2 the impacts on the proportion of the year spent on benefits tend to be negative and significant for almost all the study areas for which sample sizes are large. In most cases the magnitude of the impact is very similar between specifications. Curiously, for Preparation for Life and Work, the impact is much larger when estimated with year dummies (minus 7 percentage points) than the raw difference (minus 1.48 percentage points).

Table 141: Effect on benefit rate for women (whole sample), FL2

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	43,286	0.086	-.0218***	-.016***
Science and Mathematics	743	0.058	.0021	-.0063
Agriculture, Horticulture and Animal Care	2,757	0.082	-.0037	-.0148**
Engineering and Manufacturing Technologies	4,043	0.051	.0052*	.0031
Construction, Planning and Built Environment	848	0.239	-.0549***	-.0599***
Information and Communication Technology	4,011	0.094	-.0151***	-.0152***
Retail and Commercial Enterprise	36,103	0.122	-.0109***	-.0162***
Leisure, Travel and Tourism	5,047	0.056	.0001	-.0015
Arts, Media and Publishing	5,543	0.055	.011***	.0019
History, Philosophy and Theology	-	-	-	-
Social Sciences	-	-	-	-
Languages, Literature and Culture	240	0.118	-.0077	.0511

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	4,333	0.118	-.0426***	-.0341***
Preparation for Life and Work	1,998	0.180	-.0148**	-.0708***
Business, Administration and Law	19,337	0.080	-.0134***	-.0109***

Source: Frontier econometric analysis of ILR-HMRC/DWP data. Cells which are potentially disclosive have been marked with "-".

Men – L3

The impacts on pay for men studying at L3 depend very much on the method used to estimate them. The raw differences are almost all large, positive and significant. When year dummies are added in many cases the impacts become significant and negative. This will need further investigation. The largest positive impacts (where results are consistent) are for Science and Mathematics and for Social Sciences.

Table 142: Effect on monthly pay rate for men (whole sample), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	25,565	878	124.61***	-37.39***
Science and Mathematics	20,411	173	181.91***	55.35***
Agriculture, Horticulture and Animal Care	4,421	425	226.4***	16.24
Engineering and Manufacturing Technologies	37,571	934	246.62***	-104.06***
Construction, Planning and Built Environment	20,449	983	207.93***	-51.92***
Information and Communication Technology	23,000	370	233.55***	21.83
Retail and Commercial Enterprise	5,882	853	97.72***	-265.68***
Leisure, Travel and Tourism	16,863	276	265.42***	-90.14***
Arts, Media and Publishing	36,842	237	177.43***	-8.89
History, Philosophy and Theology	6,098	279	139.72***	17.86
Social Sciences	7,521	145	209.35***	67.33***
Languages, Literature and Culture	9,638	553	148.28***	21.94

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	9,400	1,407	75.12***	-25.6
Preparation for Life and Work	4,717	524	-13.6	-125.2***
Business, Administration and Law	25,285	643	201.3***	-25.32

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Similar results pertain if we filter down to men in employment for at least 11 months and earning between £4,800 and £80,000. That is, impacts estimated with year dummies are generally small, negative or insignificant. The only study area with positive and significant impacts under both specifications is Education and Training.

Table 143: Effect on monthly pay rate for men (filtered), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	7,233	1,988	61.45***	16.5
Science and Mathematics	912	1,658	128.92***	64.89
Agriculture, Horticulture and Animal Care	554	1,590	119.94***	8.52
Engineering and Manufacturing Technologies	11,573	1,993	243.68***	-26.3*
Construction, Planning and Built Environment	7,098	1,882	244.1***	-13.86
Information and Communication Technology	2,669	1,799	113.23***	-6.41
Retail and Commercial Enterprise	1,491	1,829	106.25***	-69.23*
Leisure, Travel and Tourism	1,206	1,711	106.69***	-145.62***
Arts, Media and Publishing	2,095	1,704	116.81***	9.4
History, Philosophy and Theology	378	2,037	55.57	-34.01
Social Sciences	240	1,356	154.51***	118.94
Languages, Literature and Culture	1,234	2,409	31.39	30.47
Education and Training	4,227	2,187	95.42***	84.29***
Preparation for Life and Work	624	1,537	69.68**	-35.19
Business, Administration and Law	5,643	2,014	131.52***	26.62*

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

As with other groups investigated, the impacts on employment are positive and significant. The raw differences seem to be implausibly large. Impacts estimated with year dummies are also fairly large, though in some cases they become negative. The largest positive impacts that are consistent across specifications are for Science and Mathematics; Social Sciences; Information and Communication Technology; and for Languages, Literature and Culture. At over 10 percentage points, these estimates still seem rather high.

Table 144: Effect on employment rate for men (whole sample), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	25,565	0.573	.1246***	-.0025
Science and Mathematics	20,411	0.253	.3237***	.1395***
Agriculture, Horticulture and Animal Care	4,421	0.379	.26***	.0492***
Engineering and Manufacturing Technologies	37,571	0.575	.1569***	-.0229***
Construction, Planning and Built Environment	20,449	0.631	.0923***	-.015***
Information and Communication Technology	23,000	0.339	.2993***	.1084***
Retail and Commercial Enterprise	5,882	0.586	.1092***	-.0489***
Leisure, Travel and Tourism	16,863	0.311	.3664***	.0888***
Arts, Media and Publishing	36,842	0.310	.281***	.0754***
History, Philosophy and Theology	6,098	0.299	.2686***	.0846***
Social Sciences	7,521	0.261	.3294***	.1474***
Languages, Literature and Culture	9,638	0.357	.2652***	.1099***
Education and Training	9,400	0.712	.0562***	.025***
Preparation for Life and Work	4,717	0.473	.1074***	-.0084
Business, Administration and Law	25,285	0.447	.2447***	.0367***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Although results are fairly similar between specifications, impacts on benefits are larger and more significant when estimated using year dummies. The effect is largest for Preparation for Life and Work, though this study area starts from the largest base. In general these impacts are quite large relative to the pre-education averages.

Table 145: Effect on benefit rate for men (whole sample), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	25,565	0.095	-.0208***	-.027***
Science and Mathematics	20,411	0.022	-.0025***	-.0074***
Agriculture, Horticulture and Animal Care	4,421	0.052	-.0072***	-.0184***
Engineering and Manufacturing Technologies	37,571	0.043	-.0123***	-.0104***
Construction, Planning and Built Environment	20,449	0.040	-.0114***	-.0102***
Information and Communication Technology	23,000	0.063	-.0012	-.0195***
Retail and Commercial Enterprise	5,882	0.064	-.0064***	-.0119***
Leisure, Travel and Tourism	16,863	0.020	.0002	-.0062**
Arts, Media and Publishing	36,842	0.044	.0017**	-.0121***
History, Philosophy and Theology	6,098	0.039	-.0012	-.0069**
Social Sciences	7,521	0.023	.0002	-.0114***
Languages, Literature and Culture	9,638	0.036	-.0014	-.0052**
Education and Training	9,400	0.072	-.0214***	-.0184***
Preparation for Life and Work	4,717	0.130	-.0404***	-.0784***
Business, Administration and Law	25,285	0.032	-.0037***	-.0116***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Women – L3

Unlike men at L3, for women there is more consistency between impacts estimated with either method. There are still some study areas for which the results sharply differ, such as Health, Public Services and Care; Construction, Planning and Built Environment; and Retail and Commercial Enterprise. In those cases the impacts change from positive significant to negative significant. The study areas with largest increases are Social Sciences Languages, Literature and Culture.

Table 146: Effect on monthly pay rate for women (whole sample), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	91,953	477	133.02***	-64.04***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Science and Mathematics	29,332	207	158.93***	28.85***
Agriculture, Horticulture and Animal Care	8,890	351	167.54***	-7.51
Engineering and Manufacturing Technologies	1,797	588	196.99***	44.58
Construction, Planning and Built Environment	1,592	966	120.18***	-112.82**
Information and Communication Technology	9,999	483	158.27***	26.77
Retail and Commercial Enterprise	36,008	462	141.8***	-40.79**
Leisure, Travel and Tourism	15,035	240	293.46***	-30.21*
Arts, Media and Publishing	55,370	218	169.02***	25.07***
History, Philosophy and Theology	9,288	264	101.35***	-39.7***
Social Sciences	12,181	163	184.00***	65.42***
Languages, Literature and Culture	23,238	323	163.88***	56.49***
Education and Training	29,249	833	98.18***	18.91**
Preparation for Life and Work	13,943	422	-19.51***	-55.88***
Business, Administration and Law	39,236	641	187.19***	-6.57

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Looking only at women in employment for at least 11 months and earning between £4,800 and £80,000 before and after study we see fairly similar results to those presented above, though with a degree more consistency between results from the two specifications. Study areas with reasonable sample size and with reasonable increase in both specifications are Education and Training Science and Mathematics Information and Communication Technology Arts, Media and Publishing.

Table 147: Effect on monthly pay rate for women (filtered), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	19,444	1,319	73.37***	20.64***
Science and Mathematics	1,918	1,398	72.77***	55.57**
Agriculture, Horticulture and Animal Care	1,111	1,370	66.49***	-11.33
Engineering and Manufacturing Technologies	449	1,507	139.2***	-16.45

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Construction, Planning and Built Environment	628	1,627	179.5***	32.39
Information and Communication Technology	2,189	1,446	64.88***	70.03**
Retail and Commercial Enterprise	6,575	1,432	53.97***	40.71***
Leisure, Travel and Tourism	1,094	1,509	113.31***	-53.9
Arts, Media and Publishing	3,562	1,496	94.03***	74.23***
History, Philosophy and Theology	779	1,440	-2.84	-93.85**
Social Sciences	560	1,253	100.72***	124.25**
Languages, Literature and Culture	2,391	1,737	67.86***	64.12**
Education and Training	11,904	1,416	110.91***	50.57***
Preparation for Life and Work	1,957	1,264	2.28	61.1**
Business, Administration and Law	12,138	1,483	114.18***	19.84**

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Impacts on employment for L3 women are almost all large, positive and significant. They are implausibly large when estimated as raw differences. The largest increases (with year dummies) are for Science and Mathematics; Social Sciences; and for Languages, Literature and Culture.

Table 148: Effect on employment rate for women (whole sample), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	91,953	0.540	.1763***	-.0354***
Science and Mathematics	29,332	0.316	.3145***	.1205***
Agriculture, Horticulture and Animal Care	8,890	0.402	.2618***	.0636***
Engineering and Manufacturing Technologies	1,797	0.521	.2137***	.0871***
Construction, Planning and Built Environment	1,592	0.686	.0875***	-.0342**
Information and Communication Technology	9,999	0.486	.2257***	.0701***
Retail and Commercial Enterprise	36,008	0.537	.159***	.0023
Leisure, Travel and Tourism	15,035	0.340	.3791***	.0865***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Arts, Media and Publishing	55,370	0.337	.2904***	.0888***
History, Philosophy and Theology	9,288	0.369	.2344***	.0314***
Social Sciences	12,181	0.305	.3291***	.1363***
Languages, Literature and Culture	23,238	0.351	.2938***	.1287***
Education and Training	29,249	0.732	.0723***	.0346***
Preparation for Life and Work	13,943	0.568	.0578***	-.0268***
Business, Administration and Law	39,236	0.571	.1886***	.024***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Impacts on benefit rates for women at L3 are all negative and in all but one case they are statistically significant. In most cases they are of a broadly similar magnitude across specifications. Although the impacts may appear fairly small, they can be quite large relative to the benefit rate pre-education. The largest impacts are for Preparation for Life and Work and Engineering and Manufacturing Technologies

Table 149: Effect on benefit rate for women (whole sample), L3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	91,953	0.089	-.0202***	-.0177***
Science and Mathematics	29,332	0.033	-.0048***	-.0078***
Agriculture, Horticulture and Animal Care	8,890	0.065	-.0098***	-.0166***
Engineering and Manufacturing Technologies	1,797	0.075	-.0225***	-.0246***
Construction, Planning and Built Environment	1,592	0.074	-.0166***	-.0113
Information and Communication Technology	9,999	0.097	-.0153***	-.0147***
Retail and Commercial Enterprise	36,008	0.116	-.0212***	-.0157***
Leisure, Travel and Tourism	15,035	0.032	-.0032***	-.012***
Arts, Media and Publishing	55,370	0.046	-.0013**	-.0104***
History, Philosophy and Theology	9,288	0.064	-.0128***	-.0223***
Social Sciences	12,181	0.046	-.0078***	-.013***
Languages, Literature and Culture	23,238	0.035	-.0038***	-.0062***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	29,249	0.072	-.0233***	-.0162***
Preparation for Life and Work	13,943	0.185	-.0534***	-.0683***
Business, Administration and Law	39,236	0.053	-.0118***	-.0107***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Men – FL3

When looking at raw differences, for all but two of the study areas there is a significant and large increase in monthly earnings, as large as £476 (Engineering and Manufacturing). Conversely, when we estimate the impact with year dummies, the impacts either become smaller, less significant, or negative. The largest positive impacts are for Information and Communication Technology; Leisure, Travel and Tourism; Social Sciences; and for Languages, Literature and Culture. There are negative and significant impacts for Health, Public Service and Care and for Preparation for Life and Work which are slightly puzzling.

Table 150: Effect on monthly pay rate for men (whole sample), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	7,104	492	268.58***	-158.39***
Science and Mathematics	11,285	104	180.4***	51.38***
Agriculture, Horticulture and Animal Care	2,236	279	294.86***	70.58
Engineering and Manufacturing Technologies	10,041	490	475.9***	6.96
Construction, Planning and Built Environment	9,525	651	354.34***	-65.57*
Information and Communication Technology	10,604	116	306.89***	105.82***
Retail and Commercial Enterprise	2,510	499	272.69***	-115.16**
Leisure, Travel and Tourism	10,151	99	355.43***	103.02***
Arts, Media and Publishing	20,814	138	204.86***	16.67
History, Philosophy and Theology	3,191	162	132.33***	22.8
Social Sciences	3,523	105	192.25***	85.48***
Languages, Literature and Culture	3,124	86	195.13***	86.39***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Education and Training	870	1,621	65.06	-168.26
Preparation for Life and Work	2,974	562	-156.8***	-152.57***
Business, Administration and Law	10,666	397	219.29***	-29.51

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Filtering down to men in work for at least 11 months and earning pay typical of a full time worker, sample sizes become rather small, so we would need to interpret those results with caution. Essentially, we see significant raw differences of several hundred pounds. When we use year dummies these become smaller and insignificant, or even negative. There does not seem to be any meaningful conclusions that we can draw from that piece of analysis.

Table 151: Effect on monthly pay rate for men (filtered), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	1,374	1,475	119.26***	-5.79
Science and Mathematics	250	1,368	189.25***	37.32
Agriculture, Horticulture and Animal Care	190	1,439	115.46**	136.74*
Engineering and Manufacturing Technologies	2,105	1,533	544.82***	-47.19
Construction, Planning and Built Environment	2,552	1,463	449.49***	-93.06**
Information and Communication Technology	307	1,199	269.14***	-39.08
Retail and Commercial Enterprise	495	1,491	181.79***	-40.34
Leisure, Travel and Tourism	221	1,120	401.68***	42.99
Arts, Media and Publishing	577	1,199	220.07***	86.72
History, Philosophy and Theology	94	1,471	18.69	-89.4
Social Sciences	77	1,278	125.97	126.07
Languages, Literature and Culture	62	1,242	123.54	-83.45
Education and Training	435	2,562	165.89***	-129.81
Preparation for Life and Work	370	1,347	18.27	-41.09
Business, Administration and Law	1,439	1,629	162.52***	11.59

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

For men studying at FL3 employment rates increase by a large and significant amount following time in education. This is true for all study areas. Typically the increase is around thirty percentage points. Controlling for variation over time with year dummies, these impacts become somewhat smaller, in several cases becoming insignificant or even negative. The largest impacts are for Information and Communication Technology; Leisure, Travel and Tourism; and for Languages, Literature and Culture.

Table 152: Effect on employment rate for men (whole sample), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	7,104	0.461	.2715***	-.0515***
Science and Mathematics	11,285	0.206	.3546***	.1654***
Agriculture, Horticulture and Animal Care	2,236	0.310	.3315***	.0731**
Engineering and Manufacturing Technologies	10,041	0.420	.3166***	.068***
Construction, Planning and Built Environment	9,525	0.555	.137***	-.0549***
Information and Communication Technology	10,604	0.221	.3999***	.2461***
Retail and Commercial Enterprise	2,510	0.520	.1469***	-.0088
Leisure, Travel and Tourism	10,151	0.228	.4452***	.2486***
Arts, Media and Publishing	20,814	0.257	.3271***	.1168***
History, Philosophy and Theology	3,191	0.258	.2807***	.0975***
Social Sciences	3,523	0.231	.3466***	.1603***
Languages, Literature and Culture	3,124	0.203	.3767***	.1825***
Education and Training	870	0.745	.0443***	-.008
Preparation for Life and Work	2,974	0.526	.0272***	-.0345**
Business, Administration and Law	10,666	0.363	.3184***	.1033***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

By contrast, the corresponding impacts on benefit rates are fairly small in most cases. Impacts are slightly larger when estimated with year dummies, though there is broad consistency between the two sets of estimates. The largest reductions are for Health, Public Services and Care; Education and Training; and for Preparation for Life and Work.

Table 153: Effect on benefit rate for men (whole sample), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	7,104	0.045	-.0129***	-.0405***
Science and Mathematics	11,285	0.013	-.0016**	-.0086***
Agriculture, Horticulture and Animal Care	2,236	0.034	-.0038	.0043
Engineering and Manufacturing Technologies	10,041	0.022	-.0052***	-.0119***
Construction, Planning and Built Environment	9,525	0.035	-.0073***	-.0045
Information and Communication Technology	10,604	0.025	.0078***	-.0127***
Retail and Commercial Enterprise	2,510	0.032	-.0004	-.0177**
Leisure, Travel and Tourism	10,151	0.008	.0035***	-.0018
Arts, Media and Publishing	20,814	0.030	.0041***	-.0172***
History, Philosophy and Theology	3,191	0.041	-.005**	-.0257***
Social Sciences	3,523	0.023	-.0031*	-.0231***
Languages, Literature and Culture	3,124	0.013	-.0006	.0016
Education and Training	870	0.078	-.0376***	-.0363***
Preparation for Life and Work	2,974	0.166	-.0657***	-.1064***
Business, Administration and Law	10,666	0.029	-.0005	-.0125***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Women – FL3

For women studying at FL3, for all but one study area, monthly pay increases by a large and significant amount, typically around two to three hundred pounds. Using the year dummies we see a considerably smaller estimate of the impact, which in many cases is now either negative or insignificant. The largest impact is from Languages, Literature and Training (£91). Preparation for Life and Work has a negative and significant impact of minus £79.

Table 154: Effect on monthly pay rate for women (whole sample), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	51,552	359	213.87***	-43.51***

236

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Science and Mathematics	15,388	119	167.24***	48.43***
Agriculture, Horticulture and Animal Care	3,947	182	307.56***	-19.96
Engineering and Manufacturing Technologies	636	400	263.24***	48.76
Construction, Planning and Built Environment	486	605	406.63***	35.13
Information and Communication Technology	2,876	199	238.24***	48.35
Retail and Commercial Enterprise	16,344	228	263.72***	40.53**
Leisure, Travel and Tourism	8,637	95	386.8***	121.1***
Arts, Media and Publishing	27,752	113	212.3***	67.09***
History, Philosophy and Theology	5,053	177	112.69***	-2.97
Social Sciences	5,699	126	168.98***	42.29***
Languages, Literature and Culture	8,839	93	193.78***	90.57***
Education and Training	6,383	532	95.98***	63.44***
Preparation for Life and Work	10,521	422	-84.81***	-79.01***
Business, Administration and Law	18,171	557	197.53***	19.76*

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

For women studying FL3, in employment at least 11 months before and after learning and earning between £4,800 and £80,000 per annum sample sizes are very small for most of the study areas, so we would not be able to conclude much from such an analysis. Three of the study areas with reasonable sample sizes (Health, Public Services and Care; Education and Training; and Business, Administration and Law) have positive impacts ranging from £22 to £53 that are significant to at least the 10% level. The other two study areas with reasonable sample size (Retail and Commercial Enterprise; Preparation for Life and Work) have insignificant impacts.

Table 155: Effect on monthly pay rate for women (filtered), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	8,864	1,139	127.11***	22.91*
Science and Mathematics	438	1,226	139.72***	69.85

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Agriculture, Horticulture and Animal Care	277	1,167	212.19***	51.24
Engineering and Manufacturing Technologies	122	1,308	191.4***	-236.67
Construction, Planning and Built Environment	162	1,251	451.32***	33.81
Information and Communication Technology	218	1,342	81.32*	52.12
Retail and Commercial Enterprise	1,314	1,092	185.95***	35.92
Leisure, Travel and Tourism	198	1,152	376.5***	-58.58
Arts, Media and Publishing	743	1,223	194.17***	90.88
History, Philosophy and Theology	249	1,246	-43.03	4.36
Social Sciences	174	1,215	45.48	-17.95
Languages, Literature and Culture	225	1,285	200.66***	-19.39
Education and Training	2,232	938	112.***	53.13***
Preparation for Life and Work	1,322	1,195	-28.47	51.67
Business, Administration and Law	5,425	1,323	107.09***	31.13**

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

For all study areas, the employment rate of women who studied at FL3 is significantly higher after learning, typically around 30 percentage points. In all but three cases the corresponding impact estimated using year dummies is also positive, significant and fairly large. The largest impacts are for Leisure, Travel and Tourism; Information and Communication Technology; and for Languages, Literature and Culture – all above 20 percentage points.

Table 156: Effect on employment rate for women (whole sample), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	51,552	0.477	.2564***	-.0137***
Science and Mathematics	15,388	0.249	.3637***	.1643***
Agriculture, Horticulture and Animal Care	3,947	0.287	.3877***	.1748***
Engineering and Manufacturing Technologies	636	0.409	.3294***	.1463***
Construction, Planning and Built Environment	486	0.572	.2209***	-.0869

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Information and Communication Technology	2,876	0.293	.3714***	.2086***
Retail and Commercial Enterprise	16,344	0.426	.2296***	.043***
Leisure, Travel and Tourism	8,637	0.243	.4792***	.2671***
Arts, Media and Publishing	27,752	0.251	.3722***	.1793***
History, Philosophy and Theology	5,053	0.315	.2798***	.0717***
Social Sciences	5,699	0.278	.341***	.1309***
Languages, Literature and Culture	8,839	0.224	.3939***	.2007***
Education and Training	6,383	0.735	.0715***	.0407***
Preparation for Life and Work	10,521	0.599	.0084*	-.0504***
Business, Administration and Law	18,171	0.548	.2242***	.0331***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

In the majority of cases there is a significant reduction in the benefit rate. Results are broadly similar between specifications, though they are larger when the year dummies are used. Four study areas have significant impacts in excess of 3 percentage points - Health, Public Services and Care; Education and Training; Preparation for Life and Work; and Engineering and Manufacturing Technologies

Table 157: Effect on benefit rate for women (whole sample), FL3

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
Health, Public Services and Care	51,552	0.071	-.0201***	-.0337***
Science and Mathematics	15,388	0.026	-.005***	-.0095***
Agriculture, Horticulture and Animal Care	3,947	0.026	.0033	-.0057
Engineering and Manufacturing Technologies	636	0.046	-.0192***	-.0408**
Construction, Planning and Built Environment	486	0.069	-.0104	-.0614
Information and Communication Technology	2,876	0.055	-.0034	-.0177***
Retail and Commercial Enterprise	16,344	0.102	-.0216***	-.0176***
Leisure, Travel and Tourism	8,637	0.014	.0037***	-.0005
Arts, Media and Publishing	27,752	0.028	.0035***	-.0079***

Study area	Number	Average before	Impact	
			Raw difference	Year dummies
History, Philosophy and Theology	5,053	0.068	-.0165***	-.0316***
Social Sciences	5,699	0.054	-.0125***	-.0206***
Languages, Literature and Culture	8,839	0.012	-.0013	.0001
Education and Training	6,383	0.091	-.0366***	-.0394***
Preparation for Life and Work	10,521	0.214	-.069***	-.086***
Business, Administration and Law	18,171	0.044	-.0094***	-.0121***

Source: Frontier econometric analysis of ILR-HMRC/DWP data.

Discussion of next steps and ways to improve estimates

The data sets we have used provide a unique insight into the characteristics of learners in the FE, Apprenticeships and TTG funding streams. We have been able to show how earnings, employment levels and benefit receipt differ by subject area and level, and to provide some limited information at an institutional level. The ability to undertake this analysis, at this level of detail is entirely new. It flows from the existence of the new data set but also requires careful thinking about how to analyse it appropriately.

Even in a document of this length we have only been able to scratch the surface of the data, providing overall comparisons by subject, level and demographic group. One could drill down into the data on many of these groups to provide a richer understanding. The characteristics of learners differ:

- In ways we can observe – age, ethnicity, locality;

- In ways we can observe partially and only for some – prior attainment;

- In ways that may be in principle knowable from the data but which cannot currently be used – detailed course specification;

As a result summarising across the whole population in the data is extremely challenging. Much more detailed analysis for particular subject areas and levels is clearly possible and could be very revealing.

There is no doubt also scope to compare these data with other data sources to understand more about how the different groups studying compare with the wider population.

That said there are inevitably limitations to the data. In this chapter we present what we consider to be the main limitations and provide recommendations for ways to improve the usefulness of the linked ILR, DWP, and HMRC data set. Clearly the precise data requirements will depend on the question that is asked, but we believe that many of the issues we have encountered in the course of using this data are likely to be relevant to future users as well.

We divide our comments into four sections: limitations of the ILR data, limitations of the DWP/HMRC data, limitations of the combined (cleaned) dataset, and finally our suggestions for improving the quality of the data. Our particular focus is on data limitations which may introduce bias into estimates of outcomes, may make drawing inferences problematic, or which may preclude certain types of analysis entirely.

Issues with the ILR data

We begin by highlighting some of the issues we encountered when analysing the ILR data used in this project.

241

- *Prior attainment* – Data on prior attainment is missing for many learners –with a particular paucity of information for FE learners. While most Apprenticeships and TTG learners have been assigned a prior attainment level (variable l35 in the ILR data, which describes learner prior attainment in terms of levels), around a half of FE achievers' prior attainment is coded as 'other'. The lack of prior attainment data makes it particularly difficult to compare the histories and outcomes of young learners for whom labour market histories will be short and often uninformative (e.g. Bob, a 19 year old A-level student who worked part–time for a month during the summer break). One way of overcoming this weakness in the data would be to match ILR data with school data. If we know what Bob studied at school and the grades he achieved before starting his A-levels, we could compare his performance in the labour market after he left FE with the performance of someone who has similar characteristics in terms of prior attainment.

- *Type of qualification* – The ILR data contains very detailed course information such as course title but broader aims categorisations are not plentiful. Sector subject area tiers 1 and 2 are useful in analysing the impact of training but there are other data splits which could be interesting. Identifying aims as vocational or academic would provide an additional dimension for analysis which could prove meaningful. Our experience suggests that vocational and academic qualifications are not easily identifiable in the data. This would require additional investment of resources.

- *Transition to HE* – Better information about which FE learners move on to Higher Education would help correct an important source of bias in estimating the impact of FE. A large proportion of 18 and 19 year old A-level graduates may be going on to Higher Education, and these are likely to be the most successful of the FE learners, but their outcomes in our data will be highly misleading. For example, an A-level graduate who goes to university and works part-time during vacation may appear in the earnings data. We would observe his low-paid vacation work, and conclude that his outcomes were reasonably poor, biasing estimates of the impact of training on outcomes downwards. Linking ILR and HE data would circumvent this problem, as these individuals could be identified and analysed separately.

Issues with the DWP and HMRC data

The main report above describes in detail a number of general limitations of the DWP and HMRC datasets, in the course of describing the creation of our 'cleaned' dataset. Most of the issues highlighted in that Chapter simply relate to data cleaning practice (e.g. removing duplicate spells), but do not otherwise limit the usefulness of the data for analytical research. However, some of the issues highlighted in that Chapter do have material implications for researchers:

- *Uncertain start and end dates* – The P45 data, in particular, contains millions of employment spells of uncertain length, with either the start or end dates (or both) coded to the beginning or end of the tax year. Even after preliminary data cleaning (removing duplicate and near-duplicate spells), nearly a quarter of all job spells in the data are of uncertain length. This is likely to bias estimates of employment time upwards (since people will appear to be in employment for longer than they actually were) and estimates of monthly earnings downwards (since annual earnings

derived from the P14 data will be divided by too many months of employment). We would recommend more work to improve data and reduce this bias.

- *Disagreements between P45 and NBD data* – With certain rare exceptions, individuals claiming Incapacity Benefit or Jobseeker's Allowance should not be earning money from employment at the same time. After combining the P45 and NBD data, however, it is clear that the two do not always agree about whether an individual was in work or claiming benefits at a given point in time. Researchers using this data will need to decide whether to use one dataset to 'correct' the other (as we have done – see above), or to ignore the discrepancy.

- *Lack of hours information* - The P14 data contains individual earnings per employment spell in a given financial year but has no information on the number of hours worked. An obvious problem with this is that an increase/fall in annual earnings can be due to a change in the number of hours worked rather than a change in the hourly wage. Having no means of correcting for this could result in misleading results. Suppose we observe an individual who works 12 months in the year for 20 hours and whose hourly wage is £10 per hour. After completing a L3 qualification this individual goes back to his old job but switches to working 40 hour weeks at the same wage. If we have no way of knowing this switch occurred we could incorrectly attribute the doubling in wages to training. One way of reducing the severity of this problem is to split learners by gender (females are much more likely to be employed part-time than males) and analyse the two sub sets separately. The results obtained from the analysis of the male sub set would be considered the more robust and easily interpretable of the two. This merely mitigates the problem; however, it does not eliminate it.

Issues with the combined ILR-DWP/HMRC data set

As stated in the introduction to this chapter, the precise 'limitations' which affect a researcher using this data will depend on the research question they are seeking to answer. Our focus has been on identifying the impact of training on labour market and benefit outcomes, and from that perspective the combined dataset has one major (and for the moment insurmountable) limitation: the lack of a control group.

The linked ILR, DWP, and HMRC data contains only individuals undergoing some form of training, making the construction of a counterfactual ('what would have happened to those who trained, had they not done so?') difficult. In the absence of a clear counterfactual, the best strategy is to compare individuals' post-training outcomes with their pre-training histories (the approach adopted in here), or compare different courses/levels with each other (though the latter comparison may lead to biased results, due to unobserved differences in the characteristics of individuals).

Improving the data

Many of the limitations outlined above could be overcome with the addition of further information to the dataset, perhaps linked from other sources. In particular:

- *Adding data from the National Pupils' Database (NPD)* – Linked ILR/NPD data already exists for many of the younger members of the ILR database, and provides rich and detailed information about prior attainment. This data could be used to considerably improve the prior attainment information, which is a particular issue affecting the data for FE learners.

- *Adding HE information* – Linking information on HE participation to the ILR data would remove a source of bias in the estimation of the impact of FE (discussed above). Data from the Higher Education Statistical Agency (HESA) has already been linked to ILR data in some cases, and could be used to flag individuals who go on to participate in HE.

- *Having access to information on individuals who did not enter training* – Being able to access HMRC/DWP data for individuals who did not enter training would enormously increase the potential of this dataset. Researchers could then use standard statistical techniques (such as matching) to provide robust estimates of the causal impact of training on labour market outcomes.

Other suggestions for improving the data simply require improvements in the raw data used to create our final datasets, rather than the linking of new data from other sources:

- *Improve categorisation of courses* – Identifying academic and vocational qualifications, and introducing other categorisations to 'bridge the gap' between the detailed course names (of which there are thousands) and the top level study areas (of which there are just a handful), would be enormously helpful. The study area categories we have used in this report are each likely to contain a diverse array of courses, some offering large labour market returns while others do not. The averages we report for each study area doubtless conceal enormous heterogeneity of returns across different types of course.

- *Improve data cleaning, especially of the HMRC data* – While we have created code to 'clean' the HMRC and DWP data, there is doubtless more that could be done to improve the consistency and accuracy of the spell information in these datasets. Moreover, HMRC and DWP are doubtless working themselves to improve the accuracy of their data, and any improvements they make in the raw data would feed through into improved estimates of histories and outcomes in our final data.

Conclusions

The linked ILR, DWP and HMRC dataset, made available by the Department for Business, Innovation and Skills, presents a unique opportunity to explore the attributes, histories and outcomes of individuals who enter training. Our analysis represents a preliminary attempt to explore the possibilities and limitations of this exciting resource.

The data's main strengths derive from its sheer size. It covers all individuals who undertake publicly funded learning and have an Individualised Learner Record. This scale certainly imposes some computational costs (high performance computers are required to link and manipulate the raw datasets), but the enormous sample sizes permit extremely fine-grained analysis. However, creating a useable dataset from the multiple ILR, HMRC and DWP records is far from a trivial task, as our discussion shows. The multiple records making up this dataset contain information at several different levels (individual, learning aim, employment spell, etc.), requiring careful coding to extract the relevant information for each learner. Moreover, the raw administrative data (especially that from HMRC) requires a substantial amount of cleaning before it can be used for analysis.

Having derived a dataset comprising individuals who have completed at least one learning aim ('achievers'), we began our analysis with a simple descriptive analysis of the individuals in each funding stream (FE, Apprenticeships and TTG), according to the level of the aim they had completed, from BL2 to FL3.

In general, we found that the characteristics of learners vary enormously by funding stream, and within funding stream by level and subject area. These variations in learner characteristics, to a large extent explain the differences in labour market performance both before and after training. Our descriptive analysis revealed numerous interesting patterns. Overall labour market performance improves following training for most learner groups but the gains are not uniformly distributed:

- Apprenticeship learners appear to benefit the most from training: their average earnings increase by 30%, time in employment increases by 53% and the number of learners claiming benefits falls by 3 percentage points

- FE learners' labour market performance also appears to improve following training but gains are more modest: average earnings increase by 3%, time in employment increases by 22% and the number of learners claiming benefits falls by 2 percentage points

- It is not entirely clear if the labour market performance of TTG learners improves after training. Real earnings for this group as a whole actually decline by 2%, time in employment increases by 3% and the number of learners claiming benefits falls by 3 percentage points. As our analysis shows, the poor earnings outcome is likely to be at least partially caused by the fact that most TTG learners have a different age distribution.

Within funding streams, labour market performance varies significantly by level, subject area and demographic group but in general economic performance appears to be

consistently strong for achievers in Engineering and Manufacturing Technologies and Construction, Planning and Built Environment.

Other level specific findings include:

- Among BL2 FE learners, there are significant gains in economic performance for learners in Preparation for Life and Work whose earnings increase by 4% and employment rates increase by 13 percentage points, albeit from a low base

- The employment rates of FL2 and FL3 FE learners improve by more than 20 percentage points

- The average earnings of Leisure, Travel and Tourism FE learners at FL2 decline by 4%, but increase at FL3

There are large differences in the economic outcomes of TTG, FE and Apprenticeships learners with similar characteristics (aged 20+). Training appears to benefit Apprenticeships learners significantly more than FE and TTG learners. Apprenticeships learners at FL2 and FL3 are much more likely to be in work and earn more than their FE and TTG counterparts and less likely to be on benefits. The differences between TTG learners and the rest are most pronounced at FL3.

After examining the raw differences in outcomes, we moved on to a more systematic attempt to estimate the 'impact' of training on labour market and benefit outcomes. As our description of the methodology makes clear, the lack of a control group means that we have been unable to identify the true causal impact of training on outcomes. This analysis does allow us to adjust the raw before/after comparisons of individuals' labour market outcomes to take into account individual characteristics (using fixed effects) and macroeconomic factors affecting the labour market (using dummy variables to control for year effects).

These estimates show numerous positive, significant impacts of FE training on subsequent earnings and employment – though we interpret these results with caution. Since we have no way of controlling for the fact that earnings and employment rates tend to rise with age (especially for younger individuals), our estimated impact results are the combined effect of training plus greater age/experience, not pure causal effects of training. Many of these results also appear sensitive to the specification of the estimation, with the addition of dummy variables for year effects greatly diminishing the estimated impact in many cases.

Findings from this impact analysis vary by level and demographic group, but our high level findings show that for the sample as a whole:

- Average monthly pay increases by £32

- The probability of being employed increases by 3-4 percentage points

- The probability of being on benefits falls by 1.4 percentage points

- BL2: Employment and earnings improve substantially for both men and women learners in Preparation for Life and Work. Drops in benefit rates are large and significant in Health, Public Services and Care.

- FL2: The largest earnings improvements are in Retail and Commercial Enterprise and Health, Public Services and Care while employment increases are highest in Science and Mathematics and Arts, Media and Publishing for both men and women.

- FL3: Our results on earnings are often statistically insignificant and do not reveal a clear pattern. On the other hand, there are large reductions in benefit rates for both men and women studying Health, Public Services and Care, Education and Training and Preparation for Life and Work. Employment increases are highest for both men and women in Information and Communication Technology

The impact analysis focuses on outcomes by training level, sex and study area. Our spreadsheet appendix drills down still deeper, exploring variation in outcomes by ethnicity, deprivation, and age, but even finer categorisations could be analysed, depending on the research question under consideration.

In terms of reporting, it is possible to report this data on a periodic basis, in order to get timely feedback on the impact of training on labour market outcomes. In principle, data on employment and benefit rates could be reported at a high frequency, e.g. monthly. There is an obvious trade-off, however, between the timeliness of the data and the burden of extracting and analysing it at frequent intervals. There may also be pitfalls in analysing the data too frequently. In particular, flows of completion will be uneven throughout the year, so that in some reporting periods the number of learners to be analysed will be much smaller than in others. They may also have different characteristics to learners completing at different times of year (e.g. full-year learners might be different to those completing shorter courses). There may be patterns within the year linked to seasonal employment or economic inactivity. These factors may impact on quality of results, therefore careful consideration needs to be given to the frequency of reporting, though annual reporting will resolve most issues.

 We next turned to our recommendations for improving this data. There are two main areas of focus:

- improving the accuracy/usability of the existing data records (such as improved data cleaning, and the differentiation of academic and vocational qualifications), and

- adding more information from other data sources, where it is missing in the current data (such as prior attainment and HE participation).

The ILR data has already been linked with other datasets as part of different projects (such as the National Pupil Database and Higher Education Statistical Agency data), and if derived variables from these linkages could be added to the core ILR data, they might greatly enhance its usefulness.

However, by far the greatest limitation of this dataset for impact analysis is the absence of HMRC/DWP information for individuals who did not enter training – a point to which we

have returned several times in the course of this report. Adding such information (especially if that information were paired with some rudimentary demographic data) would greatly improve the robustness of the estimated effects of training derived from this data.

In summary, we believe that this dataset represents an important step forward in the analysis of training in England. It allows us to gain a far more detailed picture than previously possible of the individuals who undertake different types of training, the paths their lives take after completion and how that differs from the path they were on beforehand. Interpretation of the results needs to take into account the fact that it is not possible to formally compare this group to those who do not receive any training, and the various assumptions we have made to clean the data and put it into a format that can be analysed.

This publication is also available on our website at www.bis.gov.uk

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.