



Research undertaken on behalf of the Higher Education Careers Services Unit

Working Paper 6

The earnings of graduates: reviewing the evidence from Futuretrack

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February 2013



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Abstract

This paper examines one of the findings presented in the Futuretrack Stage 4 report (Purcell *et al.* 2012), that the growth in the earnings of recent graduates has not kept pace with the economy-wide growth in average earnings over the past decade. The statistical model which gave rise to this finding is scrutinised carefully and is shown to be sensitive to a key assumption relating to an adjustment for the employment experience of the Futuretrack cohort as measured at Stage 4 of this longitudinal study. Information from the Labour Force Survey supports this conclusion, but also demonstrates that, over the period from 2009 to 2012, the earnings of recent young graduates have not kept pace with the growth of average earnings.

Introduction

The evidence on graduate earnings presented in the recently published report on Stage 4 of the Futuretrack study (Purcell *et al.* 2012) is examined here in greater detail. In particular, the reported finding from analysis of the Futuretrack cohort's transition from full-time study to the labour market 'that the relative earnings advantage associated with a degree appears to have been declining slowly over the past decade, possibly by as much as 2 per cent per annum relative to average earnings in the economy' (*op. cit.* p. xviii) is subjected to further scrutiny.

The additional analysis reported here, which takes advantage of recent information from the Labour Force Survey, suggests that there is a substantial margin of uncertainty surrounding this finding. Despite this uncertainty recent evidence from the Labour Force Survey shows that the earnings of newly qualified graduates have not kept pace with the growth of average earnings across the whole economy.

The survey data used in the Futuretrack report and for earlier studies

We undertook surveys in 1998/99 and 2003/04 of graduates who had completed their first degrees in 1995 and 1999 respectively. The information collected in these surveys indicated that, relative to graduates who had completed their studies in 1995, the earnings of the Class of '99 had not kept up with the rate of growth of average earnings in the economy between 1995 and 1999 (Purcell *et al.* 2005).

A similar analysis was conducted using information collected in the Stage 4 report, contrasting the earnings of the Classes of 2009 and 2010 (Futuretrack Stage 4 respondents) with the Class of '99. In so doing, it was necessary to take account of other factors that influence graduate earnings and which may differ between the two survey samples. The method used to conduct this analysis is described below.

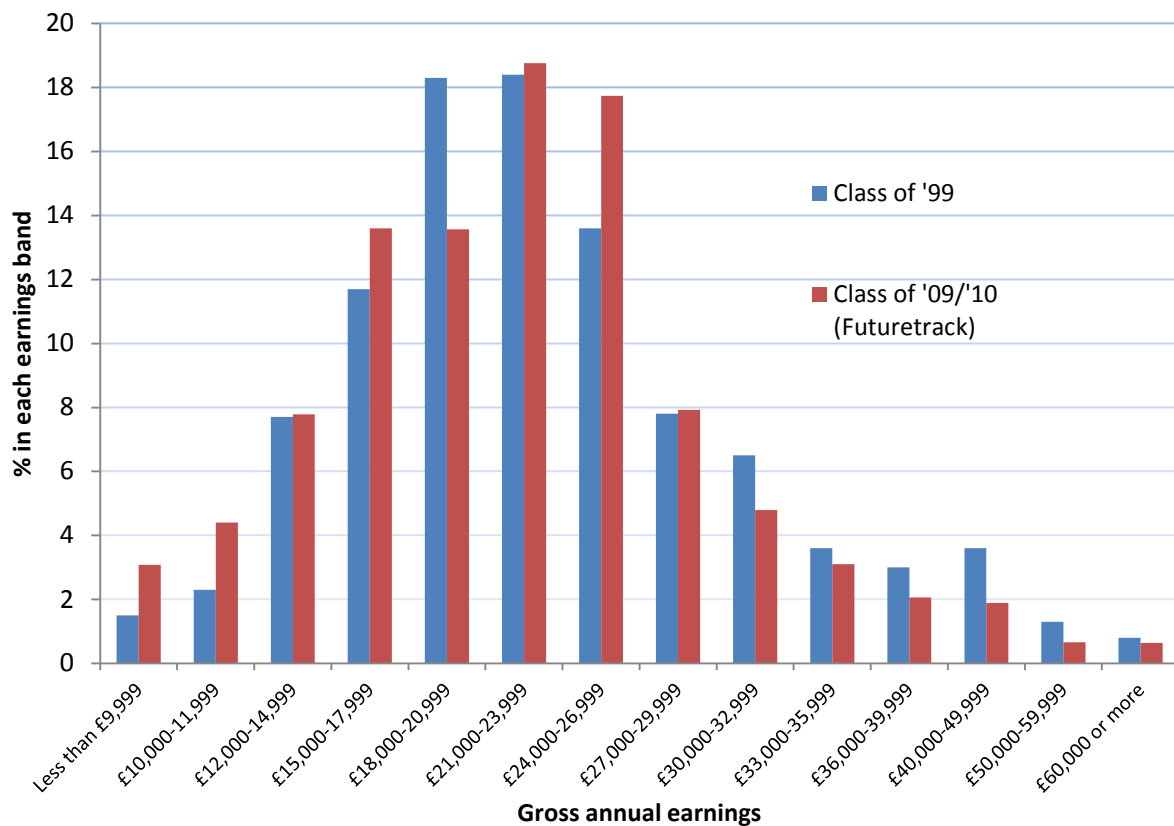
Cross-cohort comparative analysis

There are two major differences between the Class of '99 and the Futuretrack cohorts of graduates. First, the Futuretrack sample covered graduates from virtually all higher education institutions (HEIs) in the UK, whereas the Class of '99 was restricted to graduates from 38 randomly selected HEIs. Second, the Class of '99 graduates were contacted approximately four years after graduation, and consisted of a mix of those who had completed three, four or five year courses for their first degree. Futuretrack graduates were also a mix of those who had completed three, four or five year courses, but the date of the Stage 4 survey and the different sampling methodology meant that their potential labour market experience varied from a few months (for the five year course completers) to two and a half years (for the three year course completers). A comparison of the earnings of the two cohorts has to take account of these differences.

The data on earnings

Figure 1 shows the distributions of nominal gross annual earnings of graduates in full-time employment at the time of the surveys of the Class of '99 and Futuretrack Stage 4 cohorts. To take account of the sample structure, the earnings of Futuretrack graduates is restricted to those who graduated only from the 38 HEIs from which the Class of '99 sample was drawn and who were UK citizens.

Figure 1: Comparison of the annual gross earnings of Class of '99 graduates in Spring 2004 and Futuretrack graduates (Classes of 2009/10: Winter 2011)



This comparison appears to reveal a shift rightwards in the distributions of annual earnings for the two cohorts of graduates, as would be expected given that, between March 2004 and November 2011, average earnings grew by 31 per cent¹. However, if the weekly banded earnings information collected in each survey is converted to a continuous distribution², estimated mean nominal earnings for these two cohorts declines from £24,000 for the Class of '99 per annum to £22,700 for Futuretrack respondents. This reflects the fact that a higher proportion of graduates reported their annual gross earnings from full-time employment to be under £18,000 in the Futuretrack cohort, and a higher proportion of the Class of '99 graduates report nominal earnings of £30,000 or more. The median value of earnings for the two cohorts is constant at £22,500.

The issue to be resolved relates to the difference in the amount of labour market experience between these two cohorts of graduates. Respondents to the Class of '99 survey were older on average than Futuretrack respondents and had more labour market experience. Both of these factors could help explain the observed difference in real earnings. Adjustments have to be made to compensate for their potential effects, as well as for other compositional influences in the two samples which could account for the difference in real earnings. This was performed in the Stage 4 Report via regression techniques. Appendix 1 reproduces the regression results reported there.

Table 1 reproduces the analysis shown in the report, but gives some indication of the effect of including various factors in the regression model to gauge the impact they may have on the difference in earnings shown in Figure 1. In the models shown in Table 1, the earnings of the Class of '99 have been inflated in line with the growth of weekly average earnings in the UK economy between March 2004 and November 2011.

Table 1: Regression estimates of shift in earnings between Class of '99 and Futuretrack (Classes of '09/'10): pooled samples

Dependent variable is the natural logarithm of estimated real gross annual earnings

	Model 1	Model 2	Model 3	Model 4
Futuretrack respondent	-.300 (-37.3)	-.298 (-36.8)	-.221 (-18.8)	-.219 (-22.4)
Age	x	.002 (2.3)	.002 (2.4)	-.004 (5.9)
Cumulative month employed	x	x	.003 (8.9)	.003 (9.4)
All other factors ³	x	x	x	✓
\bar{R}^2	0.134	0.135	0.144	0.516
N	8,990	8,962	8,764	8,675

Note: X indicates that these variables were excluded in the model.

✓ indicates that a set of variables were included, but not reported in this table.

¹ Time series 'EARNO1 Average Weekly Earnings-total pay' published by Office for National Statistics, 12 December 2012 (earn01dec2012-tcm77-287514).

² This was performed by replacing banded interval data with mid-point estimates, with the lowest band (less than £9,999), replaced with £9,000 and the highest band (£60,000 or more) replaced with £65,000.

³ See Appendix 1.

Model 1 shows that the unadjusted difference in real earnings between the two cohorts is 30 per cent. The correction for the variation in ages of the cohort members shown in Model 2 has little effect upon this difference. However, adjusting for the difference in the cumulative months employed by members of the two cohorts indicates that this is a highly significant factor. Model 4 adds all the other variables that could account for a difference in earnings between the two cohorts (as shown in Appendix 1).

This analysis indicates that the unadjusted difference in earnings falls from 30 per cent to 22 per cent when adjustments are included for age, months employed and a wide variety of other factors. Comparison of Models 2, 3 and 4 shows that the most important factor in this respect is the difference in the cumulative number of months in employment between the two samples. The adjustment that is applied to the real earnings of members of these two cohorts is what is termed a 'linear adjustment'. This means that the effect of each month of additional employment since graduation has the same effect on earnings as any other month employed, and that the monthly effect is similar for both cohorts. Under this strong assumption the coefficient on the variable 'cumulative months employed' indicates that each year of employment would increase earnings by 3.26⁴ per cent. This effect requires further investigation to determine whether or not this method of adjustment is appropriate.

Figures 2, 3, and 4 show the distribution of the variable 'cumulative months employed'. This reveals that there are four distinct periods in the combined sample. Figures 3 and 4 show the distribution of this variable for each cohort, revealing that there are peaks occurring at 5 months, 18 months and 29 months for the Futuretrack respondents and at 52 months for the Class of '99. These peaks correspond to those leaving from five, four and three year courses in the Futuretrack sample, and from the four year follow-up of the Class of '99.

⁴ The coefficient in Table 1 is rounded. The calculation shown here is 0.002719 multiplied by 12.

Figure 2: Cumulative months employed since graduation - Class of '99 and Futuretrack samples combined

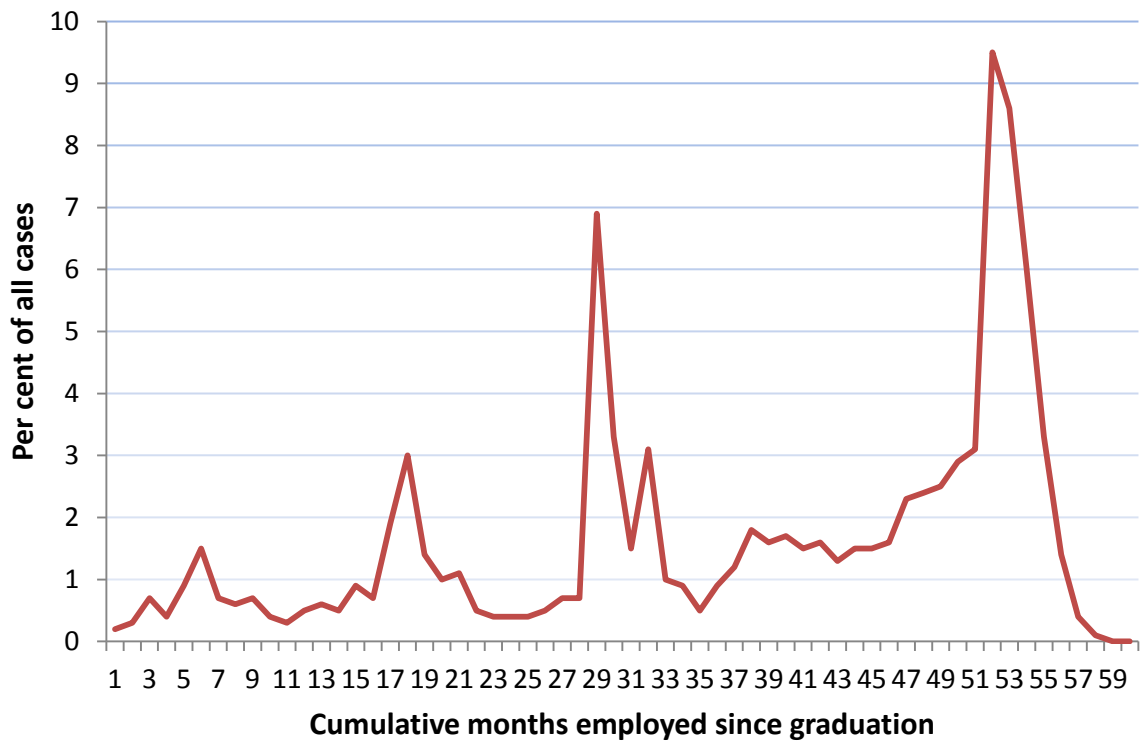


Figure 3: Cumulative months employed since graduation – Futuretrack Stage 4

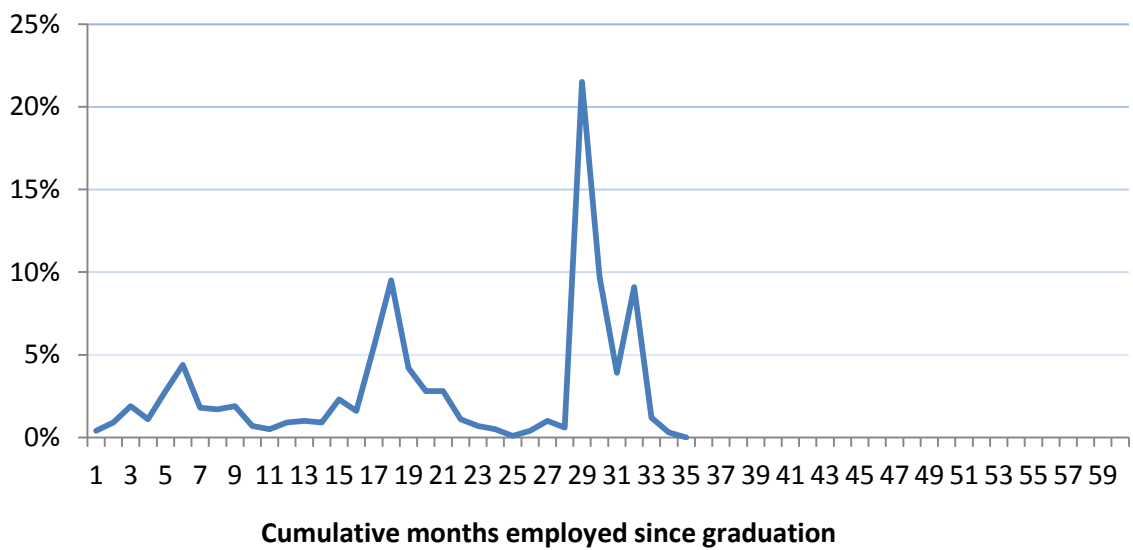
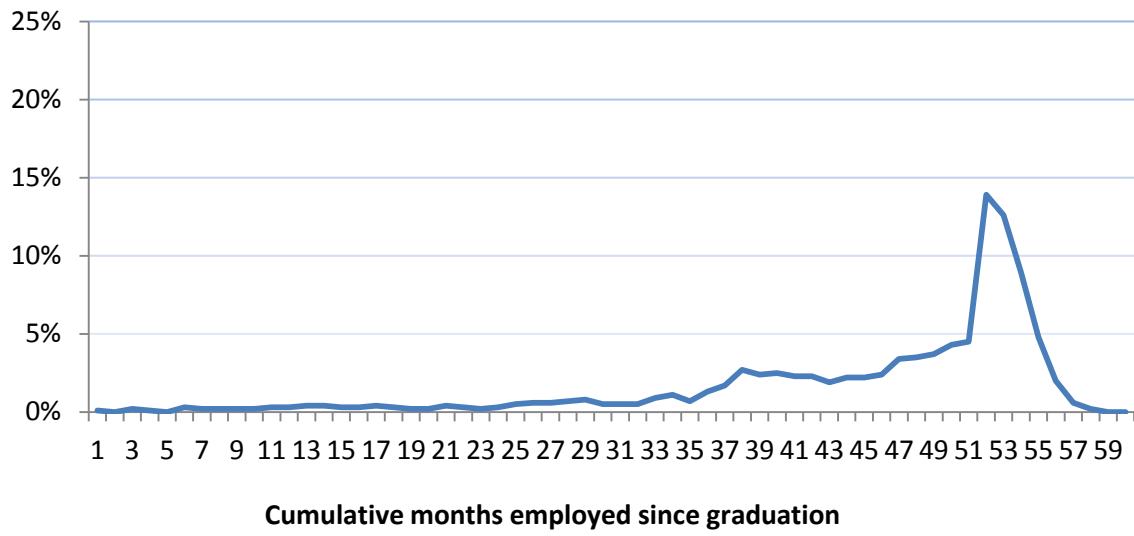


Figure 4: Cumulative months employed since graduation – Class of '99



To gain some indication of the validity of this linearity assumption, regression models are estimated separately for the two samples, with the cumulative months employed entered in a piecewise fashion. The results are shown in Table 2.

Table 2: Effect on earnings of cumulative employment experience since graduation: Class of '99 and Futuretrack compared

	Class of '99	Futuretrack Stage 4
Male	0.129 (14.6)	0.129 (9.5)
Age	-0.002 (-1.8)	0.009 (6.3)
Cumulative months employed:		
1-12	ref.	ref.
13-24	0.027 (0.9)	0.080 (4.3)
25-36	0.032 (1.3)	0.103 (5.8)
37-48	0.073 (3.4)	-
49-54	0.138 (6.6)	-
55+	0.110 (4.4)	-
\bar{R}^2	0.047	0.056
N	6,262	2,699

t-values are shown in parentheses

Dependent variable is the natural logarithm of real gross annual earnings

This analysis indicates that the rate of earnings growth associated with the cumulative months employed since graduation has been proceeding at a relatively faster rate among graduates from the Futuretrack cohort. For the Class of '99, earnings are between 3 and 6 per cent higher for each additional accumulated year of employment. In the Futuretrack cohort, earnings among those who have accumulated two or three years of employment experience are some 8 to 10 per cent higher than for those with a year or less of accumulated employment.

Earnings and the early employment experience of graduates

The evidence examined so far indicates that the relationship between accumulated employment and earning is positive but non-linear. For the Futuretrack cohort, earnings do appear to be increasing at a higher rate per year of employment experience. This is puzzling given that it has been shown elsewhere that a higher proportion of Futuretrack graduates are in what are defined as 'non-graduate' jobs, and that there has been a higher experience of unemployment among the Futuretrack respondents than was the case for the Class of '99 (Purcell *et al.* 2012, pp. 55-61). In making a comparison between the earnings of the two cohorts, the critical adjustment that is necessary is to estimate the additional impact on earnings for the Futuretrack cohort, calculating this separately of the 5 year, 4 year and 3 year completers. While this must be speculative, some indication can be gained from a detailed examination of data from recent Labour Force Surveys.

The LFS does not request information on the number of months spent in employment following graduation. However, it does request information on the year in which the highest qualification was obtained. With this information and knowing the quarter of the year to which the survey data relate, we describe below the method by which a proxy for the cumulative experiences of employment was calculated, based on the assumption that all first degree graduates obtained their degree in June of the year stated. While the resulting estimate of the cumulative experience of employment is likely to be biased upwards, the use of this variable to investigate *the change in earnings* associated with increasing employment experience should suffer less from such bias.

Data from Labour Force Surveys for the 15 quarters from January 2009 to September 2012 were consolidated as follows:

1. All those with earnings information were included once and once only, using the first quarter information from the five-wave structure of the LFS, together with new entrants to the LFS arising from household mobility;
2. Cases were restricted to those whose highest qualification was a first degree of equivalent, were in full-time employment, were aged between 22 and 26 years and who gave information on the year in which they obtained their highest qualification⁵;
3. A proxy variable for months employed since graduating was constructed from the year in which they obtained their highest qualification.

Using these data an analysis of earnings was undertaken, regressing the logarithm of gross weekly earnings on gender and the variable for potential employment experience. The results of this analysis are shown in Table 3 and in graphical form in Figure 5 for up to 5 years of experience.

Table 3: Relationship between time since obtaining first degree and gross weekly real earnings, for persons aged 22-26 years whose highest qualification is a first degree obtained between 2003 and 2012

Variable	Coefficient	(t-value)
(Constant)	3.704	(10.6)
Male	0.096	(3.1)
Months since obtaining degree		
1 to 6	ref.	
7 to 12	0.215	(3.2)
13 to 18	0.217	(3.2)
19 to 24	0.344	(5.0)
25 to 30	0.367	(5.2)
31 to 36	0.470	(6.4)
37 to 42	0.526	(6.6)
43 to 48	0.547	(6.9)
49 to 54	0.473	(5.6)
55 to 60	0.599	(6.7)
61 to 66	0.494	(4.6)
67 and over	0.358	(2.8)
Age (years)	0.071	(4.8)

Dependent variable is the natural logarithm of real gross weekly earnings

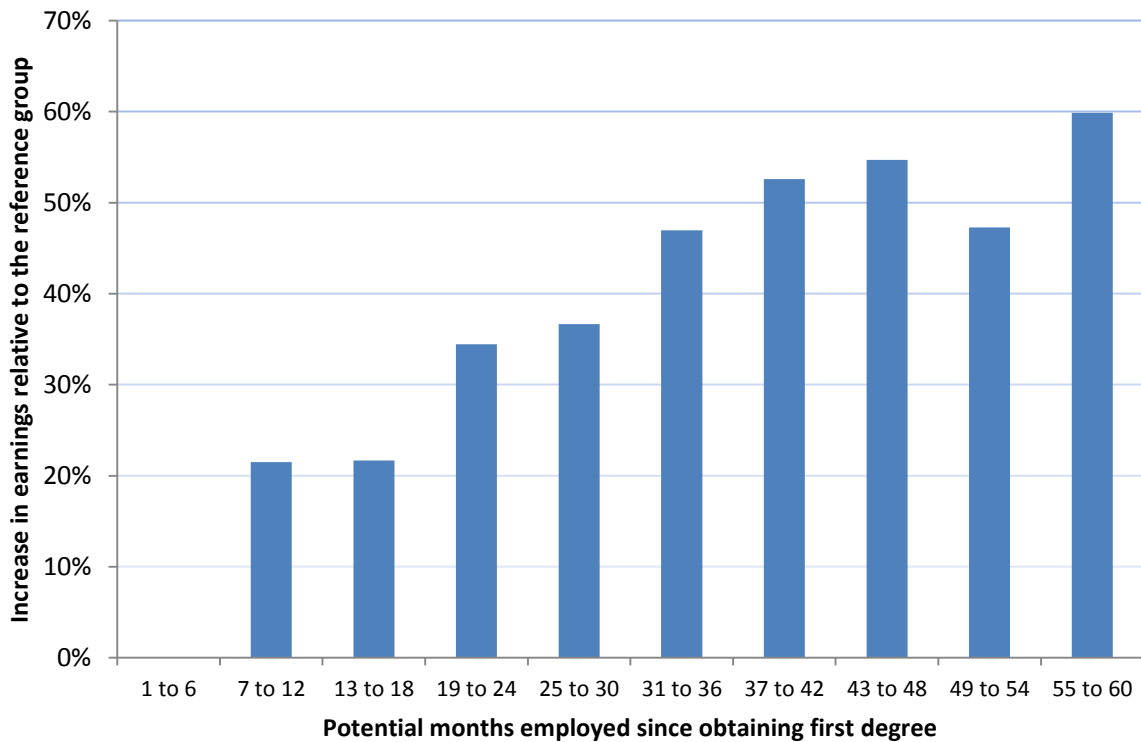
Adjusted R² = 0.141

N = 1,397

Source: Labour Force Surveys, January 2009 to September 2012.

⁵ Respondents could reply to a question on when they obtained their highest qualifications either by stating their age at that time or the year in which they obtained it. Without information on the respondent's month of birth, the number of months that had elapsed since obtaining their highest qualification to the date of the survey could not be calculated for respondents who replied to this question with their age on gaining their highest qualification. For this reason respondents who gave their age in answer to this question had to be excluded from the analysis.

Figure 5: Percentage increase in earnings associated with potential months of employment after graduation, first degree holders only



Source: Table 3

This again indicates that the relationship between potential employment experience and earnings is positive but non-linear. The estimates shown are indicative of the relationship, with a 95 per cent confidence interval for the effect on earnings of each of the 6-month periods of potential employment in the range of ± 15 percentage points, but they give some guidance as to how the earnings of Futuretrack graduates might have increased if they had had the employment experience of the Class of '99.

The mean actual cumulative experience of employment in the Class of '99 was 45.6 months. For the Futuretrack cohort it was 21.6 months, giving a difference in employment experience between the two cohorts of 24 months. The issue to be decided is how this 24 month difference in employment experience manifests itself across the Futuretrack cohort, and the effect on earnings that would be experienced by Futuretrack respondents if they were to gain the same employment experience as the Class of '99.

Table 4 shows how this potential effect on the earnings of Futuretrack graduates has been estimated. Separate calculations are performed for three, four and five year course completers. The first column of this table shows the estimated proportion of Futuretrack respondents in each of the three categories of leavers⁶. The next column shows the maximum employment experience that each group of leavers could have obtained by the time of the Futuretrack Stage 4 survey. The third column from the left shows the additional maximum employment experience that could be gained

⁶ Estimates obtained from all stages of the Futuretrack Study.

by Futuretrack respondents if they had all been surveyed 45 months after graduating, as was the case with the typical Class of '99 respondent. The right-hand column shows the estimated increase that such additional employment experience would have on earnings, using the information shown in Table 3 and Figure 5.

Table 4 Estimating the effect of additional employment experience on the earning of Futuretrack respondents

Length of course	Proportion of Futuretrack respondent in each leaver category (%)	Maximum potential employment experience to date of survey (months)	Maximum additional potential employment experience to match Class of '99 (months)	Estimated effect of additional potential employment experience on earnings (%)
3 year leaver	43.4	29	16	15
4 year leaver	43.7	17	28	28
5 year leaver	12.9	5	40	63

Source: Futuretrack Stages 1 – 4 and Table 3.

Using the estimates shown in the right-hand column of Table 4, weighting these according to the proportion of Futuretrack respondents who were in each leaver category yields an estimate of the increase in earnings that could arise for the Futuretrack cohort if respondent were to gain the same employment experience as the Class of '99 as **27 per cent**. Such an increase would mean that the earnings of Futuretrack graduates, when compared with the Class of '99, had risen in line with average earnings over the past decade. This is an upper estimate of the potential increase in the earnings of Futuretrack graduates over the next few years. The actual increase that will occur will depend on the way the earnings of recent graduates evolve over the next three to four years.

Relative increase in the earnings of new graduates over the past three years

Some indication of the way in which the earnings of recent graduates has been moving relative to average earnings can be gained from examination of the same Labour Force Survey data used for the analysis indicated in Table 3, distinguishing between those in the first seven quarters of the sample and those in the later eight quarters. The change in average gross weekly earnings for these two groups of graduates is compared with the change in the index of average weekly earnings in Table 5.

Table 5 Change in average gross weekly earnings between 2009 and 2012 for first degree holders only

Period	Average gross weekly earnings (£)	Index of average earnings	N
2009 q1 – 2010 q3	365.50	446	1,690
2010 q4 – 2012 q3	369.30	463	1,550

Note: LFS sample restricted to those who held a first degree as their highest qualification, were age between 21 and 26. The sample is not restricted in terms of the response to the question on their age/year when their highest qualification was obtained.

This analysis shows that, between these two periods approximately 2 years apart, the index of average weekly earnings grew by 3.8 per cent. The average gross weekly earnings of young graduates grew by only 1 per cent in this same period, a finding consistent with the higher estimate of the decline in the earnings of recent graduates relative to average earnings given in the Futuretrack Stage 4 report.

Discussion of results

Comparison of the gross annual earnings of two cohorts of graduates, one of which graduated in 2009 and the other for those who graduated in 2009, 2010 and 2011, indicates that the average earnings of the later cohort were 30 per cent lower relative to the increase in average earnings for the whole economy that had taken place over the intervening decade. However, the later cohort had less employment experience than the earlier cohort, necessitating adjustments to be made to compensate for this difference.

Two alternative methods have been used to compare the earnings of a cohort of graduates who graduated in 2009 with the Futuretrack graduates, who gained their undergraduate degrees in 2009, 2010 or 2011. In order to account for the lower employment experience recorded in the Futuretrack cohort a regression model was used to 'control' for the difference in employment experience. This technique indicated that, having adjusted for the lower experience of employment, the Futuretrack cohort had average earnings which had declined by almost 22 per cent relative to average earnings over the decade separating the two cohorts. However, this method adjusts earnings according to the average rate of increase of earnings in the months after graduation experienced across both cohorts. Because it is probable that the monthly growth rate of earnings after graduation is not linear (*i.e.* not increasing by the same amount in every month after graduation by the same amount), this method can only yield an indicative adjustment. Analysis of the two cohorts reveals that this is indeed the case, but does not provide sufficient guidance as to how the adjustment could be made using the information on earnings within the two cohorts. For this reason a second method was employed, utilising estimates of the monthly increase in earnings for recent graduates obtained from the Labour Force Survey. This method produces a maximum estimate of the potential additional earnings increase that the Futuretrack cohort could experience if all cohort members had been surveyed four years after graduation. This estimate indicates that the decline in the earnings of recent graduates, relative to the economy wide growth of average earnings, could be significantly lower than was previously estimated.

Clearly there is considerable uncertainty surrounding the conclusion drawn in the Futuretrack Stage 4 report that the earnings of recent graduates have declined in real terms by more than 20 per cent over the ten year period between the two studies. Analysis of the most up-to-date data available from the Labour Force Survey does point to a decline in the average earnings of recent graduates, with their gross weekly earnings rising by only 1 per cent over the last two years compared with 3.8 per cent across the whole labour force. This is consistent with the higher estimate given in the Futuretrack Stage 4 report, but it relates only to the period 1999-2012 which has been a period of stagnation.

With graduate unemployment at record levels and with a significant increase in the number of graduates taking jobs that we class as non-graduate (Elias and Purcell 2013), it would be surprising not to see such a decline. The important question is whether or not the recent decline will be

sustained in the longer term. Further monitoring of the earnings of recent graduates is required, along with analysis of the diversity of graduate earnings and career opportunities in relation to labour market and wider socio-economic changes.

References

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Appendix 1:
Earnings of graduates in full-time employment: Class of '99 and Classes of 2009/2010

	Coefficient	t-statistic	Sig.
Constant	9.704	0.037	264.1
Male	0.051	0.007	7.9
<i>Subject studied:</i>			
Arts	-0.075	0.017	-4.3
Humanities	-0.078	0.013	-6.2
Languages	-0.015	0.016	-0.9
Law	0.045	0.018	2.5
Social sciences	Ref.		
Mathematics and Computing	0.057	0.014	3.9
Natural sciences	-0.014	0.012	-1.2
Medicine and related	0.200	0.013	15.1
Engineering	0.029	0.016	1.8
Business Studies	0.045	0.013	3.5
Education	0.068	0.015	4.5
Interdisciplinary	0.006	0.011	0.6
Other vocational.	-0.026	0.018	-1.5
<i>Class of degree obtained:</i>			
First class	Ref.		
Upper second class	-0.051	0.008	-6.0
Lower second class	-0.102	0.010	-10.5
Third class	-0.168	0.019	-8.7
Pass/Diploma/Foundation degree	0.005	0.018	0.3
Ordinary degree	-0.119	0.028	-4.3
Other.	0.022	0.079	0.3
<i>Type of employment contract held:</i>			
Permanent or open-ended contract	Ref.		
Fixed-term contract	-0.042	0.009	-4.9
Probationary period prior to confirmation	-0.097	0.015	-6.6
Self-employed	0.004	0.044	0.1
Temporary, through an agency	-0.190	0.021	-9.0
Other temporary or casual	-0.156	0.025	-6.1
Other	-0.128	0.032	-4.0
Hours per week normally worked in main job	0.009	0.000	25.2
Age (years)	0.004	0.001	5.9
<i>Gender composition at workplace:</i>			
Almost exclusively/ only by men	Ref.		
Mainly by men	0.020	0.014	1.5
By a fairly equal mixture of men and women	-0.055	0.014	-4.1
Mainly by women	-0.096	0.015	-6.5
Almost exclusively/ only by women	-0.145	0.018	-7.9
Only by you	-0.045	0.020	-2.2
<i>Sector in which currently employed:</i>			
Agriculture, mining, quarrying	0.008	0.027	0.3
Manufacturing	-0.054	0.016	-3.3
Electricity, gas, water supply	-0.054	0.026	-2.0
Construction	-0.106	0.020	-5.3

Distribution, hotels, catering	-0.213	0.016	-13.0
Transport and tourist services	-0.115	0.023	-5.1
Information and communications sector	-0.090	0.013	-6.8
Banking, finance, insurance			
Business services	-0.049	0.012	-4.1
Education	-0.148	0.015	-10.0
Other public services	-0.088	0.014	-6.2
Other	-0.109	0.012	-9.4
<i>Type of organisation in which currently employed:</i>			
Public sector	Ref.		
Private sector	0.014	0.011	1.3
Not-for-profit sector.	-0.072	0.014	-5.3
<i>Parental social background:</i>			
Higher managerial and professional occupations	Ref.		
Lower managerial and professional occupations	-0.008	0.004	-2.2
Intermediate occupations	-0.006	0.003	-1.8
Small employers and own account workers	0.001	0.002	0.4
Lower supervisory and technical occupations	-0.004	0.003	-1.7
Semi-routine occupations	-0.001	0.002	-0.4
Routine occupations.	-0.004	0.002	-1.9
<i>Parental education:</i>			
Father has degree	0.009	0.007	1.2
Mother has degree	-0.001	0.007	-0.2
<i>Region in which currently employed</i>			
London	0.210	0.007	29.1
Southeast	0.066	0.009	7.5
N. Ireland	-0.085	0.011	-7.6
<i>Tariff points on entry to HE:</i>			
Not available	-0.044	0.014	-3.1
1 to 79	-0.085	0.027	-3.1
80 to 119	-0.096	0.024	-4.0
120 to 179	-0.081	0.018	-4.6
180 to 239	-0.054	0.015	-3.7
240 to 299	-0.064	0.013	-4.8
300 to 359	-0.040	0.012	-3.2
360 to 419	-0.042	0.013	-3.3
420 to 479	-0.028	0.013	-2.1
480 to 539	-0.017	0.015	-1.1
540 plus.	Ref.		
Reported a disability	-0.062	0.018	-3.4
<i>Occupation held at time of survey:</i>			
Traditional graduate job	0.232	0.010	23.6
Modern graduate job	0.199	0.010	20.1
New graduate job	0.179	0.009	19.8
Niche graduate job	0.152	0.009	16.6
Non graduate job	Ref.		
Cumulative months employed	0.003	0.000	9.4
Respondent was Class of 2009/10 graduate	-0.219	0.010	-22.4

<i>Tariff classification of university attended:</i>			
Highest tariff university	Ref.		
High tariff university	-0.026	0.009	-2.9
Medium tariff university	-0.046	0.009	-5.4
Lower tariff university	-0.037	0.010	-3.6
Specialist HE college	-0.073	0.054	-1.4

Dependent variable is natural logarithm of earnings. Samples consist of UK citizens (inc. dual citizenship) who were graduate completers in the *Class of '99* and Futuretrack (classes of 2009/10) surveys, who gained their degree from one of the 38 HEIs surveyed in the *Class of '99* and were in full-time employment at the time of the surveys.

Adjusted R Square = 0.516. N = 8,676