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# Higher education, intergenerational mobility and earnings: the case of the UK

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#### Abstract

Over the past 20 years the UK has moved from an elite system of higher education, in which only 15 per cent of the population gained access to degree-level education, to one in which close to half the population of young people now pursue higher education courses leading to a degree. While policy makers continue to suggest that access to higher education can be used as an instrument of social engineering, particularly via its potential to improve earnings and promote inter-generational mobility, economists and sociologists provide research findings which raise important questions and indicate the poverty of existing data resources to pursue this issue. This paper contributes to this debate through an analysis of survey data which show the impact of this expansion on the distribution of earnings and makes use of newly available data in the UK to explore the relationship between intergenerational social mobility and higher education.

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#### Introduction

Commencing in the late 1980s, the UK transformed its higher education sector from one which catered for a small and elite group of entrants to a system of mass higher education, offering a diverse range of educational experience and vocational skills. However, this transition has spawned a growing number of scholarly articles<sup>1</sup> referencing the 'overeducation' phenomenon in the United Kingdom, reflecting and in turn informing vigorous debate among educational policy makers of different political persuasions about the current scale of higher education and its future development.

Most of the studies of this phenomenon have adopted what might be termed a 'supply-side' approach – examining the impact on the earnings of graduates of various measure of 'overeducation', including information reported by graduates about the extent to which they feel overqualified for the jobs they hold. This paper examines recent evidence about the changing industrial and occupational structure of the UK labour market, detailing the ways in which graduates have been absorbed within the labour market. We analyse the relative earnings of graduates, placing particular emphasis on their position within the national distribution of earnings. We seek to determine how the graduate earnings premium has changed over the last fifteen years. Who are the gainers and losers and does it make a difference according to the type of higher education route pursued? Finally, we turn our attention to the intergenerational impacts of the expansion of higher education. The previous *elite* system of higher education served to maintain a relatively small but economically and socially privileged class within UK society. Has expansion created the opportunity for a more egalitarian structure to evolve by widening access to higher education to those groups which are less economically and socially privileged?

#### The changing nature of UK employment, 1992-2010

Over the eighteen year period, from 1992 to 2010<sup>2</sup> total employment in the UK grew from 24.7 million people to 28.5 million. This growth of 15 per cent outstrips the population growth of 8.6 per cent over this same period, with the employment ratio<sup>3</sup> rising from 44 per cent to an all-time high of 47 per cent by 2010.

<sup>&</sup>lt;sup>1</sup> See, for example, Sicherman (1991), Sloane (1996, 1999), Battu *et al.* (1999), Dolton and Vignoles (2000), Hartog (2000), Bauer (2002), Chevalier (2003), Rubb (2003), Sloane (2003), Brown and Hesketh (2004), McGuiness (2006), Chevalier and Lindley (2007, 2009), Green and Mcintosh (2007), Green and Zhu (2008), Lindley and McIntosh (2008), Walker and Zhu (2008).

<sup>&</sup>lt;sup>2</sup> Consistent estimates of employment from the UK Labour Force Survey are restricted to the post 1992 period.

<sup>&</sup>lt;sup>3</sup> Defined here as the ratio of the employed population to the total population of the UK.

#### Figure 1: Employment trends in the UK, 1992-2010 by broad occupational groups



Source: Labour Force Surveys, second quarter each year, 1992 - 2010

Figure 1 reveals how this increase in employment has been concentrated within higher level occupations. Using the first three categories of the UK Standard Occupational Classification as a proxy for the employment of people with jobs in what is often termed the 'knowledge economy', it can be seen that total employment in managerial, professional, technical and associate professional jobs has accounted for virtually all of the net growth in employment, with employment in other occupational categories remaining relatively constant throughout this period. Interestingly, the impact of the 2008 recession is apparent within these aggregate statistics. The steady growth in high level jobs that is in evidence in these occupational categories from 1992 to 2008 levels off over the remaining two year period. However, in all other occupational categories there is a decline in employment from 2008 to 2010.

Employment growth and occupational restructuring on this scale would not have been possible without an associated increase in the demand for people with high-level qualifications. Government policies, enacted via successive measures introduced from the late 1980s onwards and relating to the control and funding of higher education institutions provided the necessary impetus. Figure 2 shows the growth in participation in higher education by young people through the early 1990s - the period of transition within the higher education sector from a system catering for a relatively small and elite section of the UK population to mass higher education.





Source: http://stats.bis.gov.uk/UKSA/he/sa20110331.htm

The expansion of participation in higher education in the UK commenced in 1989/90, with a sharp rise in participation rates for young people through the early half of this decade and followed by a continuing, albeit slower, rate of increase from 1999 onwards. The rapid increase in the rate of participation arises not only because of the increased flow of young people into higher education institutions, but also because of a decline in the population of young people prior to this period. While the population of the UK increased by almost 9 per cent between 1994/95 and 2009/10, the population of 22-34 year olds fell by 8 per cent.

For most young people in the UK, entry into higher education takes place at ages 18 or  $19^4$ . Undergraduate degree courses are typically of three to four year's duration. Thus, the increase in participation seen through the early 1990s is likely to have given rise to a steady increase in the proportion of young graduates in the labour market from 1994 onwards. For this reason we examine changes in the labour market which took place between two time periods which span the period in which the sharpest increase in the proportion of graduates in the labour market is likely to have occurred – the period from  $1994/95^5$  to the latest period for which data are available to us, 2009/10. We focus upon young people (ages 22-34) in these two periods, given that this is the age range in which the increase in highly qualified people is likely to be concentrated.

#### Unravelling the growth in employment: industries, occupations and high level qualifications

Our interest in the sectoral changes displayed in Figure 1 relates to the capacity within the UK economy to absorb the significant increase in graduates. Table 1 details the increase in employment in the UK over the period 1994/95 to 2009/10 by broad industry sectors. This reveals the remarkable diversity in the pattern of change over these fifteen years. While employment has grown by 10 per cent overall, this varies from a decline of almost 40 per cent in manufacturing to a growth of over 60 per cent in 'other business activities'. The latter category includes management consulting, legal and accounting services, scientific research and development, software development, *etc.* These changes are not reflected directly within the 22-34 year age group. In part this is a consequence of the declining population in this age range, but it also reflects the recruitment preferences of various sectors. For example, in public administration and defence, the employment of young people fell by over 14 per cent, whereas in education it grew by 64 per cent. Clearly, public administration has recruited older workers compared with the education sector.

The four right-hand columns of Table 1 show how extensive the increase in the employment of graduates has been, with the number of employed graduates aged 22-34 growing by 94 per cent between 1994/5 and 2009/10. The sectoral distribution of this growth is interesting in that it shows how the manufacturing sector has provided little opportunity to accommodate the increased supply of graduates. While the proportion of graduates in the manufacturing sector has risen, this is a consequence of the decline in employment in the sector. Overall, the manufacturing sector now provides jobs for slightly fewer young graduates than was the situation fifteen years ago.

<sup>&</sup>lt;sup>4</sup> Entry from Scottish schools to Scottish higher education institutions can take place at age 17, typically on to a four year undergraduate course.

<sup>&</sup>lt;sup>5</sup> To provide samples large enough for detailed analysis, we combine information from eight consecutive quarterly Labour Force Surveys in each time period. Details about the method used to combine these surveys are shown in the appendix.

To examine in more detail the nature of these sectoral changes in employment, we make use of a classification of occupations designed specifically to indicate the scope that an occupation provides for a graduate to use his/her skills and knowledge acquired via higher education. This classification defines a subset of occupations as 'non-graduate jobs'. These are occupations for which we have previously determined that the constituent tasks provide little scope for a graduate to use the skills, knowledge and expertise acquired through higher education<sup>6</sup> (Elias and Purcell, 2004). In each time period we show the proportion of young graduates in the group of occupations we define as non-graduate jobs. For young graduates across all sectors this proportion has grown from 18 per cent to 26 per cent, but the sectoral distribution of this increase indicates the extent to which non-graduate employment is concentrated within the wholesale/retail trade sector, hotels and restaurants and land transport activities. Sectors with the lowest proportions of graduates in non-graduate jobs include education and health and social work. The sectors displaying the sharpest increase in non-graduate employment are agriculture, wholesale/retail trade and land transport. However, in terms of the volume of young graduates absorbed into non-graduate jobs, the sheer size of the hotels and restaurants sector means that this sector in the major employer of graduates in non-graduate jobs.

Tables 2 and 3 present this same sectoral information in different ways. Table 2 defines sectors according to their 'graduate intensity' in 1994/95. Each of 60 sectors (see appendix 1) has been classified according to the proportion of graduates recorded in that sector in 1994/95. This analysis shows that greatest increases in graduate employment have taken place in those sectors which had the lowest proportions of graduates in 1994/95. However, part of this reflects the increase in the proportion of graduate jobs in such sectors.

Table 3 uses information from the 2009 UK Innovation Survey to classify sectors as low, medium or high innovation sectors (see appendix 1). Again we note that it is the low innovation sectors which have absorbed high numbers of graduates, with many being recorded as in non-graduate jobs.

<sup>&</sup>lt;sup>6</sup> For further details about the definition of 'non-graduate jobs' see Appendix 1 and Elias and Purcell (2004).

	All emp	loyed	Employed yo	ung people	E	mployed youn	g people with a de	gree
	Employment 1994-95 (thousands)	% change '94/'95 – '09/10	Employment 1994-95 (thousands)	Employment % change 1994-95 '94/'95 – (thousands) '09/10		% change '94/'95 - '09/10	% in non- graduate jobs in 1994/5	% in non- graduate jobs in 2009/10
Agriculture/fishing	475.8	-5.2	120.9	-22.1	5.2	110.0	53.6	73.8
Mining and quarrying	108.0	7.1	34.7	-11.0	5.1	116.1	21.1	20.4
Manufacturing	4,762.9	-38.2	1,680.4	-51.1	212.1	- 3.0	18.5	22.8
Electricity, gas and water	212.9	0.0	69.8	-11.3	16.5	7.4	15.4	26.5
Construction	1,744.3	22.0	584.2	3.7	34.5	127.4	17.9	27.6
Wholesale/retail trade	3,891.0	-0.4	1,285.4	-11.7	103.3	137.6	34.8	54.8
Hotels and restaurants	1,101.6	24.0	342.6	41.4	22.8	301.1	74.5	80.6
Land transport	600.4	13.7	184.6	-32.6	9.5	64.5	39.5	65.9
Water and air transport and related	971.9	8.0	370.5	-11.8	35.9	171.9	39.9	37.4
Financial intermediation	1,121.6	-0.8	547.9	-24.1	105.1	83.3	24.9	25.3
Real estate	313.6	25.4	106.7	1.7	27.2	53.1	16.1	27.8
Equipment rentals	113.7	-7.0	44.7	-31.3	3.8	64.1	32.9	42.4
Other business activities (inc.		<i></i>				00 <b>7</b>	40 <b>-</b>	
research)	1,882.2	61.5	702.2	41.4	261.8	93.7	10.7	12.7
Public admin and defence	1,555.3	17.7	597.7	-14.4	104.3	115.4	25.4	26.9
Education	1,845.0	46.8	407.4	64.3	233.9	97.1	4.7	13.1
Health and social work	2,668.9	36.0	835.2	10.7	149.8	136.9	12.1	19.7
Other activities	1,476.6	13.7	456.7	11.9	82.6	120.3	24.5	31.5
Total	24,845.7	10.0	8,371.6	-6.2	1,413.4	94.2	18.3	26.0

 Table 1:
 Trends in employment by industry sectors, age groups, qualification and occupation (graduate vs. non-graduate jobs)

Source: Labour Force Surveys, composite files for 1994/95 and 2009/10

# Table 2:Trends in employment by industry sectors (classified by graduate intensity), age groups, qualification and occupation (graduate vs. non-<br/>graduate jobs)

	All emp	loyed	Employed yo	Employed young people		Employed young people with a degree					
	Employment 1994-95 (thousands)	% change '94/5 – '09/10	Employment 1994-95 (thousands)	% change '94/5 – '09/10	Employment 1994-95 (thousands)	% change '94/5 - '09/10	% in non- graduate jobs in 1994/5	% in non- graduate jobs in 2009/10			
less than 5%	3,863.5	-1.9	1,206.9	-10.5	59.23	165.3	54.4	72.6			
>5 but < 10%	8,594.4	-5.2	2,916.7	-19.4	239.70	100.5	29.9	43.5			
>10 but <15%	3,827.8	15.0	1,256.1	-9.2	220.10	96.2	14.1	18.8			
>15 but <20%	3,033.3	9.7	1,275.3	-17.9	235.25	93.7	25.1	26.6			
>20 but <25%	1,399.7	9.4	480.3	-3.4	126.49	53.4	16.6	27.4			
>25%	4,142.9	47.9	1,240.4	42.5	533.31	92.2	8.1	13.2			
Total	24,861.6	9.9	8,375.7	-6.3	1,414.08	94.1	18.3	26.0			

Source: Labour Force Surveys, composite files for 1994/95 and 2009/10

#### Table 3: Trends in employment by industry sectors (classified by innovation activity), age groups, qualification and occupation (graduate vs. nongraduate jobs)

	All empl	oyed	Employed yo	ung people	Employed young people with a degree					
	Employment 1994-95 (thousands)	% change '94/5 – '09/10	Employment 1994-95 (thousands)	% change '94/5 – '09/10	Employment 1994-95 (thousands)	% change '94/5 - '09/10	% in non- graduate jobs in 1994/5	% in non- graduate jobs in 2009/10		
Low innovation activity sectors	4,288.3	7.4	1,318.6	5.7	104.1	190.7	45.0	65.2		
Medium innovation activity sectors	15,744.1	13.5	5,302.4	-7.0	900.1	98.1	17.2	23.5		
High innovation activity sectors	4,813.3	0.8	1,750.6	-12.9	409.2	61.0	13.8	14.7		
Total	24,845.7	10.0	8,371.6	-6.2	1,413.4	94.2	18.3	26.0		

Source: Labour Force Surveys, composite files for 1994/95 and 2009/10

#### The changing distribution of graduate earnings

The information shown in Table 1 indicates that there has been a considerable increase in the proportion of young graduates working in what we have classified as 'non-graduate' jobs between 1994/95 and 2009/10. However, Figure 1 indicates the scale of the expansion of high level jobs more generally over this same period. This suggests that, rather than examining the change in the graduate earnings premium around the mean or median of the earnings distribution, we should investigate the impact of this expansion of high levels skills within the labour market across the distribution of earnings. In this section we present such analyses, using multivariate techniques to control for a wider range of influences on earnings than can be represented graphically.

Before examining the changing distributions of the earnings of graduates within the distribution of earnings, we consider how their relative position in the earnings distribution might change in the light of the expansion of higher education. Two different hypothetical scenarios are presented. The first assumes that, as more people acquire higher education qualifications, employers adjust by segmenting the labour market into graduate jobs and non-graduate jobs, restricting the recruitment of graduates to jobs that utilise and reward their potential to innovate and 'add value' as a result of the skills and knowledge they possess – and these jobs are at the higher end of the earnings distribution. The second scenario is one in which an oversupply of highly qualified labour means that graduates are being recruited for lower paid jobs that do not require higher-level skills and knowledge and previously were the domain of non-graduates.

The consequences of these two scenarios for the changing distribution of young graduates in the labour market are demonstrated in Figures 3 and 4. In Figure 3 we hypothesise that, at higher earnings levels, the proportion of people with a degree will increase. The relationship is probably not linear, in that there are likely to be some 'mismatched' graduates who have taken low-paid and/or temporary work while they continue to search for better paid employment. With an increase in the proportion of graduates in the labour market, the curve does not just shift upwards as the proportion of young full-time employees with degrees increases, but swings anticlockwise as higher proportions of these graduates enter better paid jobs than was the case in the earlier period. This situation is consistent with the maintenance a graduate earnings premium.

In Figure 4 we illustrate how the graduate earnings premium might decline as graduates are forced disproportionately into lower paid jobs as a result of the expansion of higher education and the increased competition for better paid jobs. In this scenario the curve representing the proportion of graduates at various points in the earnings distribution swings clockwise. Between these two scenarios is a situation in which the graduate earnings premium is maintained.



Figure 3: Graduate expansion associated with an increase in the graduate earnings premium





If the 'overeducation' scenario holds, we would expect the aggregate outcome to be closer to that shown in Figure 4 than Figure 3. The actual change that was recorded between 1994/95 and 2009/10 is shown in Figure 5. There is a degree of 'noise' in these graphs associated with the lower survey numbers at the higher end of the earnings distribution. To eliminate this noise, a polynomial function has been fitted to each of the graphed lines. Inspection of the shift in these functions between 1994/5 and 2009/10 reveals that the change observed lends more support to the first hypothesis (Figure 3), that the graduate earnings premium appears to have been maintained during this period of rapid expansion of the number of young graduates in the labour market.



Figure 5: Graduate expansion and the change in the distribution of 22-34 year old graduates by earnings, 1994/95 and 209/10

Source: Labour Force Surveys, composite files for 1994/95 and 2009/10

To confirm this finding we present results from multivariate analyses of these same data. Table 4 shows the return to various qualifications, ranging from 'O' level certificates or equivalent (examinations taken at ages 14/15 prior to attaining the end of compulsory education), 'A' level qualifications or equivalent (entry level examinations for higher education, usually taken at ages 17/18), a first degree (typically started at ages 18/19 and of 3 year's duration), other postgraduate qualifications, master's degrees and doctorates. For each respondent the highest qualification attained in this set is coded '1', '0' otherwise. Other variables included in the linear regressions on the natural logarithm of gross weekly earnings include: age (single years); age squared; gender; family structure (presence or otherwise of children in the household aged 0-1 years, 2-4 years, 5-9 years, 10-14 years; tenure in current job (<1 year, 1 - < 2 years, 2 - < 3 years, 3 - < 6 years, 6 years and over); ethnicity (White, Mixed, Asian, Black, Chinese, Other); area of residence (Inner London, Outer London, Rest of SE of England, Rest of UK exc. N. Ireland, N. Ireland); self-declared part-time job; usual weekly hours worked (0-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61+) and a dummy variable indicating whether or not the response was a proxy response<sup>7</sup>.

<sup>&</sup>lt;sup>7</sup> Detailed regression results for all the regression equations shown in this paper are available from the authors on request (email: <u>p.elias@warwick.ac.uk</u>).

The upper half of Table 4 shows, for these two time periods, the economic returns to various highest qualifications for all people aged 22 years and over, then separately for males and females. For each regression equation it can be seen that there is a regularity of returns with respect to the highest qualifications. PhDs command the highest return, followed by Masters degrees, other postgraduate qualifications, first degrees, 'A' and then 'O' level qualifications. Contrasting the coefficient on the variable 'A' level or equivalent is highest qualification with the coefficient on *First degree is highest qualification* gives an estimate of the mean economic return associated with a first degree relative to 'A' levels, controlling for the effect of all other variables included in the regression equation.

Looking first at all people aged over 22 years in 1994/5 and 2009/10, we note that the earnings premium for a first degree compared with 'A' levels has risen from 25 per cent to 31 per cent. Examination of these changes shows that both men and women have experienced this increase, men more so than women.

The lower part of Table 4 shows the results for 22-34 year olds in both periods – the age range in which the bulk of the increase in graduates in employment is concentrated. Here we note a similar, though less marked increase in the graduate earnings premium. For men and women combined, the earnings premium grows from 20 per cent in 1994/95 to 23 per cent in 2009/10. The increase for young men is from 15 per cent to 19 per cent and for young women from 24 to 26 per cent. These findings accord with the information in Figure 5 – the upward shift in the curve depicting the increasing proportion of graduates at all points in the earnings distribution and the anticlockwise rotation revealing that, in 2009/10, more young graduates were in jobs with gross weekly pay at the higher end of the earnings distribution than at the lower end than was the situation in 1994/95.

Table 5 examines in more detail the return to higher education qualifications by subject studied. This analysis could not be restricted to the 22-34 age group because of sample size limitations. The results shown in Table 5 relate to all employed people aged 22 years and older in 1994/95 and 2009/10.

For those who hold a PhD as their highest qualification, the economic return has increased for PhDs in *medicine and related subjects* and declined significantly for those with a PhD in *education*. For those who hold Master's degrees and other postgraduate qualifications, the returns to such qualifications in all of the subject groups change very little between these two periods. Again, *medicine and related subjects* command the highest economic return.

Where the highest qualification held is a first degree, subjects such as *medicine*, *nursing*, *sciences*, *maths*, *computing*, *engineering* and *technology* show reasonably high and stable rates of return in each period. Bio sciences and agricultural subjects have a lower rate of return, falling somewhat in the more recent period. Social science, business administration and library subjects show reasonable rates of return (25-30% higher than 'A' levels) but again these returns decline slightly in the later period. Arts degrees show the lowest economic return, falling considerably over the fifteen year period.

1994/95	All ages (22 and	and over), men women	Men (22	2 and over)	Women	(22 and over)
	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
Highest qualification:						
PhD	0.572	0.022	0.573	0.025	0.567	0.044
Master's degree	0.539	0.015	0.521	0.018	0.577	0.025
Other postgraduate qualification	0.528	0.022	0.509	0.030	0.547	0.034
First degree	0.447	0.006	0.444	0.008	0.446	0.009
'A' levels or equivalent	0.199	0.008	0.255	0.012	0.142	0.012
'O' level and equivalent	0.045	0.004	0.077	0.006	0.003	0.006
	N = 65,148	N = 65,148		3	N = 33,05	4
	Adj. R <sup>2</sup> = 0.68	57	Adj. $R^2 = 0$	0.441	Adj. $R^2 = 0$	0.695
2009/10						
PhD	0.639	0.015	0.624	0.020	0.679	0.025
Master's degree	0.510	0.009	0.517	0.013	0.505	0.012
qualification	0.456	0.010	0.470	0.017	0.444	0.013
First degree	0.404	0.005	0.438	0.008	0.367	0.007
'A' levels or equivalent	0.091	0.006	0.168	0.010	0.028	0.008
'O' level and equivalent	-0.005	-0.005 0.004		0.007	-0.041	0.006
	N = 75,284		N = 36,070	)	N = 39,21	.3
	Adj. R <sup>2</sup> = 0.630		Adj. $R^2 = 0$	.484	Adj. $R^2 = 0$	0.662
1994/95	Men and we	omen (22-34 ars)	Men (22-34 years)		Women	(22-34 years)
PhD	0.423	0.037	0.383	0.043	0.540	0.072
Master's degree	0.425	0.025	0.444	0.031	0.405	0.041
Other postgraduate qualification	0.379	0.034	0.377	0.049	0.380	0.047
First degree	0.335	0.009	0.327	0.012	0.349	0.013
'A' levels or equivalent	0.138	0.011	0.173	0.016	0.105	0.016
'O' level and equivalent	0.014	0.007	0.047	0.009	-0.019	0.009
	N = 21,219		N = 12,051	1	N = 12,16	8
	Adj. R <sup>2</sup> = 0.65	4	Adj. $R^2 = 0$	.400	Adj. $R^2 = 0$	0.694
2009/10						
PhD	0.482	0.029	0.483	0.039	0.481	0.043
Master's degree	0.385	0.014	0.409	0.019	0.361	0.02
Other postgraduate qualification	0.368	0.016	0.396	0.027	0.348	0.020
First degree	0.300	0.008	0.327	0.012	0.272	0.012
'A' levels or equivalent	0.073	0.010	0.136	0.014	0.010	0.013
'O' level and equivalent	-0.003	0.009	0.035	0.012	-0.046	0.012
	N = 20,797		N = 9,914		N = 10,88	3
	Adj. R <sup>2</sup> = 0.62	.5	Adj. $R^2 = 0$	.521	Adj. $R^2 = 0$	0.660

#### Table 4: Earnings and qualifications, by age groups and gender 1994/95 and 2009/10

Source: Labour Force Surveys, composite files for 1994/95 and 2009/10.

All earnings equations include the following variables (where relevant): age (single years); age<sup>2</sup>; gender; young children present in household (0-1 years, 2-4 years, 5-9 years, 10-14 years); tenure in current job (< 1 year; 1-2 years; 2-3 years; 3-6 years; > 6 years); ethnicity (White; Mixed; Asian; Black; Chinese; Other); area of residence (Inner London, Outer London, Rest of SE, Rest of UK exc. N Ireland, N. Ireland); self-declared part time working; usual weekly hours worked (0-10; 11-20;

21-30; 31-40; 41-50; 51-60; 61+); respondent was proxy.

	199	94/95	20	09/10
Highest degree is:	Coeff.	Std. error	Coeff.	Std. error
PhD				
Medicine and related	0.739	0.062	0.901	0.037
Science and engineering	0.560	0.027	0.586	0.020
Social sciences, arts and humanities	0.475	0.046	0.575	0.032
Education	1.189	0.233	0.675	0.104
Masters				
Medicine and related	0.758	0.066	0.692	0.031
Science and engineering	0.487	0.026	0.501	0.014
Social sciences, arts and humanities	0.535	0.02	0.484	0.012
Education	0.559	0.039	0.528	0.033
Other postgraduate qualification				
Medicine and related	0.854	0.054	0.842	0.038
Science and engineering	0.429	0.044	0.420	0.023
Social sciences, arts and humanities	0.483	0.035	0.455	0.016
Education	0.429	0.057	0.400	0.016
First degree:				
Medicine and related	0.595	0.022	0.577	0.016
Nursing	0.509	0.073	0.420	0.022
Bio sciences/agriculture	0.382	0.023	0.335	0.015
Other sciences, maths, computing	0.455	0.014	0.427	0.012
Engineering/technology	0.445	0.014	0.486	0.014
Social sciences, bus. admin, library studies	0.470	0.010	0.428	0.008
Languages	0.442	0.019	0.337	0.017
Humanities	0.335	0.021	0.264	0.020
Arts	0.280	0.025	0.199	0.017
Education	0.429	0.020	0.359	0.016
'A' levels or equivalent	0.195	0.008	0.087	0.006
'O' level and equivalent	0.041	0.004	-0.009	0.004
	N = 65,148		N = 75,284	1
	Adj. $R^2 = 0.6$	587	Adj. $R^2 = 0$	.633

#### Table 5:Earnings and subject of qualification, 1994/95 and 2009/10

Source: Labour Force Surveys, composite files for 1994/95 and 2009/10.

All earnings equations include the following variables (where relevant):

age (single years); age<sup>2</sup>; gender; young children present in household (0-1 years, 2-4 years, 5-9 years, 10-14 years); tenure in current job (< 1 year; 1-2 years; 2-3 years; 3-6 years; > 6 years); ethnicity (White; Mixed; Asian; Black; Chinese; Other); area of residence (Inner London, Outer London, Rest of SE, Rest of UK exc. N Ireland, N. Ireland); self-declared part time working; usual weekly hours worked (0-10; 11-20; 21-30; 31-40; 41-50; 51-60; 61+); respondent was proxy.

Men and women (22-34 years)	10% 0	quantile	25%	quantile	50%	quantile	75%	quantile	90%	quantile
1994/95	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error	Coeff.	Std. error
PhD	0.587	0.052	0.500	0.039	0.375	0.037	0.279	0.040	0.239	0.062
Master's degree	0.511	0.035	0.471	0.026	0.444	0.024	0.356	0.027	0.265	0.042
Other postgraduate qualification	0.454	0.048	0.424	0.035	0.375	0.033	0.307	0.036	0.307	0.057
First degree	0.394	0.013	0.390	0.009	0.354	0.009	0.285	0.010	0.237	0.016
'A' levels or equivalent	0.182	0.016	0.150	0.012	0.136	0.011	0.106	0.012	0.096	0.019
'O' level and equivalent	0.067	0.009	0.050	0.007	0.017	0.006	-0.033	0.007	-0.055	0.011
	Pseudo R <sup>2</sup> = 0.534		Pseudo $R^2 = 0.492$		Pseudo F	$R^2 = 0.422$	Pseudo $R^2 = 0.362$		Pseudo F	<sup>2</sup> = 0.315
	N = 24,219									
2009/10										
PhD	0.600	0.045	0.570	0.029	0.498	0.026	0.413	0.034	0.415	0.039
Master's degree	0.315	0.022	0.408	0.014	0.404	0.013	0.369	0.017	0.357	0.019
Other postgraduate qualification	0.460	0.025	0.446	0.016	0.385	0.015	0.308	0.019	0.253	0.022
First degree	0.256	0.013	0.308	0.008	0.322	0.008	0.289	0.010	0.286	0.012
'A' levels or equivalent	0.097	0.015	0.087	0.010	0.082	0.009	0.053	0.011	0.039	0.013
'O' level and equivalent	0.029	0.013	0.027	0.009	0.006	0.008	-0.021	0.010	-0.043	0.012
	Pseudo R <sup>2</sup>	= 0.473	Pseudo F	$R^2 = 0.461$	Pseudo R <sup>2</sup> = 0.421		Pseudo R <sup>2</sup> = 0.376		Pseudo $R^2 = 0.341$	
	N = 20,79	7								

#### Table 6: Earnings and qualifications, quantile regression estimates 1994/95 and 2009/10

Source: Labour Force Surveys, composite files for 1994/95 and 2009/10.

All earnings equations include the following variables (where relevant):

age (single years); age<sup>2</sup>; gender; young children present in household (0-1 years, 2-4 years, 5-9 years, 10-14 years); tenure in current job (< 1 year; 1-2 years; 2-3 years; 3-6 years); ethnicity (White; Mixed; Asian; Black; Chinese; Other); area of residence (Inner London, Outer London, Rest of SE, Rest of UK exc. N Ireland, N. Ireland); self-declared part time working; usual weekly hours worked (0-10; 11-20; 21-30; 31-40; 41-50; 51-60; 61+); respondent was proxy.

Next we examine how the returns to higher education vary across the earnings distribution. We have observed in Table 1 the increase in the proportion of graduates in non-graduate jobs in sectors which are traditionally associated with lower than average earnings (retailing, hotels, restaurants, land transport. The regression results in Table 5 show a declining return in subjects such as languages, humanities and the arts – degrees which have been shown previously to be associated with lower than average returns for a degree. These findings suggest that the distribution of economic returns to a first degree might vary with earning. Table 6 shows the estimated coefficients on qualification at various points in the distribution of earnings, obtained via quantile regression. At the median of the distribution these results compare well with the mean regression results for 22-24 year olds shown in the lower half of Table 4. For men and women the estimated returns to higher education qualifications at the mean and the median are very close, except for the estimated return on a PhD where the difference for men widens by approximately 5% points. This reflects the impact on the mean as opposed to the median regression results of high earning outliers in the earnings distribution.

Table 7 summarises the changing pattern of returns to a first degree compared with 'A' level as the highest qualification. Scanning across the earnings distribution we note that the return to a first degree compared with 'A' levels as the highest qualification ranges from 21 per cent (10% quantile), to 14% (90% quantile). The lower rate of return at the higher end of the distribution arises not because of a lower coefficient associated with a first degree at this point in the distribution, but because of the higher returns those whose highest qualification was 'A' levels in 1994/95. The pattern of change across the distribution from 1994/95 to 2009/10 is interesting. At the lowest end of the earning distribution we note that the return to a first degree compared with 'A' level has fallen markedly, from 21 per cent to 16 per cent. Across the rest of the distribution, the returns have remained fairly constant, increasing at the top end of the distribution as the premium associated with having 'A' levels as the highest qualification falls away in 2009/10.

## Table 7:Comparison of the returns to a first degree compared with 'A' levels as highest<br/>qualification: mean versus quantile regression estimates

Estimated economic return for a first degree compared with 'A' levels	Regre: indi	ssion estim	ates at tile:	Mean regression estimates	Regression estimates at indicated quantile:		
	.10	.25	.50		.75	.90	
Men and women aged 22-34 years, 1994/95	21%	24%	22%	20%	18%	14%	
Men and women aged 22-34 years, 2009/10	16%	22%	24%	23%	23%	25%	

Source: Table 4 and Table 6.

#### Inter-generational social mobility and higher education

Prior to the period of expansion in the mid-1980s participation in higher education in the UK period was very much the preserve of the higher social groups. Evidence published in 1963 shows that, in 1962, 71 per cent of first degree students were from non-manual backgrounds, with 25 per cent were from households where the father was in a manual occupation<sup>8</sup>. This same source indicates that there had been little change in this division in the preceding 30 years. Expansion of higher education was seen, therefore, as a vehicle to help break down the social class structure of British society, providing greater social and economic opportunities for those who originate from less privileged backgrounds<sup>9</sup>.

While policy makers continue to stress the ways in which access to higher education can be used as an instrument of social justice, particularly via its potential to promote inter and intra-generational mobility, economists and sociologists have provided research evidence which raises important questions and indicates the poverty of existing data resources to pursue this issue. An example of this arises with the cross-cohort analysis of intergenerational earnings mobility based upon the 1958 and 1970 birth cohorts. Blanden *et al.* (2002, 2004) show the decline in interquartile earnings mobility, defined as the position of a son in relation to the parental distribution of earnings when aged 16 compared with position of same individual in distribution of earnings reported by all individuals at ages 30/33. Goldthorpe and Jackson (2007), using these same data sources and time points, show that intergenerational social mobility (measured as movement between class positions) shows little evidence of decline. As Goldthorpe and Jackson note, the claim made by economists – that a general decline in social mobility associates with the rise in higher education – cannot be sustained on the basis of these two studies which are only 12 years apart and with observations taken prior to a significant increase in the flow of new graduates onto the labour market<sup>10</sup>.

The evidence currently available to guide policy on fair access to higher education is also difficult to interpret either because of problems relating to the operationalisation of the concepts of social class or by the use of poor quality proxy indicators for measures of social class. Examples include the development of indicators of trends in participation by socio-economic groups (DBIS 2009; Cabinet Office 2009), which groups small employers and own account workers with lower supervisory and technical, routine and semi-routine occupations. The inclusion of occupations such as hotel and accommodation managers and restaurant and catering managers in this 'less advantaged' aggregate group of social class categories sits at odds with the classification of graduate occupations we use in this paper, which places these categories in the category 'new graduate occupations'. Furthermore, existing indicators of social class are derived from information on parental occupations obtained during the process of applying to higher education by prospective students. Currently, social class cannot be determined for 22 per cent of applicants and, for those providing relevant information, the quality of the information often precludes accurate coding. Proxy measures are sometimes employed, in particular a measure based upon residential classification, but this again introduces further questions about the validity of the resulting indicators (Kelly and Cook, 2007).

<sup>&</sup>lt;sup>8</sup> For a more detailed analysis of changes in the social backgrounds of undergraduates, see Bolton (2010).

<sup>&</sup>lt;sup>9</sup> See, for example *Higher Ambitions. The future of universities in a knowledge economy* (DBIS 2009), also known as the 'Milburn Report'.

<sup>&</sup>lt;sup>10</sup> Further work on this apparent anomaly by Blanden *et al.* (2008) using the same data sources suggests that there are significant downward trends in intergenerational earnings mobility within social classes.

Here we make use of a new and current resource. The UK Household Longitudinal Study (known as *Understanding Society*) is the successor to the *British Household Panel Study*. It commenced in 2008 and is currently the world's largest household panel study. Like its predecessor, it collects information on the respondent's social background at age 14, but from a much larger sample of households across the UK. Information from this source is presently only available for the first half of wave 1 of the new survey. However, this provides sufficient information for a broad analysis of changes in the social background of recent and older graduates.

Two age cohorts are defined from the *Understanding Society* survey data. These are 22 - 34 years and 37 - 49 years; defined to match the age groups selected for the preceding analyses based on Labour Force Survey data and the 15 year period over which the analysis has been conducted. For each age group we distinguish between those who stated that their highest qualification was a first degree or higher and those without such a high level qualification. For the younger age group (22 - 34 years), the proportion stating that they have a first degree or higher in Understanding Society is 34.5 per cent. This compares well with the proportion in the combined Labour Force Survey files for 2009/10 at 34.9 per cent. For the older cohort (37 - 49 years) these proportions are 26.0 per cent in Understanding Society and 25.4 in the combined Labour Force Survey files for each period.

The use of two age cohorts to approximate the passage of time (15 years) takes no account of differential migration that has taken place over this period nor, more importantly, does it take account of the fact that those aged 22 - 34 years in 1994/5 will have acquired further high level qualifications during the 15 years that passes before they are members of the later age group. We note that the 22 - 34 year age group as defined in the 1994/95 Labour Force Surveys shows the proportion holding a first degree or higher as 21.0 per cent, significantly lower than the 26.0 per cent recorded in the 37 - 49 age group in the *Understanding Society* survey data in 2008.

Figure 6 shows the socio-economic backgrounds of degree and non-degree holders for these two age groups. Socio-economic background is defined via the National Statistics Socio-economic Classification (NS-SEC) based on the latest version of the UK Standard Occupational Classification (SOC2010).<sup>11</sup> Of the seven broad socio-economic classes, we group three in terms of the lower likelihood that people with such a parental social background will participate in higher education. These are 'Lower supervisory and technical occupations', 'Semi-routine occupations' and 'Routine occupations'. Among the younger age cohort the proportion of degree holders from these social background categories in 2008 is 24.1 per cent, although these categories account for 40.4 per cent of all respondents in the 22 – 34 age group. In the older age cohort, these proportions are 31.5 and 47.4 per cent respectively. In interpreting these figures, we must bear in mind that the older age cohort is likely to have gained more degree-level qualifications over the 15 year period separating these age groups, possibly by as much as 5 per cent. This accounts for much of the apparent 'decline' in the proportions holding degree level qualifications between these pseudo cohorts. We find a significant absolute difference between these proportions that is virtually constant. In other words, there is little evidence to suggest that the expansion of higher education has favoured those social categories which have low rates of participation in higher education.

<sup>&</sup>lt;sup>11</sup> For further details about these classifications and the look-up tables translating occupational information into socio-economic classes, see <u>http://www.ons.gov.uk/about-statistics/classifications/current/soc2010/soc2010-volume-3-ns-sec--rebased-on-soc2010--user-manual/index.html</u>



# Figure 6: Degree level qualifications by parental social class, respondents aged 22-34 years and 37-49 years

Source: UK Households Longitudinal Study, Wave 1, Year 1

#### Conclusions

We show that, over the past 15 years and through a period of growth and recession, the UK labour market has undergone occupational and industrial and restructuring which has maintained a strong demand for highly qualified young people, particularly those with a degree. This has taken place against a background of demographic change which has seen the population of 22-34 year olds declining in the UK over the same period.

Our analysis of the impact of this restructuring on earnings shows that, on average, the real earnings-premium for a degree among young people has held virtually constant over the 15 year period from 1994/95 to 2009/10. The stability of this return is remarkable given the scale of the expansion of higher education that took place through the 1990s and the subsequent increase in the proportion of young degree holders in the labour market. However, the average experience masks some significant distributional effects. We note that certain sectors show a large increase in the proportion of degree holders who are working in jobs we define as non-graduate jobs. These are sectorally specific, being concentrated mainly in retailing, hotels, restaurants and land transport. More graduates than ever before can be found in non-graduate jobs in these sectors. Given that these sectors are also associated with relatively low paid jobs, this could impact significantly upon the estimated economic return for a degree at the lower end of the earnings distribution. If there is also a corresponding higher than average return for those with jobs which demand graduate level skills and knowledge and with gross weekly earning towards the upper end of the earnings distribution, the mean return could remain constant. Analysis of the returns to a first degree at different points in the earnings distribution shows clearly that these returns have not been gained equally. Graduates at the bottom end of the earnings distribution have seen a decline in their relative earnings premium, from 21 to 16 per cent. This has been offset by a rise in the rate of return at the top end of the earnings distribution, from 14 to 25 per cent. In the earlier period, young people with 'A' levels as their highest qualification were able to command high salaries. It appears that this is no longer the case in 2009/10.

As an instrument of social engineering, we use recent information on inter-generational social positions to investigate the impact that the expansion of higher education has had on social mobility. While the expansion of higher education has benefited all socio-economic categories, the proportion of young people with degrees coming from social background categories which have traditionally had low rates of participation in higher education is virtually unchanged over the last fifteen years.

We are aware that the analysis we have undertaken is partial in nature. For instance, if more graduates are now found in non-graduate jobs in specific sectors, what is the prospect for those non-graduates who would have traditionally taken such jobs? Also, although our evidence is the most up-to-date currently available, recent evidence may be little guide to the future. If the UK economy continues to stagnate while the output of graduates from higher education institutions continues to grow, the decline in the return to a degree, currently located within the very lowest part of the earnings distribution, may become more widespread throughout the distribution.

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#### Appendix

#### Data sources and definitions

The data required for the analyses presented in Tables 1 – 7 were obtained by merging 8 quarterly Labour Force Survey files from quarters 1 to 4 for 1994 and quarters 1 to 4 for 1995 and 8 files from quarters 1 to 4 for 2009 and quarters 1 to 4 for 2010. Labour Force Survey files were provided courtesy of the UK Economic and Social Data Service. Respondents remain in the survey for five quarters. Before merging these files, all respondents who appeared more than once were removed. For the 1994/95 surveys, occupations were coded to the 1990 Standard Occupational Classification. For 2009/10, coding was performed to the 2000 Standard occupational Classification. In an earlier paper we show how these two classifications can be mapped to a common classification of jobs for analysis of the graduate labour market. Full details of these mappings and their validation are given in <a href="http://www2.warwick.ac.uk/fac/soc/ier/research/completed/7yrs2/rp6.pdf">http://www2.warwick.ac.uk/fac/soc/ier/research/completed/7yrs2/rp6.pdf</a>

Table 3 maps sectors of economic activity to innovation categories. This was performed with reference to the *2009 UK Innovation Survey*, covering the period 2006 to 2008. Details of the survey methodology, sampling methods and sample size, definitions of concepts and the questionnaire are given at <a href="http://www.bis.gov.uk/assets/biscore/science/docs/u/10-p106-uk-innovation-survey-2009-statistical-annex">http://www.bis.gov.uk/assets/biscore/science/docs/u/10-p106-uk-innovation-survey-2009-statistical-annex</a>

The mapping to innovation categories was performed with reference to sectoral information in this survey on the percentage of organisations defined as 'wider or strategic innovators'. 'Wider or strategic innovators' are 'organisations which have introduced new and significantly improved forms of organisation, business structures or practices aimed at improving internal efficiency or effectiveness of approaching markets and customers' (see above referenced statistical annex). High innovation sectors are those sectors which have more than 30% of organisations recorded in this category. Medium innovation sectors have 20-30 % of organisations recorded in this category. Low innovation sectors have less than 20% of organisations in this category. The UK Innovation Survey does not cover sectors 1 - 4 and 52 - 60. These have been classified as 'low' and 'medium' respectively on the basis of information contained in a detailed cross classification of Labour Force Survey text descriptions of occupations and industries for January to March 2006.

Sectors were also grouped by the proportion of graduates in their total workforce in 1994/95. The table below shows how the six grouped categories of graduate intensity were defined. Table 1 uses a broad sectoral classification. The mapping from the 60 sectors recorded in the Labour Force Survey to these broad sectors is also shown in the table below (with the associated key table).

Sector (Standard Industrial Classification 1992)	Innovation activity	Graduate intensity in 1994/95	Broad sector of activity
01 Agriculture, hunting, etc.	Low	Less than 5%	1
02 Forestry, logging etc.	Low	> 15% and < 20%	1
03 Fishing, fish farms, hatcheries etc.	Low	Less than 5%	1
04 Coal, lignite mining, peat extraction	Low	> 5% and < 10%	2
05 Oil, gas extraction etc. (not surveying)	Low	> 20% and < 25%	2
07 Mining of metal ores	Low	> 20% and < 25%	2
08 Other mining, quarrying	Low	> 5% and < 10%	2
09 Food, beverage manufacture	High	> 5% and < 10%	3
10 Tobacco products manufacture	High	> 10% and < 15%	3
11Textile manufacture	High	> 5% and < 10%	3

12 Clothing, fur manufacture	High	Less than 5%	3
13 Leather, leather goods manufacture	High	Less than 5%	3
14 Wood, straw, cork, wood prods(not furniture)	High	Less than 5%	3
15 Pulp, paper, paper products manufacture	High	> 5% and < 10%	3
16 Printing, publishing, recorded media	High	> 10% and < 15%	3
17 Coke, petrol products, nuclear fuel manufacture	Medium	> 20% and < 25%	3
18 Chemicals, chemical products manufacture	Medium	> 20% and < 25%	3
19 Rubber, plastic products manufacture	Medium	> 5% and < 10%	3
20 Other non-metallic products manufacture	Medium	> 5% and < 10%	3
21 Basic metals manufacture	Medium	> 5% and < 10%	3
22 Fabric-metal prod (not machines, equipment) manufacture	Medium	Less than 5%	3
23 Machinery equipment manufacture	Medium	> 5% and < 10%	3
24 Office machine, computer manufacture	High	> 25%	3
25 Electrical machinery, equipment manufacture	High	> 10% and < 15%	3
26 Radio, TV, communication equipment manufacture	High	> 10% and < 15%	3
27 Medical, precision, optical equipment man	High	> 15% and < 20%	3
28 Motor vehicles, trailer, etc. manufacture	High	> 5% and < 10%	3
29 Other transport equipment manufacture	High	> 10% and < 15%	3
30 Furniture etc. manufacture	Medium	> 5% and < 10%	3
31 Recycling	Medium	> 5% and < 10%	3
32 Electricity, gas, steam etc. supply	High	> 15% and < 20%	4
33 Water collection, purification, supply etc.	High	> 25%	4
34 Construction	Medium	> 5% and < 10%	5
35 Sales of motor vehicles, parts, fuel etc.	Medium	Less than 5%	6
36 Wholesale, commission trade (fee, contract)	Medium	> 5% and < 10%	6
37 Retail trade (not motor vehicles) repairs	Low	> 5% and < 10%	6
38 Hotels, restaurants	Low	Less than 5%	7
39 Transport by land, pipeline	Medium	Less than 5%	8
40 Water transport	Medium	> 5% and < 10%	9
41 Air transport	Medium	> 15% and < 20%	9
42 Auxiliary transport activities, travel agents	Medium	> 5% and < 10%	9
43 Post, telecommunications	Medium	> 5% and < 10%	9
44 Financial intermediaries(not insurance, pensions)	Medium	> 15% and < 20%	10
45 Insurance, pensions (not Social Security)	Medium	> 15% and < 20%	10
46 Other financial (not insurance, pensions)	Medium	> 15% and < 20%	10
47 Real estate activities	Medium	> 20% and < 25%	11
48 Personal, household, machinery and equipment rental	Medium	> 5% and < 10%	12
49 Computer, related activities	High	> 25%	13
50 Research, development	High	> 25%	13
51 Other business activities	High	> 25%	13
52 Public admin, defence, social security	Medium	> 15% and < 20%	14
53 Education	Medium	> 25%	15
54 Health, social work	Medium	> 10% and < 15%	16
55 Sanitation, sewage, refuse disposal etc.	Medium	> 10% and < 15%	17
56 Activities of membership organisations	Medium	> 25%	17
57 Recreational, cultural, sporting activities	Medium	> 20% and < 25%	17
58 Other service activities	Medium	Less than 5%	17

59 Private households with employed persons	Medium	Less than 5%	17
60 Extra-territorial organisations etc.	Medium	> 15% and < 20%	17

#### Index to broad sector classification

- 1 Agriculture/fishing
- 2 Mining and quarrying
- 3 Manufacturing
- 4 Electricity, gas and water
- 5 Construction
- 6 Wholesale/retail trade
- 7 Hotels and restaurants
- 8 Land transport
- 9 Water and air transport and related
- 10 Financial intermediation
- 11 Real estate
- 12 Equipment rentals
- 13 Other business activities including research
- 14 Public admin and defence
- 15 Education
- 16 Health and social work
- 17 Other activities

### Means of variables in the regression equations (Tables 4, 5 and 6)

	1994/95 all ages	1994/ 95 all ages, males	1994/95 all ages, females	2009/10 all ages	2009/10 all ages, males	2009/10 all ages, females	1994/95, 22-34 years	1994/95, 22-34 years, males	1994/95, 22-34 years, females	2009/10, 22-34 years	2009/10, 22-34 years, males	2009/10, 22-34 years, females
Female	0.51			0.52			0.50			0.52		
Age	39.8	39.9	39.8	42.8	43.0	42.6	28.3	28.4	28.2	28.3	28.3	28.3
Household												
Children aged 0-	0.07	0.09	0.06	0.08	0.09	0.07	0.14	0.16	0.13	0.17	0.16	0.18
1 yrs. in nome Children aged 2-	0.11	0.13	0.10	0.10	0.11	0.10	0.20	0.20	0.20	0.17	0.16	0.19
4 yrs. in home Children aged 5-	0.17	0.17	0.16	0.15	0.15	0.15	0.19	0.16	0.21	0.13	0.10	0.16
9 yrs. in home Children aged 10-15 yrs. in	0.17	0.17	0.10	0.13	0.13	0.13	0.08	0.10	0.21	0.13	0.10	0.10
home Solf declared	0.20	0.10	0122	0.125	0.17	0.20	0.00	0.00	0.10	0.07	0.00	0.00
part time	0.25	0.04	0.45	0.26	0.09	0.41	0.18	0.03	0.33	0.20	0.07	0.31
Ethnicity:												
White	0.95	0.95	0.95	0.92	0.92	0.93	0.94	0.95	0.94	0.89	0.89	0.90
Mixed	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01
Asian/Asian British	0.01	0.02	0.01	0.04	0.04	0.03	0.02	0.02	0.02	0.06	0.06	0.05
Black/Black British	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02
Chinese	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Other	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01
Not stated	0.01	0.01	0.02	0.00	0.00	0.00	0.02	0.01	0.02	0.00	0.00	0.00
Highest												
PhD	0.01	0.01	0.00	0.01	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.01
Master's degree	0.02	0.02	0.01	0.05	0.05	0.04	0.01	0.02	0.01	0.06	0.06	0.05
Other												
postgraduate qualification	0.01	0.01	0.01	0.03	0.03	0.04	0.01	0.01	0.01	0.04	0.03	0.05
First degree	0.12	0.15	0.10	0.18	0.18	0.18	0.15	0.15	0.14	0.26	0.24	0.28
equivalent	0.06	0.06	0.06	0.11	0.10	0.12	0.08	0.08	0.08	0.16	0.16	0.16
equivalent Region of residence:	0.37	0.40	0.34	0.31	0.32	0.29	0.43	0.43	0.43	0.25	0.26	0.23
Inner London	0.68	0.68	0.68	0.70	0.69	0.70	0.68	0.68	0.68	0.68	0.69	0.68
Outer London	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.05	0.05
Rest of SE	0.07	0.07	0.07	0.06	0.06	0.06	0.08	0.08	0.08	0.06	0.06	0.06
Rest of UK (exc. NI)	0.20	0.20	0.20	0.19	0.19	0.19	0.19	0.19	0.19	0.18	0.18	0.17
N Ireland	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.01	0.02	0.03	0.03	0.03
Tenure in current job												
< 1 year	0.15	0.13	0.16	0.12	0.12	0.12	0.21	0.19	0.23	0.20	0.20	0.21
1-2 years	0.09	0.08	0.10	0.10	0.10	0.10	0.13	0.12	0.14	0.16	0.16	0.16
2-3 years	0.07	0.06	0.08	0.09	0.09	0.09	0.09	0.08	0.10	0.13	0.13	0.13
3-6 years	0.20	0.18	0.22	0.20	0.20	0.21	0.24	0.24	0.24	0.26	0.26	0.26
> 6 years	0.49	0.54	0.43	0.49	0.50	0.48	0.33	0.37	0.29	0.24	0.25	0.23
not known/not stated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Proxy response Usual hours worked:	0.24	0.32	0.17	0.27	0.33	0.22	0.25	0.31	0.18	0.31	0.36	0.26
0-10	0.05	0.01	0.09	0.03	0.01	0.05	0.04	0.01	0.07	0.02	0.01	0.03
11-20	0.11	0.02	0.19	0.11	0.04	0.17	0.08	0.01	0.15	0.09	0.04	0.14
21-30	0.09	0.02	0.16	0.12	0.04	0.20	0.06	0.01	0.11	0.09	0.04	0.15

31-40	0.36	0.34	0.37	0.41	0.43	0.39	0.39	0.35	0.44	0.46	0.47	0.44	
41-50	0.29	0.42	0.16	0.24	0.34	0.15	0.31	0.43	0.20	0.25	0.33	0.18	
51-60	0.08	0.14	0.03	0.06	0.10	0.03	0.08	0.13	0.03	0.06	0.08	0.04	
61+	0.03	0.05	0.01	0.02	0.03	0.01	0.03	0.05	0.01	0.02	0.02	0.01	
not known/not stated	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	

## Means of additional variables in regressions shown in Table 5

Highest qualification and subject	All employed persons, 1994/95	All employed persons, 2009/10
PhD		
Medicine and related	0.001	0.002
Science and engineering	0.005	0.008
Social sciences, arts and humanities	0.002	0.003
Education	0.000	0.000
Masters		
Medicine and related	0.001	0.003
Science and engineering	0.005	0.016
Social sciences, arts and humanities	0.009	0.024
Education	0.002	0.003
Other postgraduate qualification		
Medicine and related	0.001	0.002
Science and engineering	0.002	0.006
Social sciences, arts and humanities	0.003	0.012
Education	0.001	0.013
First degree		
Medicine and related	0.007	0.012
Nursing	0.001	0.006
Bio sciences/agriculture	0.006	0.014
Other sciences, maths, computing	0.018	0.024
Engineering/technology	0.018	0.017
Social sciences, bus. admin, library studies	0.036	0.062
Languages	0.010	0.011
Humanities	0.008	0.008
Arts	0.005	0.011
Education	0.009	0.012
School level qualifications		
'A' levels or equivalent	0.056	0.112
'O' level and equivalent	0.368	0.308