Graduate returns, degree class premia and higher education expansion in the UK

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Abstract

We investigate the extent to which graduate returns vary according to the class of degree achieved by UK university students. Using a variety of complementary datasets for individuals born in Britain around 1970 and aged between 30 and 40, we estimate an hourly wage premium for a 'good' (relative to a 'lower') class of degree of 7% to 9%. Our estimate of the premium for a 'lower' degree class (relative to A-levels) of 11% at age 30 indicates a wide spread around the average graduate premium according to academic achievement. We also estimate the premium for a good relative to a lower degree for different cohorts (those born between the mid-1960s and early-1980s and with wages observed up to 2013) and find evidence that the premium has risen over time with the proportion of the cohort participating in higher education.

JEL Classification: J31, J24, I23, D82

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1. Introduction

Estimates of returns to education tend to measure education either by the number of years of schooling or by the level of qualification achieved. There is little analysis of how returns vary according to the level of academic achievement (for example, by grade point average) *given* the level of qualification or years of schooling. This is particularly surprising given that employers often recruit at specific educational levels and, in ranking candidates, are likely to consider grades or scores achieved. In the current paper, we examine evidence on the extent to which graduate returns in the UK vary the class of degree they achieve, where degree classification has four main categories: first (I), upper second (II.1), lower second (II.2) and third (III) class degrees.[1] Students commonly perceive that post-university career prospects can be affected by class of degree, consistent with the Association of Graduate Recruiters report in 2010 that 78% of employers filtered out applicants who had not achieved at least an upper second class degree (see AGR, 2010).

Our analysis begins with estimates of wage returns to different classes of degree based on the 1970 Birth Cohort Study (BCS70). This dataset is rich in information on personal characteristics such as ability scores, personality traits and family background. Following the analysis of the similarly structured NCDS data for the 1958 birth cohort by Blundell *et al*. (2000, 2005), we use a proxying and matching approach to produce estimates of the return to a degree relative to a control group of individuals who did not attend university but with A-level qualifications which would have enabled them to do so.[2] Our BCS70 analysis distinguishes between graduates with good and with lower degree classes to derive an estimate of the premium for a good degree. This binary distinction is based in part on ensuring reasonable cell sizes, but also coincides with the potentially important difference between the award of an upper rather than a lower second class degree. Having obtained estimates on the premium for a good degree based on the BCS70 birth cohort data, we replicate our analysis as closely as possible on all available datasets which contain information on class of degree, with a focus on cohorts born in, or close to, 1970 for comparability with the BCS70 analysis. Such datasets include: the Labour Force Survey (LFS); administrative data on entire cohorts of university graduates from the Universities Student Records (USR) and its successor, the Higher Education Statistics Agency (HESA); and Graduate Cohort Surveys (GCS). We see these datasets as providing complementary evidence given their differing properties. Among other results, we estimate that the wage premium for a lower degree class over A-levels is around 11% while that for a good degree relative to a lower degree class is *circa* 7%, implying substantial variation by academic performance around an average graduate wage premium of approximately 15%.

A second focus of the paper concerns the extent to which any premium associated with the award of a good degree class has changed over time with changes in both higher education (HE) participation rates and in graduate labour market conditions. We note that the

[1] Below these are Pass and Ordinary degree classes, which we label collectively as 'Other'. Firsts and upper seconds can be grouped into 'Good' degree class awards while 'Lower' degree class awards consist of lower seconds and below.
[2] A-levels taken in the final year of secondary school in England and Wales are the typical qualification on which admission into university is based.

participation rate of young people in HE in the UK – having been stable at about 13-14% from 1970 through to the mid-late 1980s – rose rapidly to reach 20% in 1990 and 30% in 1995, since when it broadly stabilised at about 33%. A long-standing literature in the US addresses the question of whether expansion-induced changes in ability composition impact on educational returns (see Blackburn and Neumark, 1991). Walker and Zhu (2008) find that during the period of rapid expansion in UK HE participation, the return to a degree did not change on average, but did increase for male graduates in the top quartile of the wage distribution while falling for those in the bottom quartile, interpreting this as consistent with expansion-induced changes in the composition of unobserved ability. Our results are consistent with this as we find the pay premium for a good degree to be stable until the early 1990s, from when it doubled in magnitude as the higher participation cohorts entered the labour market. We also discuss the possible influence of other factors on the good degree premium, including skill-biased technological change and the tightness of the graduate labour market. We also note that the proportion of good degrees awarded has been increasing over time (from 38% in 1985 to 54% in 1998) with potential consequences for degree class premia.

2. Is there a premium for a good degree?

Graduates' earnings might vary with academic performance at university either because employers treat performance as a signal of potential productivity or because degree class is a measure of human capital acquired. Suppose the econometrician estimates that the premium associated with academic achievement at university is very high. How might we interpret such a finding? Under a signalling approach with employer learning (see, for example, Altonji and Pierret (2001), Farber and Gibbons (1996) and Lange (2007)), we might view the premium as reflecting the *employer's* lack of information about the worker's productivity at the point of recruitment and expect that the estimated premium would diminish with the worker's tenure as the employer acquires information on worker productivity. Under a human capital approach, we would interpret the premium as reflecting a greater acquisition of human capital by the graduate and would want to be sure that there was no ability bias in the estimated premium reflecting the *econometrician's* lack of information on the graduate's ability or productivity. Under either approach, evidence that the premium is high is likely to be interpreted as indicating substantial variation in post-university outcomes by degree class: even if the premium is a consequence of signalling, students might be concerned that failure to obtain a good degree might reduce their long term labour market prospects.[3] If potential university applicants expect that there is wide variation in graduate earnings according to academic performance, then this might deter applications – especially among individuals less confident of their capacity to perform well at university. In this context, we note evidence from Smith and Naylor (2001) that university performance differs by social class of family background.

Arcidiacono *et al*. (2010) provide evidence for the US that while signalling in an employer learning/statistical discrimination (EL-SD) approach might be relevant for understanding

[3] If employers do not learn (see, for example, Habermatz, 2014), then signals can have long run effects.

returns to high school graduates, it is less applicable for college graduates as employers have considerable information about the latter, for whom the grade point average together with transcripts and other information, such as standardised test scores, reveal rather than merely signal ability. This contrasts with traditional institutional features in the UK, where secondary school leavers receive certificates showing detailed information about performance in national examinations at ages 16 and 18 while university graduates receive relatively less finely calibrated measures. The argument is that signalling is likely to be more relevant in countries, like the UK, in which graduates receive and convey relatively limited information on their performance.[4]

Classification of degrees in the UK is based on performance in examinations and in any assessed coursework, typically in the final two years of the traditional 3-year degree course. Examinations are set and marked within each university at the subject level but classifications are intended to be broadly comparable across institutions through a system of moderation based on external examiners from other universities. External examiners are involved at all stages of examination and, typically, are regarded as decisive at the point of classification in final examination boards. Nonetheless, it cannot be assumed that there is absolute parity across institutions in degree classification and in our analysis we examine whether results are robust across universities.

There is no national dataset containing information on the underlying marks which form the basis for the class of degree awarded to the student. In our analysis, class of degree is the sole measure of student performance and so we cannot identify whether degree class acts simply as a proxy for performance or whether it operates as a signal of ability over and above underlying marks. In an important paper, Feng and Graetz (2013) adopt a regression discontinuity approach in which they exploit detailed information about students' course marks to compare early occupational earnings of those graduates who just make a particular degree class with those who just miss out.[5] We see our analysis as providing evidence complementary to the single-institution RD design of Feng and Graetz. Across the various datasets we investigate, we are able to exploit administrative data on full populations of UK university students, rich information on a particular birth cohort, and to observe personal earnings up to age 41. In the case of our birth cohort analysis, our empirical strategy will appeal to the richness of the information on individuals, including detailed data on ability measures and other personal and family characteristics.

2.1 Methodology

Our initial estimates of wage premia by class of degree awarded exploit BCS70 data on a cohort of babies born in the UK in a particular week in April 1970. Our approach is similar to that adopted by Blundell *et al.* (2000) in their analysis of the earlier NCDS data on the 1958 birth cohort in that we select all those individuals with at least one A-Level qualification and compare outcomes of individuals with HE qualifications with those of individuals who did

[4] There is a growing tendency in the UK for universities to issue more detailed transcripts, in part to conform with recent regulations regarding the production of Higher Education Achievement Reports for each student.
[5] See also Di Pietro (2010), who uses a RD approach to examine effects of degree class on employment outcomes.

not participate in HE despite having sufficient prior qualifications. Like Blundell *et al*., we rely on the richness of the longitudinal birth cohort data on personal and family characteristics, which we use to proxy typically unobserved characteristics. We estimate the equation:

$$\ln w_i = \beta' E_i + \gamma X_i + \varepsilon_i \tag{1}$$

where w_i is the real hourly wage rate, E_i is a set of dummy variables identifying the individual's level of educational attainment, and β measures the return to each level conditional on the exogenous observed characteristics, X_i. The approach assumes that conditioning on the observable characteristics is sufficient to control for the endogeneity of educational choices and outcomes. OLS estimation of (1) is unbiased if the mean independence condition is satisfied, that is, if $E(\varepsilon_i \mid E_i, X_i) = E(\varepsilon_i \mid X_i)$. Dearden (1999), using NCDS 1958 birth cohort data, reports that OLS produces reasonable estimates of the true causal effect of education on wages and given the similarities between NCDS and BCS70 data this gives us confidence in our own estimates. As we discuss alongside the respective analyses, the definitions of the dependent variable and of the vector E_i vary across the datasets employed.

2.2 Evidence from BCS70

Based on samples of respondents to follow-up surveys, we select individuals who obtained at least A-level qualifications and analyse the wage return to HE qualifications with respect to those individuals who did not complete any form of HE. The original cohort consists of 16,135 individuals. Of these, 4,315 have at least one A-level and 4,138 have two or more, of whom we have degree class and age 30 wage information on 3,046 individuals.

Table 1 presents OLS estimates of log-wage premia associated with both (i) a good degree class relative to a lower degree class and (ii) a lower degree class relative to A-levels. [6,7] The dependent variable is the natural logarithm of gross hourly wages at age 30. We present results for males and females combined as we cannot reject the hypothesis that the estimated premia are the same for men and women. Table 1 reports estimates from five specifications. The base case is Specification 1 which controls for a set of basic characteristics from both childhood (gender, ethnicity, region of residence) and adulthood (marital status and number of children). Specification 2 additionally includes parental income and social class, each parent's education, and each parent's interest in the child's education; Specification 3 also includes measures of ability at age 10, based on numerical and verbal British Ability Scores (BAS); Specification 4 adds BAS measures at age 5; and Specification 5 adds non-cognitive ability measures at ages 5 and 10, based on child, parent or teacher responses on dimensions of the child's self-esteem, locus of control, sociability, extroversion, hyperactivity, conscientiousness, anxiety and clumsiness. Specification 5 is motivated by the literature on

[6] We find that results are not sensitive to whether the default is an individual with one or with two or more A-levels.
[7] We have also produced estimates based on a control function approach and on propensity score matching and obtain results very similar to those based on OLS.

the impact of non-cognitive personality traits on both education and labour market outcomes: see Heckman *et al*. (2000), Carneiro *et al*. (2007) and Blanden *et al*. (2007).

Table 1: Estimated log wage premia (BCS70)

Specification:	1	2	3	4	5
Wages observed in year:	2000	2000	2000	2000	2000
Wages observed at age:	30	30	30	30	30
Good degree class premium	0.078	0.077	0.073	0.071	0.068
relative to lower degree class	(0.007)	(0.008)	(0.012)	(0.014)	(0.019)
Lower degree class premium	0.119	0.105	0.107	0.103	0.109
relative to 2+ A-levels	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Controls:					
Family background	*No*	*Yes*	*Yes*	*Yes*	*Yes*
Ability at age 10	*No*	*No*	*Yes*	*Yes*	*Yes*
Ability at age 5	*No*	*No*	*No*	*Yes*	*Yes*
Non-cognitive ability	*No*	*No*	*No*	*No*	*Yes*
Base controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
No. of Obs	3046	3046	3046	3046	3046
R^2	0.081	0.099	0.103	0.112	0.119

Notes: p-values reported in parentheses. Dependent variable is log gross hourly wage in 2000 prices. For details of controls, see text.

The estimated wage premium for a good degree relative to a lower degree class is 7.8% under Specification 1. As controls for family background, cognitive and non-cognitive abilities are successively included, the estimated good degree class premium falls monotonically to 6.8% under Specification 5, which is our preferred specification, with each set of controls jointly significant. The estimated return for a lower class of degree over two or more A-levels falls from 11.9% under Specification 1 to 10.9% under Specification 5. Hence, our estimates indicate that the wage premium for a good relative to a lower degree is approximately two-thirds that for a lower degree relative to A-level qualifications only and that the average estimated graduate wage premium at age 30 is approximately 15%.[8]

Blundell *et al*. (2000) found that the average returns to a degree were substantially higher for women (at *circa* 37%) than for men (*circa* 17%) for the 1958 birth cohort. In contrast, we find no significant gender differences in the effects of either degree class or of obtaining a degree on wages for the 1970 birth cohort: the estimated coefficients on the interaction of gender with good degree and with lower degree have p-values of 0.878 and 0.815, respectively. Changes in the composition of graduate and non-graduate females, associated with the large increase in female HE participation, might explain part of a falling graduate premium for women. Our analysis does not correct for endogenous selection into employment: as Dearden (1999) observes, there are no convincing candidates for instruments which might affect employment but not wages, even in the cohort data. For men, it is unlikely that this represents a serious problem for our estimates as the employment rate is 97% (at age 30) both for those with A-levels and for those who participated in HE. Among women, the

[8] Calculated by weighting the good degree and the lower degree class premia by the respective proportions with good and lower degrees.

employment rates at age 30 are 85% for those with A-levels only and 92% for those with a degree and so, potentially, our estimates for women of the overall returns to a degree might be downward biased. We note that this difference in employment rates by education level for women is less pronounced than that reported by Blundell *et al*. from NCDS, limiting the comparability of results for women across the cohorts.

It might be the case that not all returns to HE are realised by age 30. In supplementary analysis based on wages at age 38, we find the good degree premium to be broadly unchanged compared with results reported in Table 1. In contrast, the return to a lower class degree over the A-level default is double that at age 30. This is likely to be a result of both (i) the steeper age-earnings profile of graduates relative to non-graduates and (ii) the general increase in inequality occurring in the period 2000 to 2008. We note that the estimated coefficients at age 30 – with the higher response rate – are more precise than at age 38, where attrition causes the sample to fall from 3046 to 1642 observations. The estimated premium for a good degree is robust to analysis of those who responded at both 30 and 38.

Our principal finding from the BCS70 analysis, then, is that there is a statistically significant premium of approximately 7% at age 30 (and at age 38) associated with the award of a good degree relative to a lower degree class. The magnitude of this premium is perhaps surprising; it is not much smaller than the premium for a lower class degree over A-levels. We find no significant differences in the degree class premium across broad subject fields: an F-test for the joint significance of the interaction terms produces a p-value of 0.718 at age 30.[9]

A major attraction of the BSC70 data is the richness of the controls one can include. However, the number of graduates in the sample is relatively small and so it is valuable to compare results with those from alternative datasets. We have replicated our results as closely as possible using LFS data, a sample survey of UK households interviewed over 5 consecutive quarters, without further follow-up. We use a sample of those born between 1969 and 1971.[10] Information on class of degree is available only from the final quarter of 2005. We are able to produce estimates of degree class premia for those aged 36 to 41, based on the same approach as that adopted for the BCS70 data. Results, reported in Table A1 (see Appendix), show an estimated premium for a good degree relative to a lower degree class of 8.8% for individuals aged 36-41. This is close to the estimates obtained from BCS70, especially with that of 7.8% from the specification without controls for ability and family background (which are not available in the LFS data).[11] The estimated premium for a lower degree class relative to A-levels, at 18.8%, is intermediate between the estimates obtained from the BCS70 data for ages 30 and 38. As with the BCS70 data, we find no significant

[9] There are, however, significant differences across subjects in the return to a lower class degree over A-levels, consistent with a wider literature on how UK degree returns vary by subject of study. See, for example, Lissenburgh and Bryson (1996), Harkness and Machin (1999), Walker and Zhu (2001, 2011), Dolton and Makepeace (1990), Chevalier *et a*l. (2002), Belfield *et a*l. (1997), Battu *et a*l. (1999). We leave detailed analysis of this for further work.

[10] We aim for a data set as similar as possible to that based on BCS70 data but broaden out the year of birth to a 3-year window in order to have a reasonable sample size.

[11] Our estimates are also similar to the average of those reported in Walker and Zhu (2011).

differences either by gender or subject studied in the effects either of degree class or of obtaining a degree on wages.

2.3 Evidence from USR/FDS

All UK universities are required to maintain detailed administrative records on all of their students. Prior to 1994, these data were collected by the Universities Statistical Records (USR) and, subsequently, by the Higher Education Statistics Agency (HESA). In the year following graduation, all university leavers from all universities are sent a first destination survey (FDS). We are able to exploit data from the FDS linked to the USR (or HESA) administrative records of the entire cohort of UK university graduates for each of the leaving cohorts of 1985 through 1993 and of 1998. We focus on the 1991 graduating cohort and select those born between 1969 and 1971 for comparability with the BCS70 and LFS analyses.

The major advantage of analysing USR data is that they provide rich and high quality administrative data on complete populations of UK university students: the file of 1991 leavers contains information on all 83,932 degree-level students leaving university that year. Of these, 92% of UK-domiciled graduates responded to the FDS, of whom 49% were in employment. A total of 22,459 employed graduates identified their particular occupation and this is our selected sample. Cell sizes are much greater than with either BCS70 or LFS data.

A weakness of the USR/FDS data is that we do not observe individuals' earnings in the FDS files. Instead, we attribute to each graduate the average gender-specific life-time earnings of the occupation in which they are employed.[12] In Section 3, we argue that there are advantages of using this measure of earnings as a basis for comparisons over time. The use of life-time earnings means that we are mitigating potential problems of using initial career earnings and we believe that this is the better measure of employment quality. However, graduates will change occupation over time and degree class may well be correlated positively with the probability of transiting into a higher earning occupation. Similarly, given our use of median occupational earnings, we do not capture intra-occupational differences in earnings across graduates. These differences are unlikely to be randomly distributed: potential correlation between intra-occupational earnings and degree class is likely to be positive. Hence, we interpret our results as lower-bound estimates of the effects of degree class on graduates' earnings. Table 2 presents estimates of log-earnings premia, based on gender-specific median occupational earnings data, for a good degree over a lower degree.[13]

[12] From FDS data, we know the graduate's occupation at the 4-digit SOC level and match to this occupational earnings information from the Labour Force Survey at the 3-digit level: cell sizes are too sparse at the 4-digit level. Feng and Graetz (2013) adopt a similar earnings measure.

[13] We have also estimated a multinomial logit model of first destination outcomes based on: employment; further study; unemployment or inactivity; and non-response. Correcting the occupational earnings equation for possible self-selection, we find that the p-values on the correlation term are not significant even at the 10% level. Hence, reported results are from OLS earnings regressions.

Table 2: Estimated log-earnings premia (USR91, graduate cohort), birth cohort 1969-1971

Earnings observed at:	1992	1992
Earnings observed at age:	21-23	21-23
Good degree class premium	0.046	0.043
relative to lower degree class	(0.000)	(0.000)
Ability and background controls	*No*	*Yes*
Other controls	*Yes*	*Yes*
No. of Obs.	22,459	22,459
R^2	0.334	0.336

Notes: p-values reported in parentheses. Dependent variable is log of median occupational earnings. Ability controls include detailed pre-university qualifications. Background controls include social class of parents and school type. Other controls include gender, marital status, university attended and type of degree course.

The results reported in Table 2 show an estimate of 4.6% for the good degree class occupational earnings premium, or 4.3% when controls for prior qualifications and family background are included. Again we find no significant variation in the estimated coefficients for a good degree by subject studied: the p-value for the joint significance of the interaction between degree class and broad subject area is 0.391. We conclude that there is further corroborating evidence of a statistically significant premium associated with the award of a good degree class to graduates born in *circa* 1970.

The USR-based estimates of 4.3% to 4.6% are lower than the estimates of 6.9% to 8.7% from the BCS70 and LFS datasets, but this difference is consistent with the use of life-time median occupational earnings from USR-FDS data. To check this further, we have also examined data from the 1990 Graduate Cohort Study (GCS90), which provides personal salary information based on a postal survey of 5% of the population of 1990 leavers from a selection of UK universities. The typical graduate in the GCS90 data would have been born in 1969. We condition on the graduate being aged 21-23 when wages are observed one year after graduation for consistency with the USR91 evidence reported in Table 2. Results are presented in Table A2 and show the estimated wage premium for a good degree to be 4.9%, close to the USR-based estimate of 4.3% one year after graduation. Looking at data six years after graduation and conditioning on being aged 26-28, we estimate the premium for a good degree to be 7.9%, close to the estimates for BCS70 (for age 30) and LFS (for ages 36-41).

We conclude from our analysis of the four complementary datasets that there is robust evidence of a significant wage premium for a good class over a lower class of degree for individuals born in or *circa* 1970 and graduating in or close to 1991. At least for graduates more than 5 years out of university, our estimates of the wage premium all lie in the range 6.8-8.8%. We view the wage premium for a good degree as substantial when we consider that our estimate for the premium associated with a lower class degree over A-levels at age 30 is about 11%. The implication is that there is a large dispersion around the average return to a degree according to the graduates' levels of achievement in their degree, though relatively less so at age 38. Evidence from both BCS70 and LFS data suggests that between the ages of 30 and 40 the wage premium for a good degree is essentially constant, while our analyses of USR/FDS and GCS90 data indicate that the good degree premium increases in the early part of the graduate's career – from around 5% to 8% – between 1 and 6 years out of university.

3 Has the premium for a good degree changed across cohorts?

We explore the behaviour over time of the estimated pay premia reported in Section 2. From LFS data there is the potential to compare our results for those born around 1970 with later cohorts. From USR/FDS (and HESA/FDS) data, we can consider cohorts both earlier and later than those born in 1970. Overall, we can produce estimates of good degree premia for cohorts born between 1964 and 1982 and hence graduating between the mid-1980s and the early 2000s. There are various reasons why the good degree premium might have changed over this period.

First, individuals graduating in 1985 entered a labour market in which the unemployment rate among graduates was relatively high, at about 4%, but falling to about 2% by 1990.[14] The rate then rose to about 4.5% in 1993 but fell back to 2% by 2000, remaining essentially constant until 2008. A priori, it is not clear whether a slack graduate labour market might exaggerate the penalty for a relatively poor academic performance or whether a tight market might augment the premium for a strong performance. But if graduate unemployment is a major driver of the degree class premium, one would expect the behaviour in the premium to reflect trends in the unemployment rate over this time interval.

Second, skill-biased technological change (SBTC) is a potential driver of increased returns to education. Walker and Zhu (2008) argue that SBTC tended to exert upward pressure on the average return to a degree. It is also conceivable that any impact of SBTC might have been more pronounced among higher performing graduates. Most analysis of SBTC focuses on its impact on pay in the 1970s and 1980s (Card and Di Nardo, 2002, and Haskel and Slaughter, 2002) and therefore we would expect any impact to be already apparent among the early cohorts we observe.

Third, the participation rate of young people in HE in the UK was broadly stable from 1970 to 1985 but began to rise thereafter, especially from 1988, to reach 20% by 1990 and 30% by 1995. In a US context, Blackburn and Neumark (1991, 1993) and Blackburn, Bloom and Freeman (1990) investigated – and rejected – the hypothesis that a participation-induced change in the relationship between ability and education might have explained the observed rise in the college wage premium from the 1970s: see also Taber (2001), Chay and Lee (2000), Rosenbaum (2003) and Cawley *et al.* (2000).

Walker and Zhu (2008) argue that with expansion of higher education in the UK, universities have been admitting individuals with lower unobserved skills and this is likely to have weakened the correlation between education and ability. Thus, any bias in the OLS estimate of *average* degree returns will have been decreasing with expansion, *ceteris paribus*, and this will have tended to lead to a lower estimate of the return. However, Walker and Zhu (2008) find that the average return has not fallen and conclude that the reduction in the bias associated with expansion has been just offset by an increasing return to unobserved skill.[15] The question we investigate concerns how expansion has affected the correlation between

[14] Calculations of the graduate unemployment rate are based on LFS data.

[15] See also Harkness and Machin (1999) and Moffitt (2007) for evidence on changes over time in the returns to a degree in the UK.

educational achievement and ability *among* graduates, rather than that *between* graduates and non-graduates, though we do also consider the latter. The application to this issue of the theoretical framework of Blackburn and Neumark (1991, 1993) generates the prediction that an increase in the higher education participation index will increase the premium associated with a good degree class.[16] Intuitively, as more of the cohort obtain a degree, the greater is the signalling value of a higher class of degree.

Working against the prediction that HE will have induced an increase in the good degree premium, we note from USR and HESA data that the proportion of good degrees awarded has increased over time, from 38% in 1985 to 47% by 1993 and 54% in 1998. This is often interpreted as evidence consistent with grade inflation, which would be likely to reduce the relative return to a good degree through narrowing the associated ability gap across good and lower degree class recipients (see Ireland *et al*., 2009).

From the ability-composition hypothesis, we would expect expansion-induced changes to produce increases in the estimated premium for a good degree for cohorts matriculating from 1988 and hence graduating from 1991. For earlier cohorts we would expect little change in the premium. It is not possible to compare our BCS70 estimates of the good degree class premium with estimates for the 1958 birth cohort as degree class information was not collected in the NCDS. In any case, this is not a particularly interesting comparison for current purposes as the age participation index in HE in the UK changed very little between these cohorts. In contrast, LFS, USR and GCS datasets do enable comparisons across cohorts over a periods before and after the onset of substantial HE expansion.

3.1 Evidence across cohorts: LFS

We use information from LFS between 2005 and 2013 to make a series of comparisons of the premium for a good degree across birth cohorts at specific ages. Estimates of the log-wage premium for the different ages and birth cohorts are reported in Table 3.

Graduates from the 1973-74 birth cohorts would, typically, have matriculated in 1991-1992 while graduates born in 1981-1982 would have matriculated in 1999-2000. Thus, the data window spans the period of HE expansion. In order to make comparisons across birth cohorts, while not conflating comparisons with age effects, we are restricted to the age group comparisons on which the results reported in Table 3 are based. Consider the estimated premia for those aged 32-35 within the observation window 2005-2013. The estimated wage premium for a good degree for those born in 1973-74 is 9.0%. The same estimated premium of 9% is found for those born in 1975-76. But for those born in 1977-78 the premium is 11.3%: so there is some indication of a rising premium across these successive cohorts at ages 32-35.

For the age group 30-33, the estimated premia for a good degree are very similar for the earlier two cohorts and one cannot reject the hypothesis that the estimated wage premium for a good degree was constant across the two. In contrast, the premium for those born in 1979-

[16] This is demonstrated in Ireland *et a*l. (2009).

80 is very poorly determined. Finally, there is some indication for the 28-31 age group that the estimates are highest – at 11.7% – for the latest cohort, those born in 1981-82 – but we do not regard this as clear evidence of a rising premium as the other estimates for this age group are not statistically significant. We note that, across all the cohorts, where the estimates of the premia are statistically significant they tend to cluster in the neighbourhood of 9% to 11%.

Table 3: Estimated log-wage premia for a good degree (LFS), selected birth and age cohorts

Birth Cohort	1973/74	1975/76	1977/78	1979/80	1981/82
Wages observed at:	-	-	2005-09	2007-11	2009-13
Wages observed at age:	-	-	28-31	28-31	28-31
Good degree class premium	-	-	0.062	0.033	0.117
relative to lower degree class			(0.070)	(0.246)	(0.000)
No. of obs	-	-	1297	1587	1504
R^2	-	-	0.119	0.138	0.130
Wages observed at:	-	2005-09	2007-11	2009-13	-
Wages observed at age:	-	30-33	30-33	30-33	-
Good degree class premium	-	0.114	0.107	0.047	-
relative to lower degree class		(0.001)	(0.001)	(0.111)	
No. of obs	-	1313	1474	1526	-
R^2	-	0.135	0.131	0.131	-
Wages observed at:	2005-09	2007-11	2009-13	-	-
Wages observed at age:	32-35	32-35	32-35	-	-
Good degree class premium	0.090	0.090	0.113	-	-
relative to lower degree class	(0.012)	(0.005)	(0.000)		
No. of obs	1394	1496	1358	-	-
R^2	0.162	0.180	0.133	-	-

Notes: p-values reported in parentheses. Dependent variable is log hourly wages observed between 2005Q1 and 2012Q4 and deflated by the average earnings index. Other controls include: gender, marital status and number of children, ethnicity and tenure with current employer.

We conclude from the LFS data that we have not found robust evidence of clear patterns of change in the premium for a good degree over the cohorts we have considered. We note, however, that this analysis is based on comparisons across cohorts through a limited observation window and with relatively small sample sizes. Furthermore, given the structure of the data, we cannot draw inferences about whether returns for individuals of given ages are changing because of cohort-specific effects (such as changes in the HE participation) or because of period effects (such as differences in the state of the labour market).

3.2 Evidence across cohorts: USR-HESA/FDS

In Table 2, we presented USR/FDS-based estimates of the occupational earnings premium for a good degree over a lower degree class for 1991 graduates. USR/FDS data are also available for cohorts of students graduating in each year from 1985 to 1993 and estimates equivalent to those reported in Table 2 are reported for each of these cohorts in Table 4. Comparisons over USR graduate cohorts are more reliable than those based on the LFS data in important

respects: first, USR data cover entire populations of UK graduates and, second, the administrative data were collected through unchanging processes over time.

Compared to the 1991 graduates, the ability composition hypothesis predicts that the premium for a good degree would have tended to rise for 1992 and 1993 graduates as the participation index at matriculation rose from 15% to 17% to 19% across these 3 cohorts. From 1985 to 1991 we might expect a broadly stable but slightly rising good degree premium as the participation index rose steadily but gently from 13% to 15% over these 7 cohorts. If the graduate unemployment rate drives degree class premia, we might expect the estimated premium for a good degree to show three phases: 1985 to 1990, when graduate unemployment was falling; 1991 to 1993, when it was rising; and beyond 1993, when graduate unemployment was in decline once again.

The picture which emerges from Table 4 is one in which the premium for a good degree across all universities was broadly stable (at 2-3%) over cohorts graduating between 1985 and 1990 (a test cannot reject the null hypothesis of constancy of these estimates over this period) but increased to 6% for later cohorts. This is consistent with the hypothesis that an increase in the higher education age participation index raised the premium for a good degree relative to a lower degree class. It is also consistent with the related result of Walker and Zhu (2008), who found that, for men, while there was no significant reduction in the average return to a degree despite expansion, the return to a degree increased for graduates in the top quartile of the residual wage distribution and fell for those in the bottom quartile. In contrast, we are not aware of any reason why SBTC should have impacted specifically after 1990. Nor do we find the evidence supportive of a cyclical explanation: if a higher graduate unemployment rate explains a rising premium between 1990 and 1993, we would have expected a falling premium between 1985 and 1990 and beyond 1993.

In addition to the USR/FDS data for 1985 to 1993 graduates, we have also examined the equivalent HESA/FDS files for the 1998 cohort, who matriculated just as the participation rate was reaching a peak of about 33%. Under the expansion-induced compositional change hypothesis, one would expect the premium for a good degree to have continued to rise from the figure of 6.4%, estimated for the 1993 graduates. Instead, the premium seems to have stabilised at 6.4% for the 1998 cohort.[17] One possible explanation for this is that the proportion of good degrees awarded continued to rise, reaching 54% in 1998.

Table 4 also reports the estimated good degree class premia for each cohort separately by university type. The results are surprisingly robust and consistent with the idea that both the level of and the trends in the value of a good degree are relatively constant across different categories of university. It can also be observed that the proportions of the USR populations by university type were essentially constant over the 1985-1993 cohorts.

[17] Estimates are based on HESA data for institutions covered in the USR files. Results are robust to inclusion of all institutions covered by HESA – that is, those either before or after the abolition of the binary divide in 1992.

Table 4: Estimated log-earnings premia for a good degree (USR-HESA/FDS: selected cohorts for All students and by university type for graduates aged 21-23)

Cohort	1985	1986	1987	1988	1989	1990	1991	1992	1993	1998
All	0.025	0.026	0.023	0.030	0.021	0.034	0.043	0.061	0.064	0.064
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
HE pop^n	80947	79057	80655	82738	83360	84656	83932	94863	99569	103519
R^2	0.499	0.468	0.427	0.421	0.399	0.373	0.336	0.275	0.273	0.214
					Older Civic Universities					
	0.028	0.025	0.027	0.033	0.023	0.035	0.051	0.066	0.080	0.067
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[36.1]	[36.5]	[36.7]	[36.3]	[35.9]	[36.5]	[35.5]	[36.7]	[36.6]	[33.3]
					Newer Civic Universities					
	0.028	0.025	0.029	0.036	0.031	0.042	0.051	0.059	0.048	0.048
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[15.7]	[15.3]	[15.6]	[15.4]	[15.4]	[15.7]	[16.2]	[16.1]	[16.7]	[15.1]
					Ex-CAT Universities					
	0.013	0.025	0.027	0.021	0.012	0.026	0.039	0.045	0.063	0.058
	(0.03)	(0.00)	(0.00)	(0.00)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[14.1]	[13.9]	[13.6]	[13.7]	[14.3]	[14.0]	[13.8]	[14.3]	[14.2]	[15.6]
					1960s founded Universities					
	0.038	0.040	0.035	0.036	0.024	0.032	0.051	0.065	0.060	0.060
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[15.8]	[15.7]	[15.4]	[15.4]	[15.9]	[15.7]	[16.3]	[15.9]	[15.7]	[16.8]
					Other Scottish Universities					
	0.016	0.012	0.024	0.020	0.017	0.049	0.034	0.051	0.059	0.060
	(0.09)	(0.23)	(0.02)	(0.05)	(0.13)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
	[8.5]	[9.0]	[8.9]	[8.9]	[8.7]	[8.5]	[8.1]	[7.5]	[7.7]	[8.0]
					Other Welsh Universities					
	0.017	0.053	0.028	0.024	0.016	0.045	0.001	0.091	0.067	0.086
	(0.28)	(0.01)	(0.11)	(0.16)	(0.36)	(0.03)	(0.97)	(0.00)	(0.01)	(0.00)
	[2.5]	[2.4]	[2.6]	[2.9]	[2.7]	[2.7]	[2.8]	[2.8]	[2.9]	[5.0]

Notes: See notes to Table 2. Good degree premium is relative to a lower degree class. Ability and Background controls are included. Numbers reported in squared parentheses are the % of the total cohort in each of the university types. Figures for the separate category "Oxbridge" are not reported for reasons of protection of anonymity. University types are defined in the Appendix.

We have also exploited GCS85 data for the 1985 graduate cohort to compare with our results for GCS90 and thereby examine further the USR/FDS result that the good degree was relatively constant through the period 1985 to 1990. Table A3 reports results, showing that at ages 26-28 the estimated premium is constant at 7.9% for both cohorts, with some evidence that initial career premia were a little higher, at 6.4%, for 1985 graduates than for 1990 graduates, at 4.9% – though we cannot reject the hypothesis of constancy over this period.

3.2.1 Inequality inflation versus structural effects

The estimated premia reported in Table 4 are based on matching, for each cohort, contemporaneous occupational earnings data for the respective year. Hence it is possible that the increase in the estimated premia reflects what we might term an 'inequality-inflation' effect. Suppose that the class of degree awarded affects the individual's labour market outcome – for example, the graduate's place in a queue for better jobs, as measured by occupational earnings – but that this 'structural' effect is constant and not influenced by HE expansion. Then, nevertheless, we might observe an apparent change in the effect of degree class (i.e., a rise in the estimated premium) if a general increase in pay inequality – as was occurring over this time frame – leads to a widening spread in pay differentials by educational attainment.

To distinguish between an inequality-inflation effect and a structural effect – in which degree class is genuinely becoming more important in determining graduates' labour market outcomes – we re-run the analysis reported in Table 4, replacing contemporaneous occupational earnings with a measure of earnings calculated as earnings for each occupation averaged over all years. The results do not change, giving strong support to the conclusion that there was a material change in the way in which degree class affected labour market outcomes of graduates over these cohorts.

3.2.2 Premia for separate degree classes

To this point in the paper, we have drawn a binary distinction between good and lower classes of degree by grouping together separate degree classes. The motivation for this is that cell sizes become too small to estimate separate class effects with any precision in the BCS70 and LFS datasets. However, this is not a problem in the USR-HESA/FDS data. Figure 1 plots the occupational earnings premia for the 1985 to 1993 (and also the 1998) graduating cohorts for the award of: first, lower second and third class degrees relative to the default case of an upper second class degree.

From Figure 1 we see, for earlier cohorts, the narrow and essentially constant spread in occupational earnings by specific class of degree awarded, similar to the results reported in Table 4 for aggregated classes of degree, with a clear tendency for the spread to widen markedly for cohorts graduating from 1991 onwards.[18] In 1985, the premium for a first relative to an upper second is initially less than 1% and the spread between a first and a third is about 4%. By 1993 the premium for a first over an upper second has risen to 4% and the spread between a first and a third has increased to over 10%. The major difference from the pattern of evidence presented in Table 4 is that there is a continued increase in the premium for a first class degree between 1993 and 1998 – while there was a slight fall in the earnings gap associated with a lower second relative to an upper second. This is consistent with evidence that the rise in the proportion of good degrees between 1993 and 1998 was generated disproportionately by a relative increase in upper seconds and so is also compatible

[18] Estimated premia are based on deflated contemporaneous earnings data; results are unchanged with earnings averaged over cohorts.

with the expansion-induced ability-composition hypothesis and with the finding reported in Table 4 that the premium for a good degree relative to a lower degree did not increase significantly between 1993 and 1998. Of good degrees awarded, the percentage of first class degrees fell by 14% between 1993 and 1998.

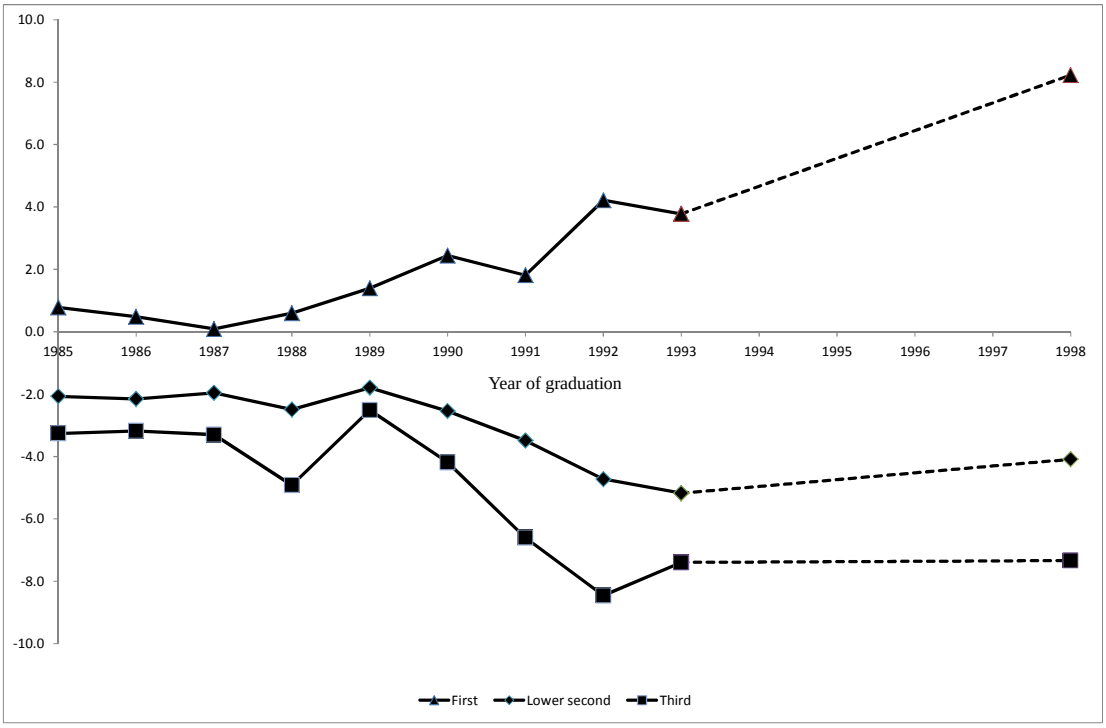

Figure 1: Estimated log occupational earnings premia by separate degree class, relative to default of lower second class (USR/FDS: 1985 to 1993 and HESA/FDS: 1998)

We conclude that the evidence based on USR-HESA/FDS data indicates that the premium for a good degree increased over successive cohorts in a manner consistent with the hypothesis concerning the effects of HE expansion on ability composition. As evidence based on USR-HESA/FDS data do not capture intra-occupational differences, it is possible that our estimates under-state both the level and also the extent of the increase of degree class premia.

We do not see the evidence as consistent with a simple macroeconomic explanation as in that case we would have expected the rising premium from 1990 to have mirrored a falling premium from 1985. Nor do we view a SBTC explanation as persuasive as we see no reason why this would have had an impact only from 1990. Finally, we note that the rising premium for a good degree occurs notwithstanding the increase in the proportion of good degrees awarded.

4 Conclusions and further remarks

We have focused on two related questions: is there a premium associated with the level of educational achievement at university (as measured by class of degree awarded) and how has any such premium varied across cohorts? From BCS70 data, we obtain an estimate of a wage premium of about 7-8% for a good degree relative to a lower degree at age 30 (and at 38) for graduates born in 1970 and graduating in 1991. We find very similar or consistent estimates

when using very different but complementary data from LFS, USR-HESA/FDS, and GCS90. We view the estimated premium to be large when we consider that our estimate of the premium for a lower degree class relative to A-levels is not substantially higher at about 11% at age 30. Evidence of substantial variation in graduate returns by academic performance creates a public policy concern if the perception that investment in HE is risky acts as a disincentive to participate – particularly if those from lower participation backgrounds are less confident of performing well at university.

Based on data exploited in the current paper, we cannot identify whether the estimated premium for a good degree arises from signalling or because degree class is a proxy for underlying marks and associated human capital. For that, detailed analysis of single institution data on both degree class and course marks is an important direction for related work (see Feng and Graetz, 2013, and di Pietro, 2010). If it emerges that degree class acts as a crude sorting mechanism for graduate employers, then this might be a further justification for the current trend in the UK away from the traditional system based on degree classification and towards the issuing of detailed transcripts.

The evidence we have presented from the USR-HESA/FDS data is consistent with quantile regression results of Walker and Zhu (2008) and with the hypothesis that trends in the good degree premium reflect expansion-induced compositional changes. Intuitively, the greater the proportion of the cohort obtaining a degree, the more valuable it appears to be to attain a good class of degree and thereby stand out from the growing crowd. We find that the first destination occupational earnings premium associated with a good degree class was very modest (at less than 3%) until the HE age participation index began to rise markedly over the cohorts graduating between 1991 and 1998, by which time it had increased to more than 6%. We have also found evidence that much of the increase in the premium for a good degree after 1990 was realised by 1993 as the participation index rose from 15% towards 20% of the age cohort. We explain the absence of clear evidence of further increases in the good degree premium by the observation that the proportion of students awarded good degrees grew markedly between 1993 and 1998, when expansion tailed off. We also find that the premium associated with the award of a first class degree (relative to an upper second) grew significantly over the period in which expansion was occurring.

If marketisation of HE in the UK leads to further grade inflation through the award of higher proportions of good degrees, then this is likely to reduce the good degree premium, *ceteris paribus*. It will be informative to base future research on more recent cohorts (for example, on longitudinal studies of later birth cohorts) in order to examine further the impact on degree class premia of potential factors such as the HE participation rate, degree class distributions and the state of the graduate labour market.

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Appendix

Table A1: Estimated log wage premia (LFS), birth cohorts 1969-1971

Wages observed at:	2005-2012
Wages observed at age:	36-41
Good degree class premium	0.088
(*relative to lower degree class*)	(0.001)
Lower degree class	0.188
(*relative to 2+ A-levels*)	(0.000)
Other controls	Yes
No. of Obs	2973
R^2	0.152

Notes: p-values reported in parentheses. Dependent variable is log hourly wages observed between 2005Q1 and 2012Q4 and deflated by the average earnings index. Other controls include: gender, marital status and number of children, ethnicity and tenure with current employer.

Table A2: Estimated log pay premia for a good degree (GCS 1990), birth cohort 1968-1970

Wages observed at:	1991	1991	1996	1996
Wages observed at age	21-23	21-23	26-28	26-28
Good degree class premium	0.051	0.049	0.084	0.079
relative to lower degree class	(0.014)	(0.014)	(0.014)	(0.014)
Ability and background controls	*No*	*Yes*	*No*	*Yes*
Other controls	*Yes*	*Yes*	*Yes*	*Yes*
No. of Obs	2839	2839	3652	3652
R^2	0.127	0.131	0.115	0.119

Notes: p-values reported in parentheses. Dependent variable is the log of the self-reported hourly wage. Ability controls include pre-university qualifications. Background controls include parental education, and other controls include age, gender, ethnicity, and marital status.

Table A3: Estimated log pay premia for a good degree (GCS 1985 and GCS 1990)

Graduate cohort	1985	1985	1990	1990
Wages observed at	1986	1991	1991	1996
Wages observed at age	21-23	26-28	21-23	26-28
Good degree class premium	0.064	0.079	0.049	0.079
relative to lower degree class	(0.023)	(0.020)	(0.014)	(0.014)
No. of Obs	1330	1738	2839	3652
R^2	0.139	0.150	0.131	0.119

Notes: p-values reported in parentheses. See notes to Table A2. Ability and Background controls included.

University Types

Older Civic Universities: typically founded in industrial towns and cities during the first decade of the 20th Century (often referred to as 'Redbrick' universities). Examples include Cardiff, Birmingham, Manchester and Leeds.

Newer Civic Universities: typically founded by or during the 1950s, often from former university colleges. Examples include Swansea, Nottingham, Leicester and Exeter.

Ex-CAT Universities: typically founded as technical colleges in the first half of the 20th Century and upgraded to university status during the 1960s or 1970s. Examples include Aston and Strathclyde.

1960s Founded Universities: typically purpose-built and often labelled as the 'campus' universities. Examples include Lancaster, Sussex and Warwick.

Other Scottish Universities: Glasgow, Edinburgh, Aberdeen and St Andrews.

Other Welsh Universities: Examples include Bangor and Aberystwyth.

A full listing of all universities by type is available from the authors on request.