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Graduate Earnings Premia in the UK: Decline and Fall?

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Abstract

A long-standing puzzle in the economics of education concerns the observed constancy of the average earnings premium for a degree despite a prolonged period of substantial growth in the share of graduates in the working population in the UK. Focusing on birth cohorts between 1970 and 1990, we produce evidence of a recent decline in the earnings premium for graduates over non-graduates by age 26. For those born in 1990, we estimate an average graduate earnings premium of 10%, contrasting with an estimate of 17% for the 1970 birth cohort. We also find a substantial increase in dispersion around the average premium according to class of degree awarded. Combined with a falling average, this has left the earnings of 1990-born graduates awarded lower degree classes only 3% above that of non-graduates. Among the 1970-born cohort, the equivalent earnings premium was 14%. We suggest that this precipitous fall is consistent with a 'double-scarring' effect associated with the combination of increased higher education participation and a rise in the proportion of graduates awarded an upper honours degree over the span of the two cohorts.

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1. Introduction

The primary purpose of this paper is to assess the magnitude of the earnings premium associated with a first degree by age 26 for UK cohorts born as recently as the early 1990s and to compare results to estimates for those born up to two decades earlier. We also examine the variation around the average graduate premium by class of degree awarded and how this has evolved over the twenty-year period. We pay particular attention to the earnings premium of those graduating with lower class degrees relative to non-graduates, as this has potential to impact significantly upon individuals' higher education participation decisions.

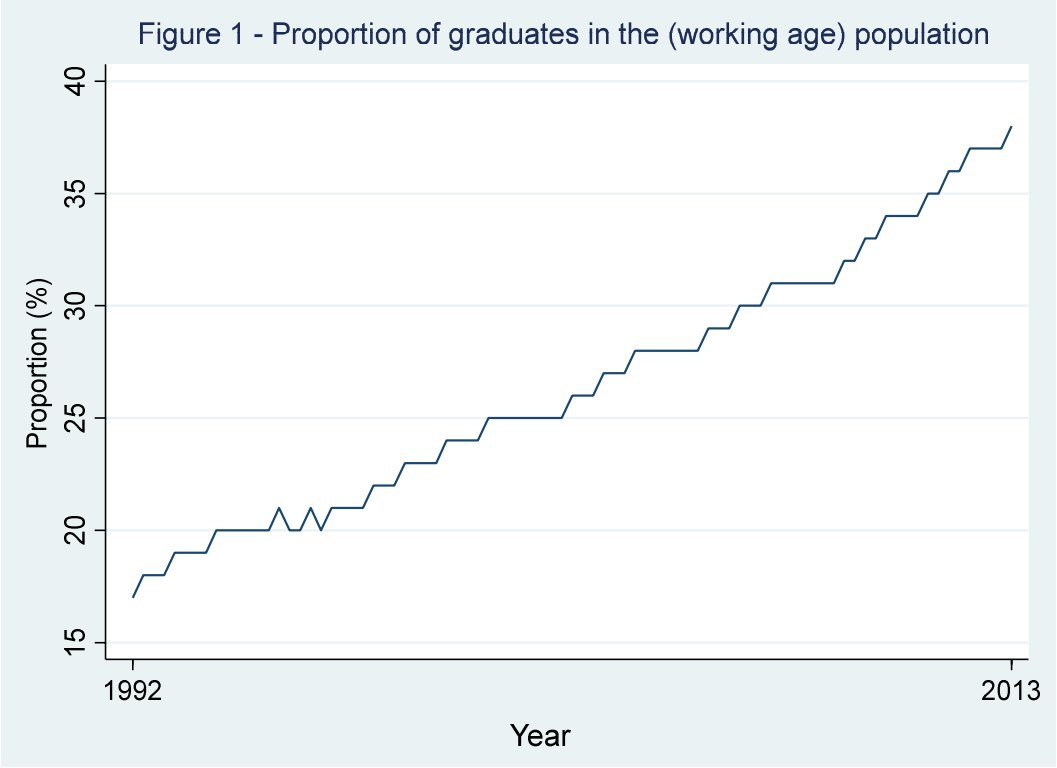
Previous research covering birth cohorts up to 1989 has identified a puzzle arising from the fact that substantial and persistent increases in the higher education participation rate of young people in the UK do not appear to have generated any reduction in the earnings premium of graduates relative to non-graduates [see Blundell *et al.* (2016a); Blundell *et al.* (2021), Walker and Zhu (2008)]. The premium is defined as the percentage by which the earnings of graduates exceed those of non-graduates, calculated as $(W_G - W_N) / W_N$, where W_G denotes the average earnings of graduates and W_N the average earnings of non-graduates. The explanation typically offered to resolve the puzzling constancy of the premium is that any impact of increased relative supply of graduate labour has been just offset by the increased relative demand for highly-skilled labour associated with factors such as skill-biased technological and organisational change. Our starting point is an exploration of the Next Steps data for a 1990 birth cohort, for whom we estimate an average earnings premium of 10% for graduates over non-graduates by age 26.[1] An equivalent analysis based on the British Cohort Study (BCS70) produces an estimate of the average graduate earnings premium of 17% for the birth cohort of 1970, indicating that there has been a substantial fall in the earnings premium associated with a degree between the two birth cohorts. Obtaining causal estimates of the graduate premium by OLS using the two cohort studies rests on being able to suitably control for confounding factors (e.g. cognitive ability), accurate earnings and qualifications data, as well as contending with possible self-selection into employment. We therefore discuss the rich set of covariates we are able to include in our modelling approach, alongside providing evidence to alleviate concerns around possible measurement error and composition bias.

We also examine Labour Force Survey (LFS) data, creating cohorts born in or close to each of 1970 and 1990, and report corroborating evidence of a large reduction in the graduate earnings premium across these two cohorts. We pursue further the question of the timing of the decline in the premium by creating a series of successive birth cohorts within LFS. We locate the fall as having occurred only for those born in the period 1988-93. That prior research evidence has been based on cohorts born no later than 1989 is consistent with why a recent decrease in the graduate earnings premium has not

[1] For simplicity, we refer to cohort members in Next Steps as a 1990 birth cohort, though participants in the study were born between 1st September 1989 and 31st August 1990 (reflecting a school year in England) and would have been either 25 or 26 years of age at the time of participating in the latest survey.

been identified previously. Confirming whether the fall we have identified is short-term or more deeply structural will have to await data for later birth cohorts: our estimates for those born in 1990 are based on the latest sweep of the Next Steps survey conducted in 2015-16, while estimates for those born through the period 1988-93 exploit LFS data for years 2014-18.

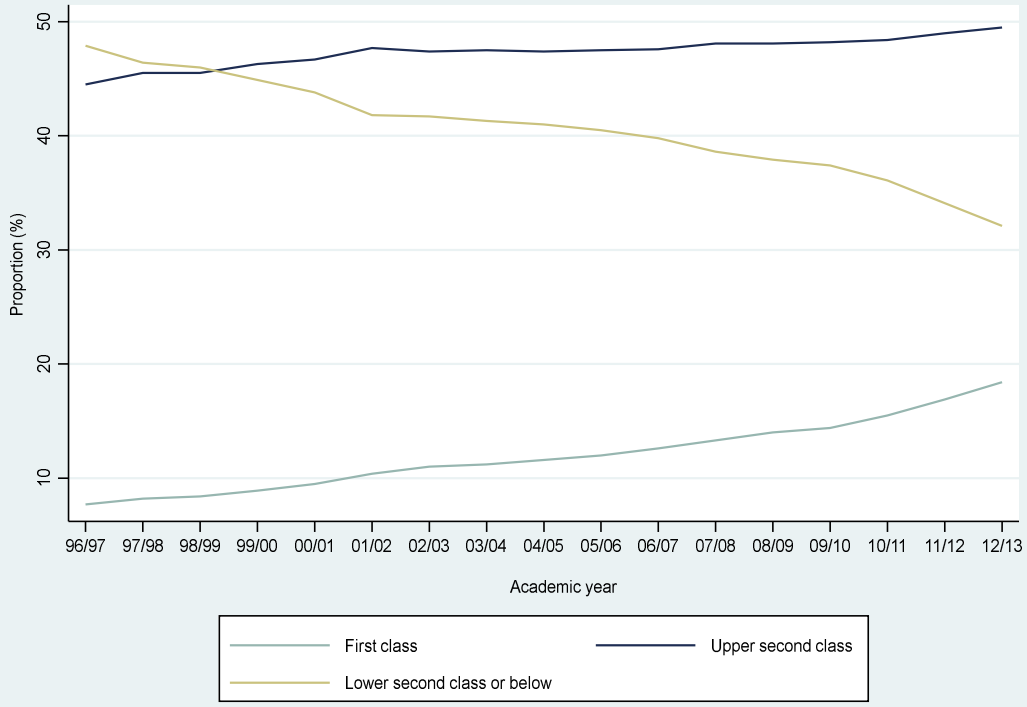
As the Office for National Statistics (ONS, 2013) highlights, in the time between the graduation of the 1970 and the 1990 birth cohorts, there was an almost linear expansion in the proportion of graduates in the working age population – rising from 17% in 1992 to 38% by 2013 (Figure 1). This is the source of the puzzle regarding previous findings of stability in the graduate earnings premium in the face of the increasing relative supply of graduates. At first sight, it might seem surprising that the fall we are finding in the average graduate earnings premium is occurring only for the later 1988-93 birth cohorts given that the higher education participation rate was growing most rapidly among the earlier cohorts (see, for example, Figure 2 in Blundell *et al.,* 2016b), but this is likely to reflect two factors. First, the timing of any fall in the average premium depends on *relative* movements in supply and demand for graduates. Second, the proportion of graduates in the labour force *stock* has continued to increase even as the *flow* of graduates into the labour force has begun to stabilise, as shown in Figure 1.



Regarding variation around the average graduate earnings premium by the class of degree awarded, Naylor *et al.* (2016) exploit data from the 1990 Graduate Cohort Studies (GCS) and LFS surveys to estimate the earnings premium for an upper honours degree over a lower degree class for those born

between 1970 and 1982.[2] Despite the proportion of graduates awarded at least an upper honours degree having continuously risen over the last two decades - predominantly driven by a rise in the award of first class degrees (Figure 2) - we are not aware of estimates of premia by class of degree for those born more recently than the very early 1980s. Hence, there is no up-to-date evidence on the impact either of increased higher education participation or of the changing proportions by degree classification on earnings premia by class of award. In the current paper, we use Next Steps data for the 1990 birth cohort to examine the earnings premium for upper honours relative to lower degree classes. We estimate the premium for an upper honours over a lower degree class to be 10% by age 26. Replicating our analysis on BCS70 data, we estimate the equivalent premium to have been 6% for the earlier birth cohort of 1970. The combination of a falling average graduate earnings premium and increasing dispersion around the average according to broad class of degree awarded necessarily implies a fall in the earnings premium for graduates awarded a lower degree class relative to non-graduates: indeed, our estimates indicate that this premium has fallen from 14% to just 3% between the 1970 and the 1990 birth cohorts.

Figure 2 - The proportion of classified first degrees by class of award in HESA records



Theoretical models predict that changes in higher education participation are likely to impact on dispersion around the average graduate earnings premium according to degree class awarded. Building on Blackburn and Neumark (1993), Ireland *et al*. (2009) apply a signalling framework and demonstrate that the greater is the proportion of a cohort obtaining a degree the more highly will the labour market

[2] Throughout this paper, we define those with an 'upper honours degree class' as graduates with a first or upper second class award in their undergraduate degree. Those with a 'lower degree class' consist of graduates with a lower second, third or pass/ordinary first degree.

value the signal of having graduated among the higher performing graduates: equivalently, the 'scarring effect' associated with the award of a lower class of degree deepens. Increases in higher education participation are capable, then, of explaining a worsening earnings position of those awarded lower degree classes relative to non-graduates through a combination of two forces: (i) the fall in the average graduate earnings premium resulting from the increased relative supply of graduates and (ii) the increase in dispersion around the average associated with a scarring effect.

In addition to the impact of the increase in higher education participation, a second source of scarring of graduates awarded a lower degree class stems from a rise in the proportion of graduates awarded an upper honours degree, which is likely to lead to a fall in the earnings premium associated with a lower degree class relative to non-graduates. This is because, *ceteris paribus*, a rise in the proportion of graduates with upper honours degrees will be associated with a reduction in the expected ability of those with lower degree classes. Based on the Universities' Statistical Record, 53% of 1991 graduates (which will predominantly comprise those born in 1970) were awarded upper honours degrees. From Higher Education Statistics Agency (HESA) data, this had risen to 64% among 2010/11 graduates (corresponding to the modal graduation year for those in the 1990 birth cohort).

Over time, the cost of financing higher education in the UK (particularly in England) has shifted away from government and towards the individual. In England, prior to 1998 when tuition fees were first introduced (thus affecting those born around 1980), the state carried full responsibility for paying the educational cost of a degree. By 2006, tuition fees had risen to £3,000 per annum (impacting on those born around 1988). Currently, tuition fees are over £9,000. The falling premium for graduates with a lower degree class combined with the growing costs of study could therefore impact adversely on the capacity of higher education to enhance social mobility if those from less advantaged backgrounds are either deterred from participation or experience less positive outcomes on graduation as a result of their degree award. We note that Naylor and Smith (2001) and Crawford (2014), have found that those from disadvantaged backgrounds are less likely to graduate with an upper honours degree.

The structure of the rest of the paper is as follows. Section 2 presents empirical estimates of the average graduate earnings premium for both 1990 and 1970 cohorts, based on data from Next Steps, BCS70 and LFS, while also considering the timing of the changes. Section 3 presents estimates of the earnings premium for upper honours relative to lower degree classes for each of the two birth cohorts, based on data from Next Steps and BCS70: estimates are also reported for the premium for graduates awarded a lower class of degree relative to non-graduates. Data from the Longitudinal Destinations of Leavers from Higher Education (LDLHE) and LFS surveys are then exploited in order to investigate more precisely the timing of changes in premia across birth cohorts by broad and separate classes of degree.[3] Section 4 closes the paper with conclusions and further remarks.

[3] In the LDLHE questionnaire, individuals are asked about their annual earnings and mode of employment. While there was a question on hours worked in the latter versions of the survey, only a very small proportion of respondents supplied a response, rendering this variable unsuitable for use in any analysis. This precludes the creation of an hourly pay measure in LDLHE. For

2. Average graduate earnings premia: data, methods and results

Section 2.1 presents analysis of the graduate earnings premium by age 26 for the 1990 birth cohort based on data from Next Steps and Section 2.2 presents equivalent analysis for the 1970 birth cohort based on BCS70. Section 2.3 then provides complementary evidence from the LFS for those born in or close to each of 1990 and 1970. We conclude this section by generating additional birth cohorts within the 1980-1993 interval, which allows us to provide more precise evidence on the timing of changes in the graduate earnings premium between the two birth cohorts and consequently explain why our findings differ from previous literature in this area.

Cohort studies are regarded as highly suitable datasets for the analysis of returns to education. As noted by Dearden (1999), one of the common issues faced by researchers wishing to estimate the graduate premium using secondary data sources is the absence of variables that could impact on both the decision to participate in higher education and future labour market outcomes. The typical example given in the literature is around innate ability which, if not suitably accounted for, can lead to (upwardly) biased estimates. However, cohort studies are unusual in the breadth and depth of information they collect. Ability test scores are typically administered to cohort members during early childhood and thus form part of the final dataset.[4] Alongside this, a wealth of data is gathered on both cohort members and parents, including detailed information on household background (e.g. parental education/occupation, household income, accommodation type, etc). Furthermore, both parents and offspring are asked questions that indicate their attitudes towards education, with cohort members additionally supplying data on non-cognitive skills, such as their locus of control and appetite for taking risks.

2.1 The average graduate earnings premium for the birth cohort of 1990: Next Steps

We start by exploiting Next Steps data for a cohort of individuals born in 1990. Previous work based on cohort data has focused on individuals born either in 1958 (National Child Development Study: NCDS) or in 1970 (BCS70) [see, for example, Blundell *et al.* (2005) and Naylor *et al.* (2016)]. Analysis of Next Steps data enables us to look at a more recent cohort for whom we have earnings data as recently as the period 2015-2016, when cohort members were aged either 25 or 26. As this cohort ages, subsequent waves will enable further analysis of the evolution of earnings premia and hence of the persistence of effects uncovered in the current paper.

consistency, the dependent variable in our regressions in this paper is the annual earnings of full-time workers. Where possible, we conduct a sensitivity analysis using hourly pay and find the premia to be very similar in nearly all instances, thus alleviating concerns around compositional bias. The relevant code can be found in our do-files and results can also be supplied upon request.

[4] With the first sweep of Next Steps having been at the age of 13-14, one of the notable omissions is early years test scores that provide an insight into the cognitive ability of the individual. However, the study has been linked to the National Pupil Database (NPD) – an administrative record that captures Key Stage test scores at the age of 11. Work by Bourne (2016) and Crawford *et al.* (2014) highlights the suitability of Key Stage measures as a proxy for cognitive ability.

Next Steps (formerly known as the Longitudinal Study of Young People in England) covers a set of individuals born in England between 1st September 1989 and 31st August 1990. The purpose of forming this dataset was to enable researchers and policymakers to understand the transitions young people make from secondary school into higher education and/or employment. A representative sample of around 16,000 young people at selected state and independent schools first took part when they were in Year 9 (aged 13-14), with yearly sweeps taking place until 2010. Parents were also asked to participate, though they were interviewed in the first four surveys only. The most recent sweep, administered between August 2015 and September 2016, explored the early adulthood outcomes of the cohort, generating information on academic qualifications gained (including classification of first degree) and current employment.

We restrict the sample of interest in Next Steps to those in full-time employment. The Supplementary Material[5] we supply alongside this paper provides full details regarding the selection of the final sample used for the analysis, constituting 1,733 observations on individual cohort members, among whom 43% of individuals had a first degree qualification. Nationally for this cohort, Heywood (2011) reports that the participation rate in higher education by the age of 22 was around 39%, thus our sample appears to be reasonably representative by education level. The mean (median) earnings of graduates in our sample is £24,977 (£24,000), while the corresponding figure for non-graduates is £21,592 (£19,760): hence the raw difference implies a graduate earnings premium of 16% (21%). One of the issues often raised about survey data is the misreporting of earnings and qualifications information by respondents, with the latter resulting in attenuation bias in estimates of the return to a degree based on OLS. However, in their analysis of NCDS, Battistin *et al.* (2014) highlight the similarity between transcript files and self-reported qualifications data at the age 23 survey. Dearden (1999) notes that measurement error in the reporting of qualification information is less of a risk the shorter the time gap between qualification and the conduct of the survey, hence our observations at age 26 should be reasonably accurate. Furthermore, the Longitudinal Education Outcomes (LEO) dataset – an administrative data source developed through linking UK education, benefit and tax records – is now commonly utilised for examining (gross) graduate earnings. Based on LEO data, the gross median earnings of 2010/11 qualifiers (the modal year of graduation for the Next Steps cohort) was £22,500 and £25,000 three and five years after graduation, respectively, with this range containing the median earnings of graduates in Next Steps. Due to the inability to distinguish between part-time and full-time workers in LEO, alongside non-graduate females being more likely to be in part-time work [see Belfield *et al.* (2018) and Boero *et al.* (2019)], it is not possible to use LEO to assess the potential accuracy of non-graduate earnings in Next Steps in the same way. Nevertheless, the aforementioned findings mitigate worries around measurement error, particularly given qualifications information is captured in Next Steps at a similar age to that considered by Battistin *et al.* (2014).

[5] Supplementary Material is available as a supplement to the copy of this paper hosted on the HESA website at: https://www.hesa.ac.uk/files/Graduate-Earnings-Premia-UK-20211123.pdf

Given the rich data we have available to us in Next Steps and reduced concerns around the accurate reporting of earnings and qualifications information by respondents, we follow Mincer and employ OLS to estimate the graduate premium, as represented by the following equation:

$$w_i = \alpha + \beta_1 E_i + X_i' \beta_2 + \varepsilon_i \quad [1]$$

where w_i represents the natural logarithm of gross annual earnings ($w_i = \ln W_i$) at approximately 26 years of age, X_i predominantly represents a set of personal and family characteristics (including the cognitive and non-cognitive ability of the cohort member) and $E_i = [1, 0]$ for graduates and non-graduates, respectively. Table 1 reports estimated coefficients and the associated graduate earnings premium from a series of models distinguished by the sets of control variables included in the regressions.[6]

Table 1: The average graduate premium based on earnings at age 25-26 in Next Steps (1990 birth cohort). The dependent variable is the log of (gross) annual earnings of full-time workers.

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Estimated coefficient	0.146*** (0.0189)	0.136*** (0.0185)	0.136*** (0.0181)	0.104*** (0.0174)	0.104*** (0.0178)	0.136*** (0.0181)	0.133*** (0.0184)	0.0972*** (0.0196)
Implied premium	16%	15%	15%	11%	11%	15%	14%	10%
R-squared	0.0454	0.110	0.159	0.226	0.227	0.248	0.256	0.282
Sample size	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733
Cohort member personal characteristics		x	x	x	x	x	x	x
Cohort member non-cognitive skills			x	x	x	x	x	x
Parental/Household background				x	x	x	x	x
Parental attitudes towards education					x	x	x	x
Job tenure						x	x	x
Cohort member health							x	x
Cognitive ability								x

[6] Homoscedastic standard errors are reported in parentheses. Note that none of our results reported in this paper change if we use robust standard errors. Following Solon *et al.* (2015), we use unweighted data for our regression analysis, but weighted data for our descriptive statistics tables in the accompanying Supplementary Material.

In Model 1, with no controls, the estimated coefficient of 0.146 implies a graduate earnings premium of 16%: this is given by $[\exp(\hat{\beta}_1)-1]$ as the dependent variable is the natural logarithm of the earnings variable. We note that the inclusion of additional controls (particularly those relating to household background and cognitive ability) tends to reduce the estimated premium. This reflects the fact that these covariates are positively correlated with both higher education participation and earnings. The one exception to this is the addition of the work tenure variable, which causes the estimated premium to rise. This occurs because, on average, graduates at age 26 will have had less opportunity to develop work tenure than non-graduates who would have completed full-time education up to 5 years earlier. Our preferred specification incorporates the full set of controls listed under Model 8: hence, our estimate of the average graduate earnings premium by age 26 for this cohort of individuals born in 1990 is 10%.

In Section 2.2, we replicate our analysis of Next Steps data on individuals born in 1970 using BCS70 data in order to compare estimates of the graduate earnings premium across the two birth cohorts separated as they are by two decades.

2.2 The average graduate earnings premium for the birth cohort of 1970: BCS70

BCS70 tracks a representative sample of approximately 17,000 people born in the UK in early April 1970. Cohort members themselves were interviewed for the first time at the age of 10, completing the British Ability Scales (BAS) assessments (which we draw upon as a measure of cognitive ability in our analysis), while their parents took part in the survey from the child's birth up to the point they reached the age of 16. At age 26, cohort members participated in a further sweep, where data on education and employment outcomes were gathered. This included the highest academic qualification held and earnings. While degree classification information is not available in the age 26 sweep, this is obtained by linking to the age 30 survey. One of the limitations of the age 26 survey is that the question on remuneration refers to net rather than gross earnings – with the latter typically used in the estimation of the graduate premium. This is a further motivation for corroborating our findings through complementary analysis of LFS data.

Following our approach in the analysis of Next Steps, we limit our BCS sample to those defined as being in full-time employment and focus on annual earnings.[7] 20% of the final sample of 3,771 individual cohort members have a first degree qualification, which aligns with higher education participation rates in the UK at the time, as noted in Naylor *et al.* (2016). The mean (median) net annual earnings in our sample for analysis are £12,660 (£11,865) for graduates and £10,580 (£9,880) for non-graduates, implying a graduate earnings premium of 20% in the raw data. This contrasts with a figure of 16% (based on mean earnings) for the 1990 birth cohort as reported in Section 2.1. As with Table 1 for our analysis of Next Steps, Table 2 reports estimated coefficients and the associated graduate earnings premium based on regression equation [1] for a set of models developed through the successive

[7] See the accompanying Supplementary Material for a discussion of the comparability of Next Steps and BCS70 datasets for the purposes of estimating graduate earnings premia.

addition of control variables, which are as similar as possible to those included in the analysis of Next Steps data.

Table 2: The average graduate premium based on earnings at age 26 in BCS70 (1970 birth cohort). The dependent variable is the log of (net) annual earnings of full-time workers.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Estimated coefficient	0.189*** (0.0127)	0.184*** (0.0123)	0.179*** (0.0123)	0.151*** (0.0127)	0.150*** (0.0128)	0.163*** (0.0134)	0.161*** (0.0134)	0.154*** (0.0136)
Implied premium	21%	20%	20%	16%	16%	18%	17%	17%
R-squared	0.0550	0.138	0.150	0.199	0.200	0.207	0.209	0.213
Sample size	3,771	3,771	3,771	3,771	3,771	3,771	3,771	3,771
Cohort member personal characteristics		x	x	x	x	x	x	x
Cohort member non-cognitive skills			x	x	x	x	x	x
Parental/Household background				x	x	x	x	x
Parental attitudes towards education					x	x	x	x
Job tenure						x	x	x
Cohort member health							x	x
Cognitive ability								x

With reference to Model 8, we estimate that at age 26, the average graduate earnings premium for this cohort of individuals born in 1970 is 17%. Hence, we find evidence that the average graduate earnings premium for the 1990 birth cohort is substantially lower than that of 1970 birth cohort: having declined from 17% to 10% across the two cohorts. This fall of 7 percentage points exceeds the fall of 4 percentage points (from 20% to 16%) observed in the raw data. This primarily arises from the fact that for the 1990 birth cohort a larger proportion of the raw disparity in earnings between graduates and non-graduates is explained by cognitive ability, suggesting that the influence of this variable on the likelihood of graduating and/or on remuneration increased across the two birth cohorts.

2.3 The average graduate earnings premium for the birth cohorts of 1990 and 1970: LFS data

Given the progressive nature of the UK income tax system, one would anticipate that the estimate for the fall in the graduate premium that we report in the preceding section may have been higher had gross earnings been available for the BCS70 sample. In this section of the paper, we investigate this further by producing estimates of the graduate earnings premium for both 1970 and 1990 birth cohorts using a common data source which captures both cohorts – that is, the LFS.

The LFS is administered by the ONS and serves the principal purpose of providing a representative sample of data that can enable a detailed examination of the UK labour market. Since 1992, the survey has been run quarterly, encompassing around 60,000 households. It operates under a rotating panel design, whereby households are interviewed for five successive quarters before dropping out of the sample. Earnings information was gathered only in wave 5 up to spring 1997, after which it has been collected in both waves 1 and 5. Most importantly for our analysis, there is consistency in the way the gross weekly earnings variable is derived, which we then convert into an annualised figure. A weakness of the LFS when compared to the birth cohort studies is the relative paucity of information on personal characteristics (including cognitive/non-cognitive ability) and family background, though data are available on the highest academic qualifications held by respondents (with questions on the class of degree awarded having been introduced in the mid-2000s).

We begin by pooling all quarters of the LFS between 1995 and 1997, with the sample being restricted to those aged 25 or 26. Hence, this incorporates those born between 1969 and 1972, approximating the BCS70 cohort. While cohort members in Next Steps participated in the latest sweep in either 2015 or 2016, we amalgamate all LFS quarters between 2014 and 2017, before constraining the sample to those aged 25 or 26. Consequently, this captures those born between 1988-1992. A wider birth cohort range has to be utilised in the LFS to ensure sufficient sample size for the analysis we wish to undertake. The real median earnings of graduates born 1988-1992 in the LFS ranges between £22,776 and £23,786, with these figures being similar to those we observe in Next Steps and LEO.[8] With no administrative earnings data available in the mid-1990s, no such source can be used to assess the LFS earnings data around that time. However, the 1996 New Earnings Survey (NES) collected gross earnings information on full-time employees directly from employers (and therefore could be considered to possess more accurate earnings information). ONS (2017) data on the 1996 NES shows that the mean earnings of full-time females aged 25-29 was in the region of £15,000, while the corresponding statistic for full-time males is around £17,000. In our 1995-1997 LFS data, we find earnings to be just under £17,000 for full-time males and slightly above £14,000 for full-time females, hence the earnings data in the 1995-1997 LFS seem reasonable.

Due to the limited number of controls available in the LFS, we replicate model 1 (with no covariates) of Tables 1 and 2 based on the birth cohort studies. Results are given in Table 3 below.

[8] We provide a full set of descriptive statistics on earnings across all the datasets we utilise in the Supplementary Material.

Table 3: The average graduate premium based on earnings at age 25-26 in LFS. The dependent variable is the log of (gross) annual earnings of full-time workers.

	[1]	[2]
Birth cohort	**1988-1992**	**1969-1972**
Estimated coefficient for 'graduate'	0.118*** (0.0175)	0.245*** (0.0157)
Implied premium	13%	28%
R-squared	0.0312	0.100
Sample size	1,405	2,189

As shown in column [2] of Table 3, the estimated graduate premium of 28% based on gross annual earnings for those born around 1970 in LFS is higher than the equivalent estimate of 21% reported in Table 2 from the analysis of BCS70, as expected. For those born close to 1990, we observe the premium in LFS to be 13%, as reported in column [1] in Table 3, which is relatively close to the estimate of 16% based on Next Steps. Overall, the results confirm our previous finding of a fall in the graduate premium across the two cohorts. The decrease of 15 percentage points (28% to 13%) exceeds the decline we estimate using the birth cohort studies: one reason for this is likely to be associated with the lack of a gross earnings measure in the age 26 survey of BCS70.

2.4. The puzzle resolved?

Through pooling all quarters of the LFS between 1994 and 2006, Walker and Zhu (2008) examine whether there is any evidence of a change in the graduate premium over time. Among those aged 25-27 (hence corresponding to those born between approximately 1967 and 1981), they find the premium to have remained stable over the period considered. More recently, Blundell *et al.* (2016a) have drawn on the same dataset to analyse the evolution of the ratio of graduate to non-graduate median earnings between the ages of 25-29 over the last two decades (thus covering those born between approximately 1965 and 1989), noting that the graduate to non-graduate earnings premium has remained almost constant at 35%. Both of these studies use hourly pay as their dependent variable and include postgraduates in their definition of those with a degree. Non-graduates are classified slightly differently, with Walker and Zhu (2008) limiting this category to those with at least 2 A-level qualifications. Blundell *et al.* (2016a) also include those with GCSEs and below degree-level qualifications in their definition of the non-graduate group.

We extend the work by Walker and Zhu (2008) and Blundell *et al.* (2016a), by considering more recent birth cohorts in order to examine whether our finding of a fall in the graduate premium for the 1990 cohort is such a recent phenomenon that it has not been detected in the previous research. To do this, we first bring together all quarters of the LFS between the years 2006 and 2018, before reducing the

sample to those aged 25 to 26. This results in a dataset containing the gross annual earnings (of full-time employees) and highest qualification held of those born between 1980 and 1993. Previously, our OLS models using LFS data replicated model 1 in Tables 1 and 2. We now refine this for the 2006-2018 LFS data to include a birth cohort dummy (equal to 1 if the individual was born between 1988 and 1993) and an interaction term indicating whether the respondent was a graduate born in this latter period, with results presented in Table 4.

Table 4: The change in the average graduate premium among those born between 1980 and 1993 based on earnings at age 25-26 in LFS. The dependent variable is the log of (gross) annual earnings of full-time workers.

Estimated coefficient for 'graduate'	0.206*** (0.0119)
Estimated coefficient for 'birth cohort 1988-1993'	-0.0271* (0.0158)
Estimated coefficient for 'graduate*birth cohort 1988-1993'	-0.0812*** (0.0201)
Implied premium for 'birth cohort 1980-1988'	23%
Implied premium for 'birth cohort 1988-1993'	13%
R-squared	0.0771
Sample size	4,958

We see that, relative to those born in the period 1980-1988, the graduate premium has fallen by 10 percentage points (from 23% to 13%) for those born in the period 1988-1993, illustrating that the decline is a recent phenomenon, hence providing an explanation for our findings differing from those of Walker and Zhu (2008) and Blundell *et al.* (2016a). We interpret these results as representing initial evidence consistent with the hypothesis that the continued rise in the proportion of graduates in the UK labour force has finally begun to impact on the earnings premium of graduates over non-graduates, resolving the puzzle of the long-term constancy of the relative pay of graduates. Our finding of a decline in the average graduate premium also appears to align with the results of recent work carried out by Belfield *et al.* (2021). Drawing on LEO data for those born between 1985 and 1991, they find no significant premium for a degree around the age of 26 for males.[9] Using the LFS for those of a similar age, but born around 1970, Walker and Zhu (2008) estimated the return for males to be in the region of 25%. Though they did not have access to the range of controls available in the cohort studies, we note from Table 2 of our analysis that the premium appears fairly robust to the inclusion of relevant covariates. Belfield *et al.* (2021) find the premium at age 30 to be around 11% for males (once drop-outs from

[9] For reasons we discuss above concerning the inability to distinguish between part-time and full-time workers in LEO (and non-graduate females being more likely to be in the former mode of employment), Belfield *et al.* (2021) note that the results for females should be treated with caution.

higher education are excluded), after controlling for factors such as attainment, socioeconomic background and school fixed effects. Using the BCS70 and a similar group of controls, Naylor *et al.* (2016) observe the male graduate premium at age 30 for those born in 1970 to be 15%. Taken together, these results are therefore consistently suggestive of a decrease in the premium.

It might seem surprising that the graduate earnings premium is falling only among the later birth cohorts given that the higher education participation rate was rising most steeply for the earlier cohorts. We note, however, that even though the increase in participation was levelling off for those born after 1980, it is nonetheless the later cohorts which have the highest participation rates. Hence the *inflow* of these cohorts into the labour market will increase the proportion of graduates within the overall labour force *stock*, as they replace the *outflow* of retirees from earlier birth cohorts. That is, the relative supply of graduates within the labour market continues to increase well beyond the point at which the higher education participation rate ceases to rise. In addition, the relative earnings of graduates and non-graduates is determined not by relative supply alone but by the interaction of relative supply and relative demand: based on our findings, the impact on relative earnings of changes in relative demand for graduates appears to have been finally overtaken by rising relative supply for those born from the late 1980s.

Our results also resonate with recent evidence on the magnitude of the graduate earnings premium (also referred to as the college wage premium, CWP) for those aged between 25 and 34 in the US. Ashworth and Ransom (2019) report that, after two decades of growth, the CWP began to level-off from 1970 onwards. Furthermore, they observe a decline in the CWP for those born after 1977, based on their analysis of the National Longitudinal Survey of Youth 1997 and the Survey of Income and Program Participation. The authors suggest that this could be due to the demand for skilled labour flattening or perhaps even falling among more recent birth cohorts.[10]

3. Graduate earnings premia by class of degree awarded

Our main finding in Section 2 is that between the birth cohorts of 1970 and 1990, there was a fall of around 7 percentage points in the average graduate earnings premium. From our preferred specifications in Next Steps and BCS70 data, which incorporate a full battery of control variables, we estimate that the earnings premium for graduates over non-graduates fell from 17% for the 1970-born to 10% for the 1990-born. There are, of course, variations around the average graduate earnings premium according to factors such as degree subject studied and university attended, as noted by Belfield *et al.* (2018). Within a university degree course, there is also likely to be dispersion around the average premium according to the class of degree awarded to the graduate. This has implications for the extent to which higher education can enhance social mobility. Callender and Mason (2017) highlight

[10] Figure 2 in Blundell *et al.* (2016b) also illustrates the rising participation in higher education (and hence supply of graduates) within the US.

the positive association between aversion to debt and deprivation. Consequently, the rising private costs of study, alongside a lower expectation of financial rewards, could deter higher education participation among those from poorer backgrounds. Furthermore, with disadvantaged students more likely to graduate with a lower degree class, greater disparities may arise in the earnings of graduates by socioeconomic status.

In Section 3.1, we use Next Steps to estimate for the 1990 birth cohort at age 26 (i) the premium for an upper honours degree (a first or an upper second) relative to no degree (ii) the premium for a lower class degree (a lower second, third or pass) relative to no degree and (iii) the implied premium for an upper honours degree relative to a lower class of degree. Section 3.2 presents equivalent results for the 1970 birth cohort from BCS70 data and compares results across the two cohorts. Section 3.3 addresses the issue of the timing of changes in the premium for an upper honours relative to a lower class of degree by exploiting LDLHE and LFS datasets. Section 3.4 focuses solely on graduates and analyses premia by separate degree classes, distinguishing between first class honours, upper second class honours and a lower degree class.

3.1 Premia by class of degree for the 1990 birth cohort: Next Steps

In our Next Steps sample, earnings of graduates at age 26 vary substantially by degree classification. As we reported above, mean annual earnings were £24,977 for graduates and £21,592 for non-graduates, implying a graduate earnings premium of 16% in the raw data. However, this masks variation in the average earnings of graduates by class of degree. Graduates awarded an upper honours degree received mean annual earnings of £25,942 compared to £22,816 for those with a lower class of degree, implying an upper honours premium of 14% relative to a lower degree class in the raw data. The premium for an upper honours degree relative to non-graduates is 20%, with a premium of just 6% for a lower degree class relative to no degree in the raw data. The distribution of degree classes among graduates in Next Steps is consistent with what we observe in administrative HESA records (see Figure 2) for academic year 2010/11 (the modal year of graduation for the 1990 birth cohort), with a slightly higher proportion of graduates with at least an upper second class degree in Next Steps (69%) compared with the HESA data (64%).

Table 5 reports estimated coefficients based on a modified version of regression equation [1] in which the default category remains non-graduates, but graduates are now separated into two groups - those awarded an upper honours degree and those awarded a lower class of degree:

$$w_i = \alpha + \beta_U E_{iU} + \beta_L E_{iL} + X_i' \beta_2 + \varepsilon_i \qquad [2]$$

where w_i represents the natural logarithm of gross annual earnings (of full-time workers) by age 26 years, as in equation [1]. X_i represents the same set of controls included in equation [1], but we now distinguish degree award level with the binary variables $E_{iU} = [1, 0]$ (where 1 denotes graduates

awarded upper honours, U) and $E_{iL} = [1,0]$ (where 1 represents those awarded lower degree classes, L). Relative to non-graduates, the earnings premium for those awarded upper honours (that is, $[W_U - W_N]/W_N$) is measured from the estimation of regression [2] as $[\exp(\hat{\beta}_U) - 1]$. Similarly, the earnings premium for those awarded a lower degree class relative to non-graduates, $[W_L - W_N]/W_N$, is measured by $[\exp(\hat{\beta}_L) - 1]$. We refer to these as the upper honours graduate earnings premium and the lower degree class graduate earnings premium, respectively. We will also report the earnings premium for upper honours relative to a lower degree class, $[W_U - W_L]/W_L$, calculated as $\left[\exp(\hat{\beta}_U) - \exp(\hat{\beta}_L)\right] \Big/ \exp(\hat{\beta}_L)$. Note that this is not simply the difference between $[\exp(\hat{\beta}_U) - 1]$ and $[\exp(\hat{\beta}_L) - 1]$, as the base is no longer the earnings of non-graduates, though the two calculations will produce very similar results for small values of $\hat{\beta}_L$.

From Model 1 in Table 5, we see that, relative to non-graduates, the estimated premium associated with an upper honours degree is 21% and that for a lower degree class is 5%. The upper honours premium relative to a lower degree class is 15%. Once we control for the full set of characteristics included in our preferred specification - Model 8 - we estimate these premia for this 1990 birth cohort to be 14% (upper honours degree class relate to non-graduates), 3% (lower degree class relative to non-graduates) and 10% (upper honours relative to lower degree class), respectively.

The fall in the upper honours earnings premium (relative to a lower degree class) from 15% in model 1 to 10% in model 8 occurs predominantly due to controlling for household/family background and cognitive ability. In particular, this reduces the earnings premium associated with an upper honours award (relative to non-graduates), though it has little impact on the corresponding lower degree class premium. In section 2, we observed a similar pattern for the average graduate premium from the successive addition of controls in the Next Steps data. Our results here indicate that the findings in section 2 are being driven by the positive correlation between family background/cognitive ability, earnings and being awarded an upper honours degree. We note from this that there is substantial dispersion around the average graduate earnings premium of 10% reported in Section 2.1. Relative to non-graduates, those with an upper honours degree have earnings that are 14% higher, though the figure is just 3% (and not statistically significant) for those with a lower degree class. We now turn to the question of the extent to which these premia for the 1990 birth cohort differ from those of the 1970 cohort.

Table 5: The graduate premium by classification awarded based on earnings at age 25-26 in Next Steps (1990 birth cohort). The dependent variable is the log of (gross) annual earnings of full-time workers.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Estimated coefficient for upper honours	0.188*** (0.0209)	0.178*** (0.0199)	0.178*** (0.0193)	0.143*** (0.0187)	0.142*** (0.0190)	0.174*** (0.0193)	0.169*** (0.0196)	0.130*** (0.0207)
Implied upper honours premium (relative to non-graduates)	21%	19%	19%	15%	15%	19%	18%	14%
Estimated coefficient for lower degree class	0.0506* (0.0282)	0.0435 (0.0268)	0.0428 (0.0262)	0.0260 (0.0251)	0.0252 (0.0255)	0.0591** (0.0256)	0.0595** (0.0256)	0.0344 (0.0255)
Implied lower degree class premium (relative to non-graduates)	5%	4%	4%	3%	3%	6%	6%	3%
Implied upper honours premium (relative to lower degree class)	15%	14%	14%	12%	12%	12%	12%	10%
R-squared	0.0605	0.125	0.173	0.236	0.237	0.258	0.265	0.289
Sample size	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733
Cohort member personal characteristics		x	x	x	x	x	x	x
Cohort member non-cognitive skills			x	x	x	x	x	x
Parental/Household background				x	x	x	x	x
Parental attitudes towards education					x	x	x	x
Job tenure						x	x	x
Cohort member health							x	x
Cognitive ability								x

3.2 Premia by class of degree for the 1970 birth cohort: BCS70

We observed in Section 2.2 that mean net annual earnings in our sample of individuals in BCS70 are £12,660 for graduates and £10,580 for non-graduates, implying a graduate earnings premium of 20% in the raw data. Those with an upper honours degree report mean net annual earnings of £13,015, while the figure for graduates with a lower degree class is £12,301, implying an upper honours earnings premium of 6% relative to a lower degree class. Relative to non-graduates and based on the raw data, the upper honours graduate earnings premium is 23%, while the lower degree class graduate earnings premium is 16%.

We also noted in Section 2.2 that 20% of the BCS70 sample obtained a degree. Among these graduates, 7% were awarded a first class degree, 44% an upper second class degree and 49% a lower class degree. The Universities' Statistical Record for 1991 (the modal year for graduation for this birth cohort) reports that 9% of graduates were awarded a first class degree, 44% an upper second class degree and 47% a lower class degree in this year. Hence, the BCS sample appears to be representative by degree classification. We note that comparing the 1970 and 1990 birth cohorts, the share of graduates awarded an upper honours degree rose from 53% to 64%, with the share awarded a lower degree class falling from 47% to just 36%.

Table 6 reports results based on regression equation [2] using BCS70 data to replicate as closely as possible the analysis reported in Table 5 for the 1990 birth cohort. Based on Model 8, our preferred specification with controls for the full set of characteristics, we estimate the premia for this 1970 birth cohort to be 20% for an upper honours and 14% for a lower degree class (both relative to non-graduates) and hence derive an upper honours premium of 6% (relative to a lower class degree).

In contrast to Next Steps, we see here that the addition of household background has a similar impact on both the upper honours and lower degree class premiums (relative to non-graduates), with all other controls having minimal or no impact on the estimates. Hence, the upper honours premium relative to a lower degree class essentially does not change with the inclusion of relevant covariates. We note that there is much less dispersion around the average graduate earnings premium for this cohort compared to that for the later 1990 birth cohort.

Comparing the results from Next Steps with those of BCS70, we find that the premium for an upper honours relative to a lower degree class rose by 4 percentage points - from 6% to 10% - over the two decades between the two birth cohorts. Equivalently, the earnings 'penalty' associated with the award of a lower degree class relative to upper honours increased by 4 percentage points.

Table 6: The graduate premium by classification awarded based on earnings at age 26 in BCS70 (1970 birth cohort). The dependent variable is the log of (net) annual earnings of full-time workers.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Estimated coefficient for upper honours	0.218*** (0.0170)	0.217*** (0.0164)	0.211*** (0.0163)	0.179*** (0.0166)	0.177*** (0.0166)	0.190*** (0.0171)	0.189*** (0.0171)	0.182*** (0.0173)
Implied upper honours premium (relative to non-graduates)	24%	24%	23%	20%	19%	21%	21%	20%
Estimated coefficient for lower degree class	0.158*** (0.0171)	0.151*** (0.0164)	0.146*** (0.0164)	0.124*** (0.0165)	0.123*** (0.0165)	0.136*** (0.0171)	0.134*** (0.0171)	0.127*** (0.0172)
Implied lower degree class premium (relative to non-graduates)	17%	16%	16%	13%	13%	15%	14%	14%
Implied upper honours premium (relative to lower degree class)	6%	7%	7%	6%	6%	6%	6%	6%
R-squared	0.0568	0.140	0.152	0.200	0.202	0.208	0.211	0.214
Sample size	3,771	3,771	3,771	3,771	3,771	3,771	3,771	3,771
Cohort member personal characteristics		x	x	x	x	x	x	x
Cohort member non-cognitive skills			x	x	x	x	x	x
Parental/Household background				x	x	x	x	x
Parental attitudes towards education					x	x	x	x
Job tenure						x	x	x
Cohort member health							x	x
Cognitive ability								x

Summarising, those among the 1990 birth cohort graduating with a lower degree class have suffered relative to their counterparts in the 1970 birth cohort from the combination of two phenomena: (i) a fall of 7 percentage points in the average graduate earnings premium (from 17% to 10%, as reported in Section 2.2) relative to the 1970 birth cohort, and (ii) the increased dispersion around the average implied by the rise of 4 percentage points in the upper honours premium relative to a lower degree

class. The magnitude of this combined impact is witnessed in the premium for a lower class of degree, relative to non-graduates, falling by a precipitous 11 percentage points, from 14% to 3%.

We have shown in Section 2 that the average graduate earnings premium is falling only among those born in or close to 1990. We now turn to the question of the timing of the increased dispersion around the average by broad class of degree.

3.3 The timing of changes in premia by broad class of degree: LDLHE data

Using gross hourly pay in the 1990 GCS of graduates for a cohort born close to 1970, Naylor *et al.* (2016) estimate that the premium for an upper honours degree relative to a lower degree class was 8%-9% for graduates by ages 26-28, which is similar to our findings based on BCS70 (Table 6).[11] Additionally, they find tentative evidence (due to the small sample sizes) from the LFS that the premium was 12% for those aged 28-31 who were born in the early 1980s.[12] Collectively, these results indicate that the premium for an upper honours degree relative to a lower degree class increased over time among those born between 1970 and 1982. Here, we extend that analysis by estimating the magnitude of the upper honours premium relative to a lower degree class for a series of cohorts born after 1980.

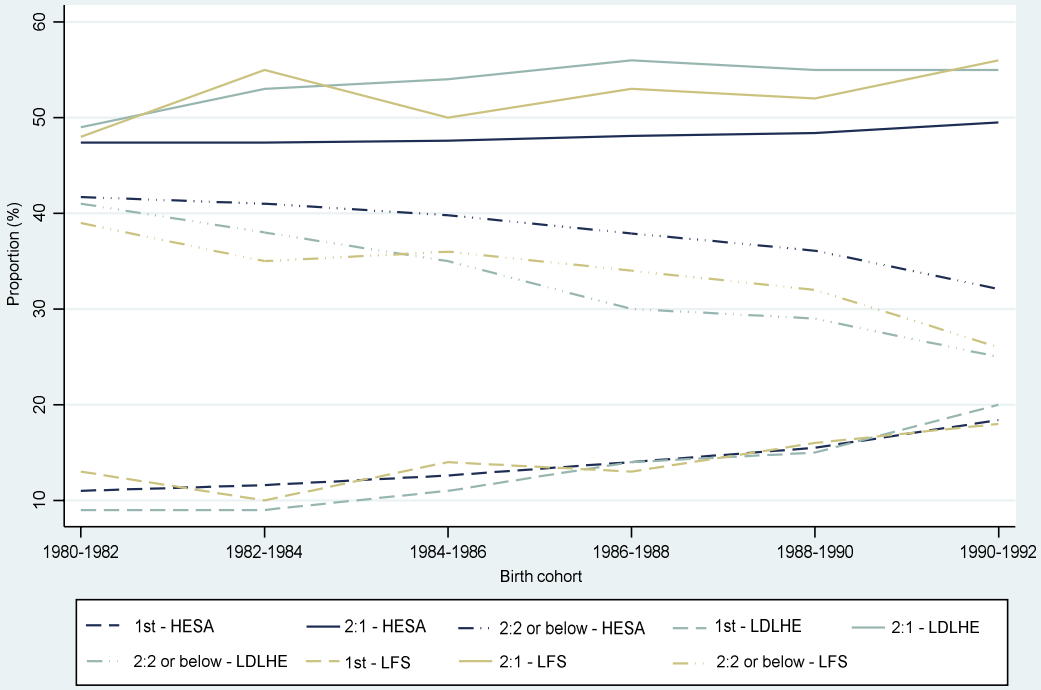
To investigate the further evolution of earnings premia by broad class of degree, we utilise two datasets – linked LDLHE-HESA data and the 2006-2018 LFS (discussed in section 2) – to examine changes in the premium for those born within the period 1980-1993. LDLHE refers to a bi-annual survey run by HESA for graduating cohorts between 2002/03 and 2012/13. Originally, HESA managed the Destinations of Leavers from Higher Education (DLHE) survey, which captured data on outcomes six months after graduation. As this was recognised to be a very early career point, graduates of the 2002/03 academic year were selected as the initial cohort to take part in LDLHE, which surveyed respondents who had participated in DLHE forty-two months after course completion. The final cohort to participate in LDLHE were qualifiers in 2012/13, leading to a total of six collections. Alongside the large sample size, a key advantage of the LDLHE survey is that it can be linked to administrative records held by HESA, which provide data on the class of degree awarded. In contrast to the cohort studies and LFS data, the degree classification awarded to the graduate is supplied directly by the university to HESA. To ensure greater comparability with LFS and the birth cohort studies, we restrict our sample of interest to those aged 18 or 19 on entry to higher education and who subsequently graduated within three to four years of beginning their full-time first degree course. Consequently, they will have been aged 25 or 26 at the time the LDLHE survey was administered.[13]

Figure 3 compares the distribution by degree class for LDLHE and LFS with the appropriate year(s) of graduation from the HESA data. We see there is generally good alignment between the sample and population distributions by class of award, with the main difference being that both surveys appear to

[11] This finding appears robust to the inclusion of a wider set of controls.
[12] The limitations of the LFS meant only a few controls could be included in the OLS models employed to estimate the premium.
[13] We also remove those who obtained another first degree or a postgraduate qualification from our sample.

capture a slightly higher proportion of graduates with an upper second class degree (as we also observe in Next Steps).

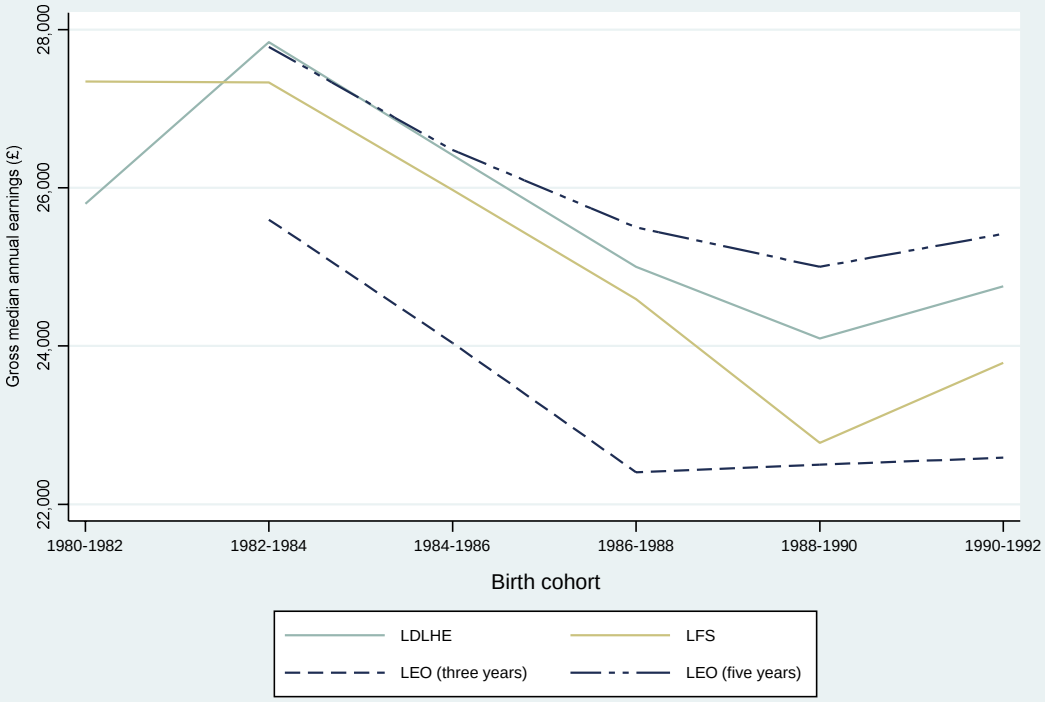
Figure 3 - The proportion of classified degrees by separate class of award in HESA, LDLHE and LFS



With regards to the real median annual earnings of graduates in the two datasets, Figure 4[14] displays the trend over time, alongside that observed in LEO data. Our rationale for including LEO analysis in this figure is to explore the similarities between the administrative and survey (self-reported) data, thus enabling us to comment on potential measurement error in the earnings information within LDLHE and LFS. We see in Figure 4 that LEO (five years after graduation), LDLHE and LFS all exhibit the same pattern, with real earnings falling among those born between 1982 and 1990, after which we observe an indication of recovery. The trajectory of earnings in LEO (three years after graduation) is slightly different, with a very modest rise in earnings evident for those born after 1988. We note that earnings in LDLHE (gathered 42 months after one qualifies) are higher than in LEO (three years after graduation) throughout the timeframe considered. This is despite changes in the way graduates were questioned about their earnings in LDLHE over the six collections. In earlier years, graduates were requested to provide their gross annual earnings, whereas in the last two LDLHE surveys, they were asked to supply their earnings and the period for which the figure referred to. One of the possible reasons for the higher earnings reported in LDLHE could be the fact that LEO cannot differentiate between full and part-time workers.

[14] Published LEO figures refer to median earnings only, which is the reason behind why we cannot utilize the mean in this instance.

Figure 4 - Gross real median annual earnings of (full-time employed) graduates



For both LDLHE and LFS, we regress the log of gross annual earnings of graduates on a dummy variable for whether the graduate was awarded upper honours or a lower degree class. This is a variant of equation [1] in which $E_i = [1, 0]$ (where 1 denotes an upper honours and 0 represents a lower degree class, respectively). As our objective is to examine whether there was any change in the premium among those born between 1980 and 1992, we add a set of five birth cohort dummies[15] as well as a corresponding set of dummies formed by interacting birth cohort and degree award. Given the absence of a rich set of controls in LFS, we do not include any further covariates in our model.[16] Results are provided in Table 7.

In LDLHE, the interactive dummies are all significant at the 1% level. We see that, relative to the default case of a graduate born in the period 1980-82 and awarded a lower degree class, a graduate of this same cohort but awarded upper honours would have enjoyed an earnings premium of 12%, which is in line with estimates presented by Naylor *et al.* (2016). For the 1982-84 cohort, this premium rises to 16%. The key finding is that the premium is remarkably constant thereafter (i.e. for graduates born in the interval 1982-1992). Therefore, we find no evidence of a change in the premium for the award of an upper honours over a lower class of degree for those born after 1982 and thus conclude that the

[15] In LFS, the final of the six birth cohorts covered the years 1990-1993. We use 1980-1982 as our reference category in our econometric analysis.
[16] Sex, ethnicity, disability and job tenure are available in both LDLHE and LFS. Their inclusion leads to little change in the results.

increase in this premium occurred solely in the earlier period - that is for those born between 1970 and 1982. Based on LFS, we find no evidence of a statistically significant change over the period (1980-1993 born), including for those born in the very early 1980s, though this is based on far smaller sample sizes, resulting in the estimates being less precise. In Model 1 of Table 5 based on Next Steps, we report the upper honours premium relative to a lower degree class to be 15%, which is very similar to the premium we find in LDLHE for a corresponding birth cohort. This also adds further reassurance around the degree classification data reported in Next Steps, which is self-reported by the individual (rather than supplied by the university).

Table 7: The premium for an upper honours award relative to a lower honours award based on (gross) annual earnings at age 25-26 in LDLHE and LFS

	LDLHE		**LFS**	
	Estimated coefficient	**Implied Premium**	**Estimated coefficient**	**Implied Premium**
Upper honours	0.109***	12%	0.0992***	10%
	(0.0103)		(0.0285)	
Upper honours*Birth cohort 1982-1984	0.0387***	16%	-0.0369	6%
	(0.0130)		(0.0417)	
Upper honours*Birth cohort 1984-1986	0.0455***	17%	-0.0561	4%
	(0.0130)		(0.0434)	
Upper honours*Birth cohort 1986-1988	0.0444***	17%	0.0283	14%
	(0.0123)		(0.0438)	
Upper honours*Birth cohort 1988-1990	0.0507***	17%	0.0567	17%
	(0.0120)		(0.0438)	
Upper honours*Birth cohort 1990-1992	0.0517***	17%	0.0250	13%
	(0.0117)		(0.0400)	
R-squared	0.0556		0.0594	
Sample size	59,830		2,997	

We conclude that while evidence provided in this paper and in previous research demonstrates that the average graduate earnings premium was broadly constant for most birth cohorts from 1970, falling only for cohorts in the period 1989-93, the increase in the premium associated with the award of upper honours relative to a lower degree class occurred primarily for the earlier birth cohorts – those of 1970-1982. We now address the question of why dispersion by degree class around the average graduate premium might have risen only for the earlier cohorts.

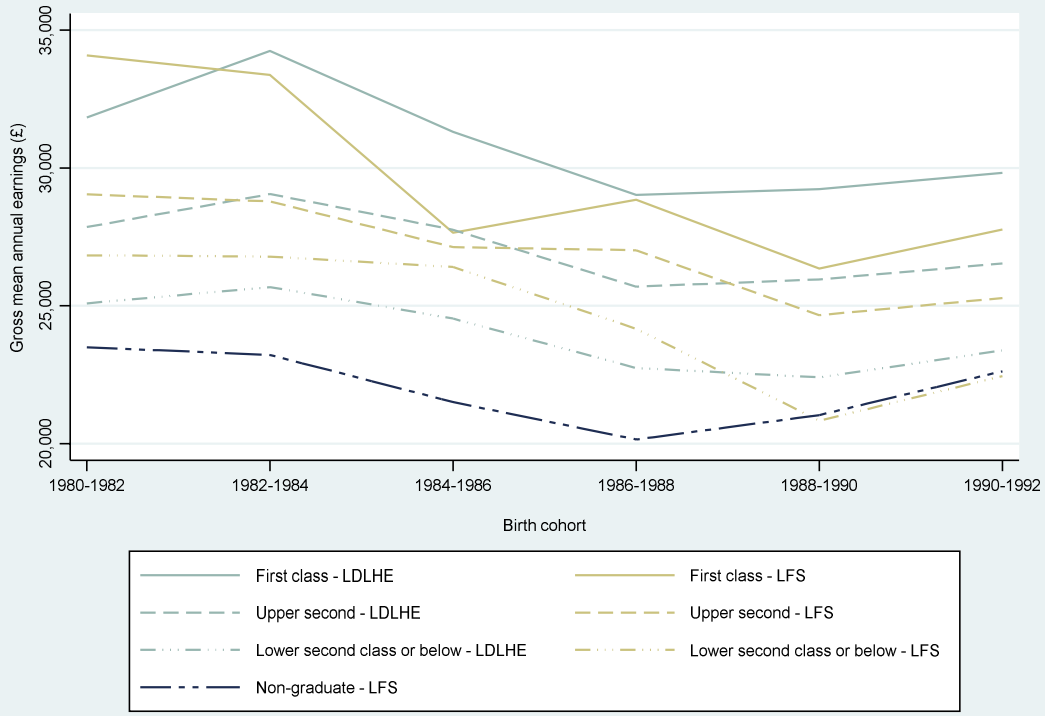
We consider two influences on the upper honours-lower degree class premium: (i) the rising participation of young people in higher education and (ii) the increase over time in the proportion of graduates awarded an upper honours degree. Within a signalling framework, the rise in higher education participation, *ceteris paribus*, will raise the upper honours-lower degree class premium [Ireland *et al.* (2009)], the intuition being that the value of the upper honours is greater with a higher proportion of graduates within a cohort. As higher education participation increased most rapidly among the earlier cohorts, this is consistent with these cohorts experiencing the widening dispersion in graduate earnings by degree class. The evidence of Figure 2 shows that the relative increase in the share of upper honours awarded occurred more rapidly among the later cohorts. This phenomenon would be expected to lower the premium for an upper honours relative to a lower degree class and was thus acting to offset any impact of increased participation for the later (but not for the earlier) cohorts, consistent with the evidence.

Finally, consider the lower degree class premium relative to non-graduates. This premium would have been impacted adversely both by the rising higher education participation rate and the increasing proportion of graduates with an upper honours degree. The rise in participation is associated both with a fall in the average graduate earnings premium and with an increase in the premium for an upper honours relative to a lower degree class, which results from the greater value of the upper honours signal or, equivalently, the deeper scarring of those with a lower degree class. These two effects were combining in the earlier period of rapid growth in participation (primarily affecting birth cohorts of the early 1970s) to reduce the lower degree class premium relative to non-graduates. In the later periods, higher education participation continued to grow, albeit at a slower rate, and hence there would have been ongoing downward pressure on the lower degree class premium relative to non-graduates. In addition to this, the later period was characterised by a decreasing proportion of graduates being awarded lower degree classes: this would have generated a second scarring effect on graduates awarded a lower degree class and hence exerted further downward pressure on the lower degree class premium relative to non-graduates in the later birth cohorts.

3.4 Earnings Premia by separate class of degree awarded

As noted previously, the growth in the proportion of upper honours awards over the past two decades has not occurred evenly, with the increase particularly driven by the rise in the percentage of first class awards. Hence, in estimating premia by separate degree class in this section of the paper, we restrict our LDLHE/LFS samples to graduates and distinguish between those with a first class honours, upper second class honours and lower second class degree or below.

Figure 5 - Gross real mean annual earnings of (full-time employed) graduates by separate class of award



When considering the (real) mean earnings of graduates by degree class in LDLHE (Figure 5), we note that the trend in earnings over time is very similar for each of the three degree classes considered, though between the 1980-1982 and 1982-1984 birth cohorts, those with a lower second class award experience a lower increase in their earnings compared with those with a first or upper second class degree. Indeed, we find that the raw premium for an upper second compared to a lower degree class rose from 11% to around 13% among those born in this period, with constancy usually observed thereafter. Meanwhile, the raw premium for a first relative to an upper second generally remains steady throughout and is found to be in the region of 13-14% for those born in the early 1980s and 1990s. A different pattern is observed within the LFS data, although this might be because of a much smaller sample size. The extent of the fluctuations in earnings of graduates with first class degree awards is greater, with the earnings of those with upper second class awards falling continuously for those born between 1980 and 1990. Graduates with lower degree classes born between 1980 and 1986 display near equivalent mean earnings, though a sharp fall is then evident for those born in the latter half of the decade.

Table 8: The premium for a first and upper second class degree based on (gross) annual earnings at age 25-26 in LDLHE and LFS.

	LDLHE		LFS	
	Estimated coefficient	**Implied Premium**	**Estimated coefficient**	**Implied Premium**
First class (relative to upper second)	0.118***	13%	0.103**	11%
	(0.0191)		(0.0437)	
First class*Birth cohort 1982-1984	0.0199	15%	-0.00338	10%
	(0.0225)		(0.0658)	
First class*Birth cohort 1984-1986	0.0133	14%	-0.0593	4%
	(0.0217)		(0.0643)	
First class*Birth cohort 1986-1988	0.00962	14%	-0.0258	8%
	(0.0209)		(0.0644)	
First class*Birth cohort 1988-1990	0.00923	14%	-0.0191	9%
	(0.0205)		(0.0623)	
First class*Birth cohort 1990-1992	0.00336	13%	0.000900	11%
	(0.0200)		(0.0549)	
Upper second (relative to lower honours)	0.0935***	10%	0.0772***	8%
	(0.0105)		(0.0299)	
Upper second*Birth cohort 1982-1984	0.0299**	13%	-0.0309	5%
	(0.0133)		(0.0433)	
Upper second*Birth cohort 1984-1986	0.0329**	13%	-0.0439	3%
	(0.0133)		(0.0455)	
Upper second*Birth cohort 1986-1988	0.0311**	13%	0.0337	12%
	(0.0126)		(0.0457)	
Upper second*Birth cohort 1988-1990	0.0365***	14%	0.0587	15%
	(0.0123)		(0.0459)	
Upper second*Birth cohort 1990-1992	0.0339***	14%	0.0216	10%
	(0.0120)		(0.0417)	
R-squared	0.0754		0.0678	
Sample size	59,830		2,997	

We adopt a slightly modified approach to that used in the previous section (3.3). While those with a lower degree class remain the reference category, we separate those with a first from graduates with an upper second. The two group categories are then interacted with the five birth cohort dummies.

We see from Table 8 that none of the interaction terms is significant in the LFS data, but this might be due to the relatively small sample size. Focusing on LDLHE, while the interaction terms involving a first class degree are insignificant, the interaction terms with the upper second class dummy are all significant at the 1% or 5% level. Indeed, there appears to have been an increase in the premium for an upper second relative to a lower degree class between the 1980 and 1982 birth cohorts, before stabilising thereafter. Consequently, the rise in the premium observed in section 3.3 (Table 7) for the broader upper honours degree class seems to have been predominantly the result of the rising premium for an upper second relative to a lower degree class.

We view this evidence as consistent with a labour market signalling interpretation in which the rapid growth in higher education participation among cohorts born in the 1970s led to an increase in the value attached to graduating with a minimum of an upper second class degree. Those with lower degree classes were increasingly scarred. This interpretation is supported by evidence that the response of employers to the rising number of graduates entering the workforce was to increasingly filter out applicants who graduated with less than an upper second [see, for example, ISE (2010)]): though there is no evidence of any widespread tendency for employers to stipulate the award of first class honours in their recruitment criteria.

4. Conclusions and Further Remarks

Exploiting data from Next Steps, we have estimated the average graduate earnings premium relative to non-graduates by age 26 for a cohort of young people born in 1990 to be 10%. From BCS70 data for a 1970 birth cohort, we estimate the equivalent graduate earnings premium to have been 17%, from which we conclude that the graduate earnings premium fell by around 7 percentage points across these two birth cohorts. Complementary analysis based on LFS data corroborates this finding of a fall in the graduate earnings premium. We also show evidence that the decline in the premium impacted only on those born close to 1990: specifically, on those born over the period 1988-93. That the decline is restricted to these later-born cohorts explains why it has tended not to be detected in previous research. Our evidence suggests that the previously puzzling constancy of the graduate earnings premium over a long period of rising higher education participation may no longer hold, with the increasing relative supply of graduates within the labour market finally producing a decline in the average earnings of graduates relative to non-graduates.

We have also estimated the extent of dispersion around the average graduate earnings premium by broad class of degree awarded, distinguishing between upper honours and lower degree classes. From Next Steps, we estimate the premium for an upper honours over a lower degree class to be 10% by

age 26 for those born in 1990: this is 4 percentage points higher than the equivalent premium of 6% for those born in 1970, based on BCS70 data. From analysis of LDLHE, we conclude that this increase in the earnings premium for an upper honours over a lower degree class is associated with those born between 1970 and 1982: there was no increase in the premium for those born during the period 1982 to 1992. We interpret the rise in this premium for the earlier birth cohorts as attributable at least in part to the rapid growth among early 1970s birth cohorts in the higher education participation rate. In a labour market signalling framework [Ireland *et al*. (2009)], this will have increased the value of the signal associated with being a more highly-ranked graduate: intuitively, when there are more graduates, it is more important to 'stand out from the crowd'. Equivalently, the scarring associated with the award of lower degree classes deepens with the rising higher education participation rate. We find that the earnings premium for an upper honours over lower degree classes did not continue to rise for birth cohorts over the period 1982-1992 despite continued, albeit slower, growth in the participation rate. We suggest that this is consistent with the fact that for these later birth cohorts, there was an acceleration in the share of graduates awarded upper honours, which would have tended to exert downward pressure on the upper honours-lower degree class premium, *ceteris paribus*.

The combination of the decline in the average graduate earnings premium together with the increased premium for an upper honours relative to a lower degree class across the 1970 and 1990 birth cohorts has necessarily resulted in a fall in the earnings premium for those awarded a lower degree class relative to non-graduates. Our estimates imply a fall in this premium of 11 percentage points, from 14% for the 1970 birth cohort to just 3% for those born in 1990. The magnitude of the fall in the earnings premium associated with the award of a lower degree class (relative to non-graduates) is likely to reflect two sources of labour market scarring, arising from (i) the impact of the growth in higher education participation among those born in the early 1970s, which would have contributed to the increased premium for an upper honours relative to a lower degree class and (ii) the increase in the share of graduates awarded upper honours degrees, occurring more rapidly among those born in the 1980s, which would have further scarred the diminishing number of those graduates awarded a lower degree class.

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