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THE RETURN TO A DEGREE

NEW EVIDENCE BASED ON THE BIRTH COHORT STUDIES AND THE LABOUR FORCE SURVEY

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October 2019

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Acknowledgements

We would like to thank anonymous reviewers for their helpful comments on earlier drafts of this report. Any remaining errors are the sole responsibility of the authors.

OBJECTIVES AND SUMMARY OF KEY RESULTS

This briefing paper has four principal objectives. First, we provide estimates of the financial return to a degree based on the Next Steps longitudinal dataset of individuals born in England between 1989 and 1990. Second, we compare results for this cohort with similar estimates obtained for a 1970 birth cohort by analysing the British Cohort Study of 1970 (BCS70). Consequently, we are able to explore the evolution in the return to a degree across a period of time during which there have been extensive changes in both higher education and the labour market. Third, we investigate the sensitivity of our findings regarding any movement in the degree return across the 1970 and 1989-90 birth cohorts by considering corresponding birth cohorts constructed using Labour Force Survey (LFS) data for these two periods. Finally, we examine birth cohorts assembled using the LFS over the period 1980 to 1991 to evaluate the trajectory of the return to a degree over this time frame.

Our main findings are as follows. First, from exploration of the Next Steps dataset, we find that the raw return[1] to a degree for the 1989-1990 birth cohort observed in either 2015 or 2016[2] (at 25-26 years of age) is 16%. After controlling for a set of personal and family background characteristics, the estimated return falls to 11%. When the full range of controls are incorporated, we do not observe any evidence of a statistically significant gender difference in the return to a degree at the five percent level.

Second, analysing the BCS70 dataset, we obtain a raw return of 21% for the 1970 birth cohort observed in 1996 (at 26 years of age). Following the addition of a rich set of controls – as similar as possible to those introduced in the Next Steps analysis (see annex 2 for more details) – the estimated return to a degree falls to 19%. Again, there is no evidence of a statistically significant gender difference in the return at the five percent level, once all controls are introduced. To the extent that the two birth cohort datasets are representative and comparable over time, our results imply that there has been a fall of around 5 percentage points in the average raw return to a degree across the 1970 and the 1989-90 birth cohorts by age 26. Following the inclusion of a comprehensive set of controls, we observe a decline of around 8 percentage points.

Third, from our analysis of LFS data, we find that at age 25-26, the raw return to a degree is 25% for males and 44% for females within the cohort of those born in or around 1970. For those born in or around 1990, the raw return at age 25-26 is found to be 19% for both men and women. Hence, from LFS data, there is corroborating evidence of a fall in the return to a degree over the 1970 and 1989-90 birth cohorts. Finally, additional analysis of LFS birth cohorts over the period 1980 to 1991 suggests that the decrease in the return to a degree is a very recent development.

The next section of this paper provides a policy motivation for our analysis. Subsequent sections describe data, methodology and results in more detail. The final section offers conclusions and further remarks.

[1] We are defining the return to a degree as the percentage by which the hourly pay of graduates exceeds that of non-graduates. Graduates are those holding a first degree only (and therefore our definition does not include those who hold other higher education qualifications only or individuals with postgraduate qualifications). Non-graduates are those whose highest educational qualification is either A-levels, GCSEs or equivalent.
[2] Whilst the wave 8 survey for Next Steps was designed to occur at age 25, the survey period ran from August 2015 to September 2016. Consequently, individuals will have been either 25 or 26 at the time of taking part.

POLICY CONTEXT

Following the rapid expansion in university attendance between the late 1980s and early 1990s, successive UK governments have continued to implement policies aimed at encouraging higher education enrolment. The higher education initial participation rate (HEIPR) now stands at just over 50% (Department for Education, 2019a). This growth in the supply of graduates relative to non-graduates might have been expected to have caused a decline in the return to a university degree. However, most of the research literature has tended to conclude that the return to higher education has stayed relatively constant, despite the increase in the supply of graduates.

Analysing the LFS, Blundell *et al.* (2016b) demonstrate that for successive birth cohorts over the period 1965 to 1989, the return essentially remained unchanged, with the 2008 recession seeming to have had an equally adverse impact on the earnings of both graduates and non-graduates.[3] Drawing upon the same dataset, Walker and Zhu (2008) reach similar conclusions regarding the stability of the return to a degree, where the focus is birth cohorts between 1957 and 1980. The explanation for the apparent puzzle tends to identify skill-biased technological change leading to greater demand for highly-educated individuals. However, there is no guarantee that the opposing forces of increasing demand and supply will continue to just offset each other. Indeed, Blundell *et al.* (2016a, 2016b), citing evidence of increasingly decentralised management structures as a factor raising the relative demand for graduates, note that once the transition to new structures has generally occurred, one might expect the return to a degree to decline. This further motivates our attempt to add to research knowledge on changes over time in the financial return to a degree.

Furthermore, awareness of the potential financial benefits to higher education is essential both for policy design and to support individuals and their families in making well-informed educational investment decisions. Indeed, the provision of information, advice and guidance to inform student choice formed an important aspect of the recently released Post-18 Education and Funding Review (Department for Education, 2019b).

Concerns that some graduates might not be benefitting fully from higher educational investments has been raised in work produced by the Office for National Statistics (Savic *et al.*, 2019), which indicated that a growing proportion of graduates are overqualified for their job. At the same time, Belfield *et al.* (2017) note that in England, changes to the funding system since 2012 (most notably the rise in fees and the removal of maintenance grants) has led to students who rely on the loan system incurring growing levels of financial liability. The capacity of graduates to repay student loans will largely depend on their salaries and hence an understanding of the evolution in the return to a degree is vital for policy-makers shaping student funding arrangements, particularly in light of the shift in the way student loans are treated in public sector finances (Moskalenko and Firth, 2019).

[3] Britton *et al.* (2015) find evidence that possessing a degree provided earnings protection after the recession.

THE ESTIMATED RETURN TO A DEGREE FOR THE 1989-1990 COHORT (NEXT STEPS)

The Longitudinal Education Outcomes (LEO) administrative dataset (which links education, benefit and tax records) has become the primary source for understanding the trajectory of graduate earnings. This is due to its comprehensive coverage of the population, coupled with high-quality information on pay. Whilst it can be used to examine the return to a degree, the lack of any detail on factors such as non-cognitive skills, work tenure and parental attitudes prevent causal estimates from being generated. Additionally, as this is a relatively new source, it does not currently allow an assessment of how the return to a degree is changing over time. Given these limitations, the birth cohort studies continue to make a valuable contribution in estimating the return to higher education in the UK. Although they offer a much smaller sample size than administrative data sources, birth cohort data tend to be rich in detail on personal characteristics and avoid potential problems associated with conflating age, time and cohort effects. Moreover, with data collected from parents and children, there is useful information available on the household, as well as parental views towards education.

The National Child Development Study (NCDS) for the 1958 birth cohort and the BSC70 for the 1970 birth cohort have both been used extensively for the analysis of the return to a degree.[4] The Next Steps dataset, however, represents a comparatively under-exploited resource. Initially known as the Longitudinal Study of Young People in England (LSYPE), Next Steps began by following the lives of around 16,000 people born in 1989-90 in England from the age of 13-14. Cohort members were surveyed annually until 2010, with the objective of the study being to understand more about the transitions made by young people from secondary school into the labour market or higher education. In order to gather evidence on outcomes in early adulthood, a further sweep took place in 2015-16 at the age of 25 or 26. Information on education and employment, as well as on family background, non-cognitive skills and individual health was collected from participants. As such, this resource provides an opportunity for research into the return to a degree for a cohort of individuals born two decades after those captured by the BCS70 study.

This briefing paper presents evidence in this field based on the analysis of employment and educational outcomes of the Next Steps cohort at the age of 25-26. Restricting the sample to employed individuals for whom we have earnings information in the 2015-16 sweep, we follow the standard approach in estimating a regression of earnings against educational attainment using ordinary least squares (OLS), where we distinguish between graduates and non-graduates (as defined in footnote 1). The dependent variable is the log of the hourly pay rate.[5] Table 1 presents results.[6]

Model 1 in Table 1 reports the estimated coefficient associated with obtaining a degree, without the inclusion of any control variables. The estimated degree return is 16%. As Next Steps data permit us to incorporate a rich set of controls, models reported in subsequent columns show how the estimated return to a degree varies as successively more covariates are included in the regressions. Model 7[7], with the inclusion of a comprehensive set of controls, reports an estimated degree return of 11%.[8] Not surprisingly, the inclusion of work tenure causes an upward jump in the estimated return as graduates will typically have 3-5 years less labour market experience than those with A-level or GCSE qualifications only. It is noticeable that when parental/household characteristics are added in Model 4, the estimated return falls considerably, reflecting the positive correlation between these characteristics and the likelihood of participating

[4] See, for example, Blundell *et al*. (2005) for an analysis of the return to a degree based on the NCDS birth cohort.
[5] This is calculated by dividing derived weekly wages by the respondent's usual hours worked in the week.
[6] Coefficients in tables are in log points, which we convert into percentage points for our commentary using the formula exp(β) – 1, where β represents the regression coefficient. For all our tables, *** indicates significance at the one percent level, ** at the five percent level and * at the ten percent level. For categorical variables with more than one dummy included in the model (e.g. parental education), we have illustrated their joint significance.
[7] For interested readers, we have supplied a fully specified model for both Next Steps and BCS70 in annex 1, which details the significance and magnitude of the coefficient for all control variables we have included.
[8] We do not control for employment characteristics, such as industry, region of work or occupation, as we are treating hourly pay as the measure of the overall return and not as the net reward after controlling for the effect of education on other outcomes such as entry into particular industries or occupations.

in higher education. In equivalent specifications in which education-gender interaction terms were also included in the regressions, we found that the term was not significant at the five percent level in model 7, implying that the return to a degree is the same for both men and women for this 1989-90 birth cohort. This contrasts with the results of Belfield *et al.* (2018) using LEO data. A key reason behind this difference, as the authors hypothesise, appears to be the differential working patterns of graduate and non-graduate females. This cannot be accounted for in LEO analysis, due to working hours data being unavailable. In the Next Steps dataset, where such information has been provided, we find a quarter of non-graduate females were working part-time, as opposed to just eight percent of graduate females. The use of hourly pay (rather than annual earnings) therefore plays a central role in understanding the differing conclusions of the two pieces of analysis. For both graduates and non-graduates, the hourly pay of women is estimated to be approximately 12% lower than that of men.

Table 1: Return to education at age 25-26 in Next Steps. The dependent variable is log of hourly pay. 'Graduate' includes only first degree qualifiers. The reference group of 'non-graduate' includes only those with GCSEs and A-levels as their highest qualification (or equivalent).

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Graduate	0.147***	0.119***	0.117***	0.0840***	0.0812***	0.107***	0.105***
Female	-0.108***	-0.112***	-0.110***	-0.113***	-0.112***	-0.102***	-0.0999***
R-squared	**0.0771**	**0.104**	**0.145**	**0.199**	**0.201**	**0.220**	**0.229**
Sample size	**1862**	**1862**	**1862**	**1862**	**1862**	**1862**	**1862**
Controls							
Cohort member background		x	x	x	x	x	x
Cohort member non-cognitive skills			x	x	x	x	x
Parental/household background				x	x	x	x
Parental attitudes towards education					x	x	x
Work tenure						x	x
Cohort member health							x

Based on the results presented in Table 1, our conclusion is that by age 25-26 the average raw return to a degree in the UK for those born in 1989-90 is approximately 16%, with about 5 percentage points of this explained by the various characteristics controlled for in the specification reported under Model 7. Age 25-26 is relatively younger than one would ideally choose for the analysis. As the Belfield *et al.* (2018) report alludes to, the earnings differential between graduates and non-graduates continues to grow steeply up until 30 (and beyond for men). The Next Steps data, however, restricts us to this age as we are exploiting the most recent sweep, conducted in 2015-16. In the next section of this briefing paper, we will investigate evidence on the extent of the degree return at age 26 for the earlier cohort of those born in 1970. In this way, we intend to examine patterns in the return across these two birth cohorts separated as they are over two decades in which there have been substantial changes both in the education sector and in the labour market.

COMPARING THE ESTIMATED RETURN TO A DEGREE ACROSS THE 1970 (BCS70) COHORT AND THE 1989-1990 (NEXT STEPS) COHORT

Based on our analysis of the Next Steps data, we replicate the models presented in Table 1 using BCS70 data, defining variables and sample selections as closely as possible. BCS70 follows the lives of 17,198 individuals born between the 5th and 11th April 1970. The first survey took place at birth, with the study initially administered under the aim of collecting medical information. However, the scope of enquiry widened in future sweeps, resulting in data on education and employment being gathered from cohort members during early adult life. We therefore attempt to detect changes in the return to a degree across two cohorts which span a period during which there has been a large increase in higher education participation. For the BCS70 cohort, Table 2 presents results of the OLS regression of the log of hourly pay at age 26 against educational attainment, distinguishing between graduates and non-graduates, defined as in Table 1 for the Next Steps cohort.

Table 2: Return to education at age 26 in BCS70. The dependent variable is log of hourly pay. 'Graduate' includes only first degree qualifiers. The reference group of 'non-graduate' includes only those with GCSEs and A-levels as their highest qualification (or equivalent).

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Graduate	0.187***	0.182***	0.174***	0.151***	0.148***	0.173***	0.171***
Female	-0.0896***	-0.0892***	-0.0906***	-0.0901***	-0.0912***	-0.0872***	-0.0824***
R-squared	**0.0878**	**0.0910**	**0.108**	**0.155**	**0.158**	**0.177**	**0.180**
Sample size	**4191**	**4191**	**4191**	**4191**	**4191**	**4191**	**4191**
Controls							
Cohort member background		x	x	x	x	x	x
Cohort member non-cognitive skills			x	x	x	x	x
Parental/household background				x	x	x	x
Parental attitudes towards education					x	x	x
Work tenure						x	x
Cohort member health							x

From Table 2, the estimated average raw return to a degree is 21%. Model 7, with the inclusion of the most comprehensive set of controls available, shows an estimated degree return of 19%. As with the case of the Next Steps analysis, the inclusion of work tenure causes a rise in the estimated return, while the addition of parental/household characteristics has the opposite effect. Again, we find the education-gender interaction term in the fully specified model to not be significant at the five percent level, implying an equal return for both men and women. Amongst both the graduate and non-graduate populations, the hourly pay of women is estimated to be approximately 9% lower than that of men. Hence, data from the two cohort studies suggests that the gender pay gap over the two decades has remained fairly constant, even once we account for other potential determinants of pay.

Comparison of the results presented in Tables 1 and 2 indicates that the return to a degree by age 25-26 for those born in 1989-90 is, on average, between 5 and 8 percentage points lower than for their counterparts born two decades earlier. To the extent that this is a robust finding, it represents evidence of a fall in the average return to a degree across birth cohorts. This could be an indication that increases in higher education participation over time are finally beginning to dominate skill-biased demand-side factors, following a period in which the general consensus has been that these two sets of determinants had tended to be in balance.

Clearly, an important issue concerns comparability between the Next Steps and BCS70 samples. BCS70 is intended to be a representative sample of the 1970 birth cohort as it captures all individuals born in Britain in a specific period within the year. Next Steps is intended to be representative of those born in England in 1989-90.[9] Provided that each of the two datasets succeeds in being representative of the full populations along dimensions of interest, that Next Steps follows individuals and their families from age 13-14 rather than from birth, as in BCS70, should not itself be problematic – at least for evidence regarding the raw return – as our dependent variable and sample selections largely relate to data collected after the age of 13-14. As far as Models 2-7 are concerned, differences in estimated coefficients between the two surveyed cohorts might, to some extent, reflect discrepancies in the definitions of control variables included in the analysis. We note, though, that the gap in the return to a degree over the two cohorts does not change a great deal once relevant control variables are added to the models.

[9] We find that our results are robust to restricting the BCS70 sample to just those born in England.

COMPARING THE RETURN TO A DEGREE FOR THE 1970 AND 1989-1990 BIRTH COHORTS USING LABOUR FORCE SURVEY DATA

Having found evidence from our comparison of BCS70 and Next Steps data of a fall in the average return to a degree at age 25-26 between the 1970 and 1989-90 birth cohorts, we attempt to corroborate this by constructing similar birth cohort samples using LFS data and subsequently replicating our analysis. LFS is a UK-wide survey that has the primary purpose of collecting information that enables assessment of the state of the labour market, with data having been gathered quarterly since 1992. It adopts a rotating panel design, whereby individual respondents are sampled for five successive quarters before being replaced. The availability of information on earnings and highest qualification attained enables us to use this dataset to analyse the return to a degree.

To assemble an LFS cohort that aligns with the BCS70 birth cohort, as well as to ensure a reasonable sample size, we take hourly pay data[10] from the LFS during the period 1995-1997 for those aged 25 or 26. This corresponds to individuals born in the period 1969-1972. We approximate the Next Steps cohort with an LFS sample based on individuals born in the period 1989-93 and aged 25 or 26, with hourly pay observed in the LFS between 2015 and 2018. Based on these constructed samples corresponding to each of the two birth cohorts, Table 3 presents results of the OLS regression of the log of hourly pay at ages 25-26 against educational attainment, distinguishing between graduates and non-graduates, as defined previously. We present results only for the average raw return – that is for Model 1 – as LFS data do not provide us with the sorts of controls used in Models 2-7 for the BCS70 and Next Steps data.

Table 3 shows that for those born in or around 1990, the raw return at age 25-26 is found to be approximately 19% for both men and women: the estimated coefficient on the education-gender interaction term is not statistically significant at the five percent level. For males born around 1970, the raw return to a degree is 25% and for females it is 44%. For each birth cohort, the magnitude of the return to a degree based on LFS data is higher than those found in the cohort-based datasets of BCS70 and Next Steps – especially in the case of women born in or around 1970.

In terms of changes in the return between cohorts, the evidence based on LFS data corroborates our findings from the comparison of BCS70 and Next Steps data: analysis of LFS indicates that the return to a degree has fallen between the 1970 and 1989-90 birth cohorts – by about 6 percentage points for men and by 25 percentage points for women. The extent of the fall in the return for men is very similar to the fall of 5-8 percentage points obtained from comparison of BCS70 and Next Steps, while the size of the fall for women is much greater and arises from the very much larger degree return for women derived from the LFS data for those born around 1970: only in those data is there a statistically different return by gender. While the essential story is one of a decrease in the return to a degree between the two cohorts – based both on the comparison between BCS70 and Next Steps data sources, as well as the comparison within LFS data – the issue which is unresolved and merits future investigation is why there is such a difference in the estimated return to a degree for women born in or around 1970 between the BCS70 and the LFS data sources.

[10] Hourly pay data is taken from quarter 1 respondents throughout. Quarter 5 data is not used to prevent the same individual appearing more than once in our sample.

Table 3: Return to education at age 25-26 in LFS. The dependent variable is log of hourly pay. 'Graduate' includes first degree qualifiers only. The reference group of 'non-graduate' includes only those with GCSEs and A-levels as their highest qualification (or equivalent). No other covariates are included.

	1989-1993 birth cohort	1969-1972 birth cohort
Graduate	0.170***	0.221***
Female	-0.0611**	-0.139***
Graduate*female	-0.0258	0.146***
R-squared	**0.0706**	**0.150**
Sample size	**1526**	**2503**

In an analysis similar to ours, Blundell *et al.* (2016a, 2016b) use LFS data to compare the average raw return to a degree for successive birth cohorts up to and including those born in the five year period 1984-1989. Despite the huge increases in the relative supply of graduates over these cohorts, they report no fall in the return to a degree. One possible explanation for the difference between this finding of constancy and ours of a fall in the return to a degree is that in the Blundell *et al.* (2016a, 2016b) analysis, the definition of graduates includes those obtaining postgraduate qualifications. As the proportion of the population taking postgraduate courses has been increasing over time, the inclusion of postgraduates in the sample of graduates may have the effect of offsetting any fall in the return to those with only an undergraduate degree, depending on the extent of the return to a postgraduate over an undergraduate degree and on how this has been changing over time. We have replicated the Blundell *et al.* (2016a, 2016b) analysis, extending the sample to the later 1989-93 birth cohort within LFS with earnings observed between 2015 and 2018. We observe stability in the return to a degree when the definition of graduates includes those with postgraduate degrees.

Finally, given our finding within LFS of a fall in the return to a degree between those born in or around 1970 and those born around 20 years later, we have estimated the return for a sequence of birth cohorts over the period 1980 to 1991 in the manner of the Walker and Zhu (2008) analysis. Unlike their results covering birth cohorts up to 1980, which indicated no fall in the return to a degree despite large increases in higher education participation, we find evidence of a decline in the return for the most recent cohorts (see Table 4).

The default case refers to those born around the period 1980-1983, with hourly pay observed in 2006-2008 at ages 25-26. For this group, the average raw return to a degree is 25%. For those born four years later, the results suggest a slight fall of around 1 percentage point in the degree return, but for those born approximately eight years later, the average raw return appears to have decreased by around 8 percentage points, suggesting that the decline we have discussed in this briefing paper appears to be a very recent phenomenon.

Table 4: Return to education at age 25-26 in LFS between 2006 and 2016. The dependent variable is log of real hourly pay.[11] The reference group of 'non-graduate' includes only those with GCSEs and A-levels as their highest qualification (or equivalent). No other covariates are included.

Graduate	0.225***
Female	-0.0632***
1984-1987 birth cohort	-0.0535**
1988-1991 birth cohort	-0.0552**
graduate*1984-1987 birth cohort	-0.0106**
graduate*1988-1991 birth cohort	-0.0748**
R-squared	**0.115**
Sample size	**2458**

[11] We use the Consumer Prices Index including owner occupiers' housing costs to generate a real hourly pay variable. 2015 is used as a base year.

CONCLUSIONS AND FURTHER REMARKS

The main contribution of this briefing paper is to provide new evidence regarding the average return to a degree in the UK for a cohort of individuals born in 1989-90, based on data from the Next Steps longitudinal survey. For this cohort, we report an average raw return at age 25-26 of 16%, falling to 11% when a comprehensive set of controls is included in the analysis.

A second contribution is to replicate our analysis on BCS70 data and to compare results with those for the later Next Steps cohort. For the 1970-born cohort, we find that the average return to a degree at age 26 was 21%, falling to 19% after including a full battery of controls. This evidence is consistent with the return to a degree having fallen – in the neighbourhood of 5 to 8 percentage points – for those born in 1989-90 relative to those born in 1970.

In a third contribution, we approximate the 1970 and 1989-90 birth cohorts within LFS data and compare outcomes, finding a fall in the return to a degree over these two cohorts, corroborating results based on the comparison across Next Steps and BCS70. For men, the fall is 6 percentage points, but for women, the decline is much greater at 25 percentage points. Finally, we use the LFS to report evidence that the fall in the return to a degree appears to be a very recent phenomenon, impacting at age 25-26 only on those born around 1988-1991.

Our key finding of a decline in the return to a degree for recent cohorts should be regarded as tentative for the following reasons. Firstly, our investigation of the LFS indicates that the decrease in the return to a degree mainly applies to those born after 1987. However, we are unable to determine whether this represents a short-term dip or is the beginning of a longer-term decline, as this can only be assessed when further data on more recent cohorts is released. In our analysis, due to data availability, we have focused on a relatively early stage in the careers and associated earnings of young people. The problem with evaluating earnings early in the lifecycle is that current evidence presented by Belfield et al. (2018) using LFS data indicates that graduate earnings grow more steeply than those of non-graduates at least until the age of 30 (and beyond for men). Similar findings are also reported by Bhuller et al. (2017), as well as Walker and Zhu (2011). Indeed, data restrictions have often resulted in research in this area being conducted a relatively short time after graduation. For instance, the most recent publication in the field by Belfield et al. (2018) concentrated on earnings at age 29 using LEO data. These constraints will inevitably be reduced, as LEO and birth cohort studies data becomes available at later ages. Indeed, it is our intention in future research to extend our analysis using birth cohort studies to later in the lifecycle. This will be done through examining later sweeps of the Next Steps study (e.g. at age 31) and comparing this to results generated from BCS70 at near equivalent ages. This will enable us to identify whether the decline in the return to a degree continues to be observed throughout the lifecycle, as it may be that the trajectory of graduate earnings for more recent birth cohorts differs to that of those born approximately two decades earlier.

In the results we have presented in this paper, we have not controlled for measures of ability. The BCS70 does provide appropriate indicators in the form of British Ability Scale assessments, though we find that inclusion of these makes little difference to the return to a degree, which is in line with analysis reported in Naylor et al. (2016). In the case of Next Steps, with data having been collected from the age of 13-14 onwards, early years test scores are unavailable. The closest proxy that can be used is Key Stage 2 (KS2) attainment through the linking of Next Steps to the National Pupil Database (NPD). We intend to explore this further in future work.

Although we have focused only on the overall return to higher education in this briefing paper, in further work, we will examine heterogeneity in the return by class of degree awarded. The issue of a rising number of graduates receiving an upper second class degree or higher has been the subject of recent debate about possible grade inflation. As well as analysing data from the birth cohort studies and from LFS, we will be able to bring in analysis of HESA, Higher Education Statistics Agency data through linking employment destinations information on graduates with the Student record.

Finally, it is important to recognise that the rewards from higher education are not solely monetary in nature. In future research, it will be interesting to consider non-financial benefits using data sources such as the Graduate Outcomes survey, in which respondents are asked questions of a subjective nature, such as the extent to which a graduate believes their current employment is meaningful and/or fits in with their future plans.

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ANNEX 1: FULLY SPECIFIED OLS REGRESSION MODELS FOR NEXT STEPS AND BCS70 (I.E. MODEL 7)

Table A1: Return to education at age 25-26 in Next Steps. The dependent variable is log of hourly pay. 'Graduate' includes first degree qualifiers only. The reference group of 'non-graduate' includes only those with GCSE and A-level qualifications (or equivalent).

Variable	Coefficient
Highest academic qualification	
Graduate	0.105***
Sex	
Female	-0.0999***
Ethnicity	
Indian	0.0614*
Pakistani	-0.0109*
Bangladeshi	0.125*
Black Caribbean	-0.0366*
Black African	0.114*
Other ethnicity	0.0298*
Special Education Needs (SEN)	
Missing SEN information	0.120***
Had SEN	-0.0626***
School type	
Attended a state school	-0.142***
School attitudes	
Attitudes towards school	0.0222
Locus of control	
Locus of control	0.121***
Risk-seeking behaviour	
Displays low risk attitudes	0.00684
Displays medium risk attitudes	0.00987
Patience	
Has low patience	0.0536***
Has medium patience	0.0316***
Parental qualification	
Missing main parent qualification information	0.0666**
Main parent has HE qualification (or equivalent)	0.0721**
Main parent has A-level qualification (or equivalent)	0.0701**
Main parent has GCSE qualification (or equivalent)	0.0521**

Parental occupation	
Missing main parent occupation information	0.0434
Main parent in professional occupation	0.0168
Main parent in non-professional occupation	0.0463
Family income/finances	
Missing finances information	-0.0714
Managing well on income	0.0421
Just managing on income	0.0369
Household tenure	
Missing household tenure information	0.0401***
Social renting	-0.0698***
Household type	
Not a single parent household	0.00221
Age of main parent	
Age of main parent	-0.000375
Siblings	
Number of siblings	0.00367
Region of residence	
Missing region of residency information	-0.0107***
North East	-0.157***
North West	-0.166***
Yorkshire and The Humber	-0.164***
East Midlands	-0.140***
West Midlands	-0.191***
East of England	-0.108***
South East	-0.0398***
South West	-0.121***
Parental attitudes towards education	
Missing parental involvement information	-0.0437
Involved in school life of child	-0.00812
Missing parental education view information	-0.0325
Leaving school at 16 limits career opportunities	0.0304
Work tenure	
Work tenure	0.0170***
Weight/BMI	
Missing weight information	-0.0495*
Overweight	-0.0318*
Disability	
Disabled	-0.0397
GHQ12 score	
GHQ12 score	-0.00723***
R-squared	**0.229**
Sample size	**1862**

Table A2: Return to education at age 26 in BCS70. The dependent variable is log of hourly pay. 'Graduate' includes first degree qualifiers only. The reference group of 'non-graduate' includes only those with GCSE and A-level qualifications (or equivalent).	
Variable	Coefficient
Highest academic qualification	
Graduate	0.171***
Sex	
Female	-0.0824***
Ethnicity	
Missing ethnicity information	0.0619
Not British	0.0353
Special Education Needs (SEN)	
Missing SEN information	-0.00578
Had SEN	-0.0201
School type	
Missing school type information	-0.0641*
Attended a state school	-0.0638*
School attitudes	
Missing sadness at leaving school information	-0.0135**
Feels sad when it is time to leave school	-0.0346**
Missing whether studying for tests is a waste of time information	0.0158
Studying for tests isn't a waste of time	0.0365
Locus of control	
Missing locus of control information	0.127***
Feels in control of life	0.143***
Risk-seeking behaviour	
Missing risk attitudes information	0.0285
Doesn't hold risky attitudes	0.00290
Patience	
Missing patience information	-0.00312
Has low patience	-0.00702
Has medium patience	-0.00128
Parental qualification	
Missing mother education information	-0.00530
Mother has HE qualification (or equivalent)	0.0257
Mother has A-level qualification (or equivalent)	-0.00829
Mother has GCSE qualification (or equivalent)	0.00897
Parental occupation	
Missing mother occupation information	-0.0149
Mother in professional occupation	-0.0182
Family income/finances	
Missing weekly family income information	0.0115***
Household has medium level of income	0.0383***
Household has high level of income	0.0805***

Household tenure	
Missing household tenure information	-0.0130***
Home is rented	-0.0465***
Household type	
Missing information on household type	-0.0194**
Not a single parent household	-0.0524**
Age of main parent	
Missing mother age information at time of child birth	0.0157
Age 24-29	0.0139
Age 30-53	0.00806
Siblings	
Missing children in household information	-0.0415
2 children in the household	0.0110
3 or more children in the household	-0.00988
Region of residence	
Missing region of residency information	-0.0600***
North East	-0.103***
North West	-0.112***
Yorkshire and The Humber	-0.124***
East Midlands	-0.125***
West Midlands	-0.0946***
East of England	-0.120***
South West	-0.109***
Wales	-0.147***
Scotland	-0.0876***
Maternal attitude towards education	
Missing maternal interest in child education information	0.0606***
Interested in child's education	0.0886***
Work tenure	
Missing work tenure information	0.0656***
Work tenure is between 2 and 4 years	0.0629***
Work tenure is between 5 and 10 years	0.106***
Weight/BMI	
Missing weight perception information	-0.0826
Perceives themselves as overweight	-0.0104
Disability	
Missing long-term health information	-0.0226
Has long-term health condition	-0.0185
Malaise score	
Missing malaise score information	-0.108**
Malaise score of 8 or more	-0.0354**
R-squared	**0.180**
Sample size	**4191**

ANNEX 2: DESCRIPTION OF THE CONTROL VARIABLES UTILISED IN NEXT STEPS AND BCS70

In creating the regression models using the Next Steps and BCS70 data sources, we have tried to ensure the controls included are as similar as possible. Here, we supply more detail on the nature of the covariates relied upon in conducting our analysis.[12]

Graduate: At age 25-26, the Next Steps survey provides a derived variable on the highest qualification achieved by the cohort member. They are also asked about any additional qualifications they have gained since the age of 19-20 (the time of the last interview). This information is used to identify graduates, which we define as those who hold a first degree as their highest academic qualification. The reference group of non-graduates consists of individuals whose highest qualification is A-level, GCSE or equivalent.

Likewise, in the age 26 survey in BCS70, respondents are also asked about the various qualifications they hold. We again classify graduates and non-graduates using the same approach as that taken in Next Steps.

Sex: In both Next Steps and BCS70, this information on the cohort member is taken from the age 25-26 survey. Our reference group is males.

Ethnicity: In Next Steps, we rely upon data collected from the cohort member at age 25-26. For BCS70, the ethnicity of the cohort member is gathered from the parent interview that takes place at age 10. The reference group in Next Steps is white, whilst it is British in BCS70.

Special Education Needs (SEN): In Next Steps, the main parent is asked whether the child has been identified as having SEN at age 13-14. In BCS70, the teacher interview at age 10 covers whether the child attends a special school. In both instances, the reference group is those without SEN.

School type: The Next Steps dataset provides a derived variable indicating whether the cohort member attended an independent school at age 13-14. In BCS70, the interview with the Head of the school at age 10 is used to ascertain the type of school the cohort member attended. In both instances, the reference group is those who attended an independent school.

School attitudes: In Next Steps, the cohort member is asked a series of questions relating to their views on school at age 13-14. We use these responses to form a continuous variable (mean) on their school attitudes that ranges from 1 to 4, with a higher score indicating more positive attitudes. In BCS70, we use two (Carolac) questions on schooling asked to the pupil at age 10. These relate to whether they feel sad when it is time to leave school (reference group is those who stated they are not sad at leaving school) and if they believe studying for tests is a waste of time (reference group is those who indicated that studying for tests is a waste of time).[13]

Locus of control: At age 25-26 in Next Steps, the cohort member is asked a series of questions relating to this non-cognitive skill. We take their responses to four questions to form a continuous variable (mean) that ranges from 1 to 4. A larger value indicates higher internal locus of control. At age 26 in BCS70, cohort members are asked if they feel they have free choice/control over their life. We use those not feeling in control as the reference group.

[12] In our tables we include dummies indicating missing information for a variable. This is to help ensure that we maximise the sample size we use in our analysis.
[13] Whilst there are differences in the age at which we have been able to capture non-cognitive skills in BCS and Next Steps (as well as there being discrepancies in how we were able to proxy for a particular type of skill), we note that the inclusion of non-cognitive skills has a very small influence on the 'graduate' coefficient.

Risk-seeking behaviour: At age 25-26 in Next Steps, individuals are asked how willing they are to take risks on a scale of 0-10. We use this information to form a categorical variable containing three groups. The reference group is those who display high risk attitudes. In BCS70, as no comparable variable exists, we use smoking behaviour at age 10 to proxy for risky behaviour. Those who have smoked are considered to have risky attitudes and thus form the reference group.

Patience: At age 25-26 in Next Steps, individuals are asked to rate their patience on a scale of 0-10. We use this information to form a categorical variable containing three groups. The reference group is those with high patience. In BCS70, the mother is asked when the child is age 10 to rate on a scale of 0-100 the extent to which the child's requests must be met immediately. This is also used to form a categorical variable consisting of three groups. We then utilise high patience cohort members as the reference group.

Parental qualification: When the child is age 13-14 in Next Steps, the main parent[14] is asked to supply information on their highest educational qualification. We use individuals having few/no qualifications as the reference group. In BCS70, mothers are asked in the parental interview at age 10 to discuss their qualifications. As with Next Steps, we again use individuals having few/no qualifications as the reference group.

Parental occupation: At age 13-14 in Next Steps, the main parent provides detail on their occupation. We rely upon a derived NSSEC indicator in our model. The reference group is those who have never worked or are long-term unemployed. In BCS70, we use mother occupation information captured when the cohort member is age 10. Our reference group is those in non-professional occupations.

Family income/finances: At age 13-14 in Next Steps, the main parent is asked how well they perceive the household is managing on their income. We use those 'getting into financial difficulties' as the reference group. For BCS70, we rely on gross weekly family income at age 10. Family income is sorted into three categories, with those on low income being the reference group.[15]

Household tenure: This is captured from household members when the cohort member is age 13-14 in Next Steps. We use those who own their property or are privately renting as the reference group. In BCS70, this information is provided by the parent when the child is age 10. The reference group is those who own a home.

Household type: This information is obtained through the parent in both surveys (age 10 in BCS70 and age 13-14 in Next Steps). In both instances, we use a single parent household as the reference group.

Age of parent: This data was provided by the parent in both surveys. It was obtained in the birth survey in BCS70, whilst being gathered in Next Steps when the cohort member was age 13-14. Note that a continuous measure was used in the Next Steps analysis, whilst a categorical variable is relied upon in BCS70, where the reference group is mother being aged 23 or under at the time of the child's birth.

Siblings: A continuous variable indicating the number of siblings to the young person at age 13-14 in the household was used in Next Steps. In BCS70, the number of children in the household at age 10 was utilised (as reported by the parent). This was transformed into a categorical variable, where the reference group was where there was 1 child in the house.

Region of residence: In Next Steps, region was collected when the child was age 14-15, whilst in BCS70, this information was picked up at age 10. In Next Steps, London forms the reference group. South East is the reference group in BCS70.

[14] This tends to be the mother.
[15] Utilising a derived variable illustrating the gross household income for the cohort member when they are aged 13-14 in Next Steps instead of finance perception leads to little change in the coefficient on the 'graduate' variable in the final specification. It is also found not to be a statistically significant factor.

Parental attitudes towards education: In Next Steps, the main parent is asked questions relating to their views on education. We include two variables in our final model. The first one relates to how involved the main parent is in the school life of the child (reference group is those not involved in this aspect). Meanwhile, the second variable assesses the parent's opinion on whether leaving school at 16 limits future career opportunities (reference group is those who believe it does not). In BCS70, the teacher is asked when the child is age 10 to provide their view on whether the mother shows an interest in their child's education. The reference group consists of those who do not show an interest.

Work tenure: Both Next Steps and BCS70 contain variables that inform one of the length of time the cohort member has spent in their current job. In Next Steps, we are told when the individual started their current job. As the majority of respondents completed the survey in late 2015 or during 2016, we proxy work tenure by subtracting the year they started their job from 2016. Meanwhile, in BCS70, a variable is readily available on length of service. Work tenure is introduced as a continuous variable in Next Steps and as a categorical variable in BCS70 (where the reference group is those with 0-1 year of service).

Weight/BMI: Next Steps contains a derived variable highlighting the cohort member's BMI category at age 25-26. In BCS70, individuals are asked to give their perception on their weight at age 26. For both studies, we use those who are underweight or have a healthy weight as the reference group.[16]

Disability: In Next Steps, a derived variable at age 25-26 is available on whether the cohort member is disabled according to the Equality Act 2010 definition. In BCS70, individuals at age 26 are asked whether they suffer from a long-term health problem. In both instances, the reference group consists of those without a disability/long-term health condition.

GHQ12/Malaise score: In Next Steps, a derived variable relating to the cohort member's GHQ12 score is available at age 25-26. This is used as a continuous variable in our analysis. In BCS70, a grouped malaise score provided at age 26 is used, where the reference group is those with a score of 7 or less.

[16] Using a variable pertaining to perception of weight in Next Steps rather than a derived BMI category leads to minimal change in the 'graduate' coefficient.

ANNEX 3: REFERENCES OF UK DATA SERVICE SOURCES UTILISED IN THIS BRIEFING

NEXT STEPS

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Butler, N., Bynner, J., University of London, Institute of Education, Centre for Longitudinal Studies. (2016). *1970 British Cohort Study: Ten-Year Follow-Up, 1980. [data collection]. 6th Edition. UK Data Service. SN: 3723,* http://doi.org/10.5255/UKDA-SN-3723-7

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LABOUR FORCE SURVEY

1995

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2016

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Northern Ireland Statistics and Research Agency, Central Survey Unit, Office for National Statistics, Social Survey Division. (2019). *Quarterly Labour Force Survey, July - September, 2016. [data collection]. 5th Edition. UK Data Service. SN: 8104,* http://doi.org/10.5255/UKDA-SN-8104-4

Office for National Statistics, Social Survey Division, Northern Ireland Statistics and Research Agency, Central Survey Unit. (2019). *Quarterly Labour Force Survey, October - December, 2016. [data collection]. 3rd Edition. UK Data Service. SN: 8145,* http://doi.org/10.5255/UKDA-SN-8145-3

2017

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