Claire Crawford, Paul Gregg, Lindsey Macmillan, Anna Vignoles and Gill Wyness

Higher education, career opportunities, and intergenerational inequality

Article (Published version)
(Refereed)

This version available at: http://eprints.lse.ac.uk/68610/

Available in LSE Research Online: December 2016

http://eprints.lse.ac.uk

Higher education, career opportunities, and intergenerational inequality

Claire Crawford,* Paul Gregg,** Lindsey Macmillan,***
Anna Vignoles,**** and Gill Wyness*****

Abstract: The UK government has expressed a desire to increase social mobility, with policies to help achieve this aim focused on reducing inequalities in educational attainment. This paper draws together established and new information about the contribution that higher education can make to social mobility using a life-course approach, considering differences by family background in terms of university attendance and achievement, as well as occupation and earnings following graduation. We find substantial socio-economic differences at each stage. Young people from poorer backgrounds are, on average, less likely to go to university than their richer peers. Even among the selected group who do go to university, they are less likely to attend the highest status institutions, less likely to graduate, and less likely to achieve the highest degree classes. These differences in degree outcomes contribute to the lower average earnings of graduates from poorer families, but earnings differentials go well beyond those driven purely by degree attainment or institution attended. The evidence strongly suggests that, even after taking these factors into account, graduates from affluent families are more likely to obtain a professional job and to see higher earnings growth in the labour market. We discuss the implications of these findings for the prospects of higher education as a route to greater social mobility.

Keywords: higher education, social mobility, widening participation

JEL classification: I23, I24, I26, J24

* University of Warwick and Institute for Fiscal Studies, e-mail: c.l.crawford@warwick.ac.uk
** University of Bath, e-mail: p.gregg@bath.ac.uk
*** UCL Institute of Education, e-mail: l.macmillan@ucl.ac.uk
**** University of Cambridge, e-mail: av404@cam.ac.uk
***** UCL Institute of Education and Centre for Economic Performance, LSE, e-mail: g.wyness@ucl.ac.uk

I.   Introduction

There is a well-established literature highlighting that children from more affluent families earn more across the life course than their peers from less affluent families, and that the UK is a poor performer in this regard, with a high degree of inequality of opportunity (Blanden *et al.*, 2007; Corak, 2013; Jerrim and Macmillan, 2015; Gregg *et al.*, 2016). The UK government has recently moved to place 'social mobility', the phrase most commonly used by politicians and commentators to describe the link between the socio-economic circumstances of parents and children, as a key social policy priority.

Much of the policy debate that has followed has focused on reducing inequalities in educational attainment, based on the reasonable premise that children with the same attainment should achieve more similar outcomes over the life course. Given the substantial returns to higher education that have been found in the UK (e.g. Walker and Zhu, 2011), participation and achievement in higher education have been a particular focus of recent attempts to reduce such inequalities of educational opportunity.

In this paper we assess the recent literature on the potential role of higher education in promoting social mobility, discussing socio-economic differences in university access and outcomes, and adding new contributions on attainment trajectories within university by family background, and how the returns to a degree vary by parental income. Given the substantial differences in university application and entry by gender that now exist in the UK and elsewhere (e.g. Chowdry *et al.* 2013; Jerrim and Vignoles, 2015), and the concerns attached to the participation rates of working class white boys in particular, we also consider the interaction between gender and socio-economic status in these outcomes, providing some confirmatory and some new evidence on the drivers of these differences.

We find substantial socio-economic differences at each stage of the student life-course. Young people from poorer backgrounds are, on average, less likely to go to university than their richer peers. Even among the selected group who do go to university, they are less likely to attend the highest status institutions, less likely to graduate, and less likely to achieve the highest degree classes. These differences in degree outcomes contribute to the reduced likelihood of moving into a professional job and the lower average earnings of graduates from poorer families, but the differences in labour market outcomes that we observe go well beyond these differences in degree achievement. Indeed, in new analysis presented in this paper, we find that the average graduate wage for a child from a poor family is comparable to the average wage of all graduates and non-graduates combined from affluent families, and that these differences in earnings between graduates from different backgrounds persist even once we account for educational attainment, including university attended and subject studied. This highlights that getting a good degree from an elite university is not enough to equalize career opportunities in the professions and prime-age earnings for those from different socio-economic backgrounds.

While much of the policy emphasis to date has focused on widening access to university, including to high-status institutions, our research highlights a need for policy intervention throughout the student life-course, to ensure equality of opportunity and outcomes for those from different socio-economic backgrounds.

II. Socio-economic differences in higher education participation

It is well known that there are large gaps in the higher education (HE) participation rates of young people from different socio-economic backgrounds. Although the proportion of students from poor backgrounds going to university has increased significantly over time, the gap in the HE participation rate between richer and poorer students remains stark (Blanden and Machin, 2004, 2008; Blanden *et al.*, 2005; Crawford *et al.*, 2016*b*).

Focusing on data for a cohort of state school students who took their GCSEs in England in 2008 (and started university anywhere in the UK at age 18 in 2010–11 or age 19 in 2011–12), Figure 1 shows the likelihood of participating in higher education for those in the top and bottom fifth of households, as measured by an index of socio-economic status combining students' eligibility for free school meals and the extent of deprivation in their neighbourhood.[1] The black bars show the gaps in terms of participation at all universities and the grey bars show the gaps in terms of participation at a group of 41 'high status' universities, which include all members of the Russell Group, plus institutions with similarly high research quality (based on the Research Assessment

Figure 1: Socio-economic gap in the percentage of English state school students going to university at age 18 (in 2010–11) or age 19 (in 2011–12)
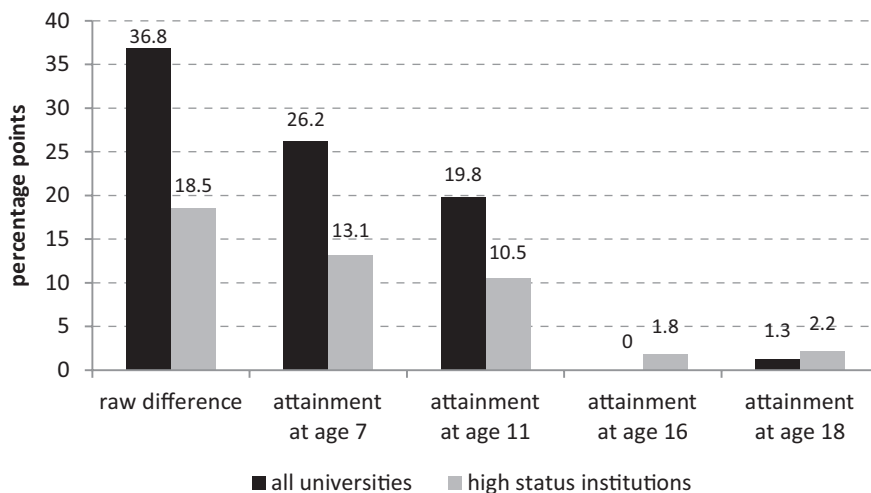
Notes: Based on administrative data for state school students in England taking GCSEs in 2008 and entering university anywhere in the UK at age 18 (in 2010–11) or age 19 (in 2011–12). Socio-economic status is defined using an index constructed from the combination of free school meal eligibility and various neighbourhood deprivation measures (see footnote 1 for further details). The measures of attainment are added separately and not cumulatively.
Source: Crawford *et al.* (2016*b*).

[1] Specifically, the index combines, using principal components analysis, the pupil's eligibility for free school meals at age 16 with their Index of Multiple Deprivation (IMD) score, their ACORN type (a socio-economic indicator based on geographic location, see http://acorn.caci.co.uk for further information), and the proportions of individuals in their very local area who work in higher or lower managerial or professional occupations, whose highest educational qualification is NQF Level 3 or above, and who own their home, merged in on the basis of the pupil's home postcode at age 16. See Chowdry *et al.* (2013) for more details.

Exercise). The left-hand bars show the unconditional gap, which is around 37 percentage points in terms of participation overall. (This is the difference between the percentage of state school students from the 20 per cent richest families who go to any university in the UK at age 18 or 19, around 56 per cent, and the percentage of state school students from the 20 per cent poorest families who do the same, around 19 per cent.)

We know that socio-economic gaps in achievement emerge early in children's lives and widen through primary and secondary school (Goodman and Gregg, 2010; Ermisch and Del Bono, 2012). The remaining black bars in the figure show various conditional gaps in HE participation, i.e. the differences in the participation rates of those from the richest and poorest families that remain after controlling for prior achievement at different ages.

The second and third bars show that we can explain some, but not all, of the socio-economic gap in HE participation if we compare students who performed similarly in primary school (at age 7 or age 11). But it is GCSE performance that seems particularly important for understanding socio-economic differences in university entry. Conditional on GCSE test scores, the gap in HE participation between students from the top and bottom fifth of households is reduced to zero. This suggests that the difference in the likelihood of going to university between those from richer and poorer families can be *entirely* explained by their differential performance at the end of secondary school in terms of the grades that they achieved in particular qualifications and subjects.

Despite the importance placed on the acquisition of good grades in 'facilitating' subjects by some universities[2]—and the fact that there are substantial differences in the subjects that young people from different socio-economic backgrounds choose at GCSE and A-level (Crawford *et al.*, 2016*b*; Dilnot, 2016)—the omission of subject choice from our models does not reduce their explanatory power a great deal. In other words, when considering socio-economic differences in university entry, it seems more important that students get good grades in respected qualifications than that they achieve those grades in particular subjects (although subject choice does make a small difference at the margin, especially when considering entry to high-status institutions) (Crawford *et al.*, 2016*b*).

Gender, as well as socio-economic, differences are also receiving increasing policy attention in the UK. In 2014, around 60,000 more females than males were accepted at universities in the UK (UCAS, 2015), and white boys from the lowest socio-economic groups have the lowest participation rates of any gender, ethnic, and socio-economic grouping, with only around 10 per cent of them recorded as going to university at age 18 or 19 among English state school students taking their GCSEs in 2008 (Crawford and Greaves, 2015).

The black bars in Figure 2 show the raw differences in HE participation rates between men and women by socio-economic background. They show that men are 5.8 percentage points less likely to go to university than women if they are one of the 20 per cent poorest state school students, while the gap increases to 9.2 percentage points when we focus on the 20 per cent richest state school students. The grey bars show what happens if we compare boys and girls with the same GCSE attainment, and in most cases the remaining gender gaps change sign. In other words, comparing those who performed equally well in exams at the end of secondary school, men are actually slightly *more* likely to go to university than women; and, moreover, this positive conditional gap is larger for those from lower socio-economic backgrounds. Thus, while boys from the

---

[2] These are more 'academic' subjects which some universities have announced that they find particularly attractive for their applicants, e.g. https://www.russellgroup.ac.uk/media/5272/informedchoices-print.pdf.

Figure 2: Gender gap in the percentage of English state school students going to university at age 18 (in 2010–11) or age 19 (in 2011–12), by socio-economic background

■ raw gap (males-females)   ■ conditional gap (accounting for GCSE results)
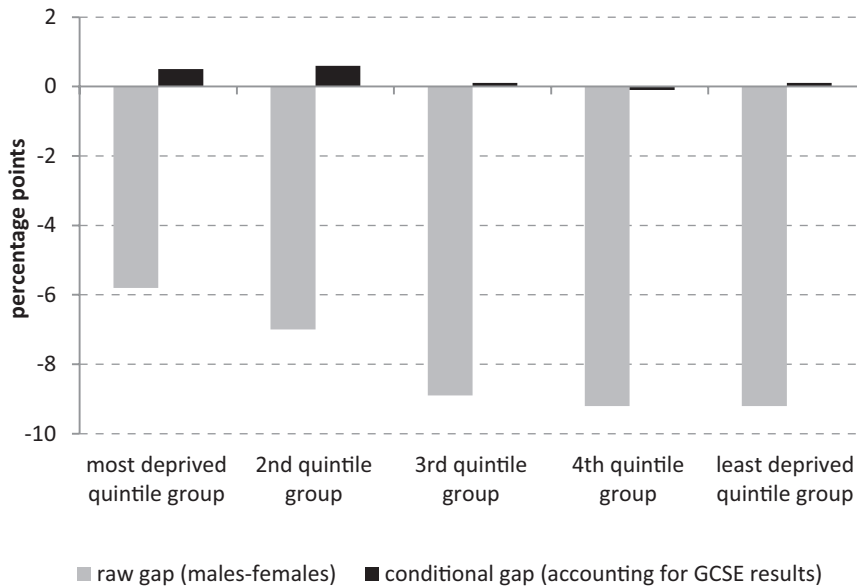
Notes: See notes to Figure 1. The conditional gaps (shown in the dark grey bars) account for the qualifications, subjects, and grades achieved at the end of secondary school.

poorest families are the least likely to go to university, they are actually slightly more likely to go to university than girls from similar backgrounds with similar grades.

Clearly, therefore, substantial progress in widening participation by gender or socio-economic status is likely to require a narrowing of school achievement gaps earlier in the education system. This has happened, albeit to a limited degree, over the last few years, with the socio-economic gap in the percentage of pupils reaching five A*–C grades at GCSE (a government benchmark in these exams taken at age 16) falling marginally (by just over 1 percentage point) between 2007–08 and 2012–13.

But it is important to remember that prior achievement is potentially endogenous. Students who do not believe they will go to university and those who feel that it is not for 'people like them' may put less effort into studying. Thus, even though our research suggests that differences in secondary school achievement are at the root of differential gender and socio-economic participation rates in higher education, it may still be the case that influencing students' aspirations could impact upon their effort and hence achievement, and therefore help to reduce differences in university entry.

This is particularly true when considering the type of institution attended. The grey bars in Figure 1 show the socio-economic gap in participation at the group of 41 high-status institutions defined above. The raw difference is somewhat smaller than that for participation overall, but this is because fewer students attend high-status institutions (just over 21 per cent of state school students from the richest backgrounds, compared to just under 3 per cent of those from the poorest backgrounds). The remaining bars show that prior attainment plays an important, although somewhat smaller, role in explaining socio-economic differences in the likelihood of attending different types of universities than it does in explaining differences in participation overall. The fact that

prior attainment does not fully explain the socio-economic difference in participation at high-status universities suggests that differences in application or admission to such institutions among similarly qualified students from different socio-economic backgrounds may make a further small contribution to the gaps, and hence may be worthy of further investigation (Anders, 2012; Boliver, 2013).

Reducing these gaps in participation has been a focus of policy in recent years, with universities now required to report on their efforts to 'widen' participation in order to charge fees of more than £6,000 per year. While robust quantitative evidence on the effectiveness of these interventions is relatively scarce (Sutton Trust, 2015), there is some evidence that the socio-economic gap in HE participation among young entrants has fallen slightly over the last decade or so, even as tuition fees have risen substantially (Crawford, 2012; Crawford *et al.*, 2016*b*), suggesting that some progress is being made.

III.   Socio-economic differences in university outcomes

We have seen that there are large socio-economic differences in the likelihood of going to university, including by type of institution attended. But are there socio-economic differences in how well students perform once they are at university as well? This section suggests that differences are apparent from the time students enter higher education to the time they leave.

We collected data from 11 universities in England on around 40,000 students who entered higher education between 2006 and 2011. Of these 11 institutions, five are members of the Russell Group, and six are not, meaning that our sample over-represents the Russell Group (which has 24 members out of 118 universities). The appendix provides some additional context for the sample of students included in our data, but in summary it is broadly representative of UK undergraduate students in terms of gender, but is younger, more white, and likely to be poorer, on average, than the whole student population, which should be borne in mind when interpreting the results based on this sample.[3]

Figure 3 illustrates how end-of-first-year exam performance differs by parental income quintile, showing that students from the lowest quintile group score, on average, 11 per cent of a standard deviation below those from the highest quintile group.[4] These differences fall, but only slightly (to 10 per cent of a standard deviation), after including a basic set of student characteristics, including prior attainment at age 18, as well university and subject fixed effects. In other words, students studying the same subject at the same institution, who have comparable attainment on entry to university, are likely to perform worse in exams at the end of their first year if they are from lower socio-economic backgrounds.[5]

---

[3] The students are likely to be poorer, on average, because our measure of parental income is based on data provided to universities via the Student Loans Company and hence is only available for students who applied to borrow money from the government to help cover living costs and who underwent the means test (which should capture gross incomes of up to around £50,000 per year).

[4] Test scores are standardized within course (institution and subject).

[5] There are 153 university–subject combinations in our data, of which just over 50 per cent contain at least five rich and five poor students. (Prior attainment varies relatively little among students on the same course.) Our results are robust to focusing on the subset of university–subject combinations with at least this number of students.

Figure 3: Average first-year exam performance by parental income quintile
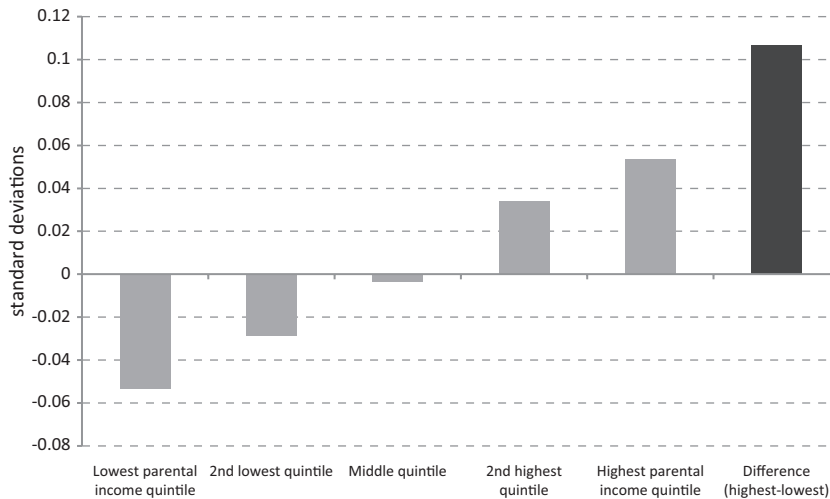
Source: Average module scores for all first-year students from 11 universities in England. Module scores have been standardized by institution and subject. See appendix for further details of this sample.

These differences matter because first-year test scores are important predictors of subsequent degree performance, even when they do not count towards final degree classification. For example, . . .tandard deviation increase in first-year exam performance increases the probability of achieving a 'good degree' (a first or a 2:1 versus any other outcome including drop-out) by 19 percentage points (again after including the above set of controls).[6] Accounting for first-year exam performance also approximately doubles the proportion of the variation in final degree classification that can be explained (from 0.17 to 0.34).

These differences in first-year exam performance by socio-economic background are also replicated in other important degree outcomes. For example, using administrative data on all English-domiciled students entering higher education at age 18 or 19 between 2004–05 and 2011–12—over a million students—we find substantial socio-economic differences in drop-out, degree completion, and final degree classification.

Figure 4 illustrates these differences. We again focus on state school students split into quintiles on the basis of our index of socio-economic status (described in the previous section) and plot the average difference in outcomes between the top and bottom 20 per cent. The left-hand set of bars shows that state school students from the 20 per cent highest socio-economic backgrounds are 8.4 percentage points less likely to drop out of higher education entirely within 2 years of entering, 13.3 percentage points more likely to complete their degrees within 5 years, and 22.9 percentage points more likely to achieve a first or 2:1 than those from the 20 per cent lowest socio-economic backgrounds.[7] These differences are reduced, but remain significantly different from zero, after accounting for background characteristics, rich measures of prior attainment from ages 11, 16, and 18, and course (institution times subject) fixed effects.

[6] Around 60 per cent of students achieve a first (around 18 per cent) or 2:1 (around 50 per cent) degree classification.

[7] We include all students when considering the likelihood of dropping out of university, but focus on those studying full-time for a first degree in a non-medical subject when considering degree completion and degree class, with final degree classification only defined for those who complete their degree within 5 years.

Figure 4: Differences between state school students from 20 per cent highest socio-economic backgrounds and 20 per cent lowest socio-economic backgrounds in likelihood of dropping out, completing degree, and achieving a first or 2:1 degree class

■ Dropout within 2 years ■ Complete degree within 5 years ■ Graduate with a first or 2:1
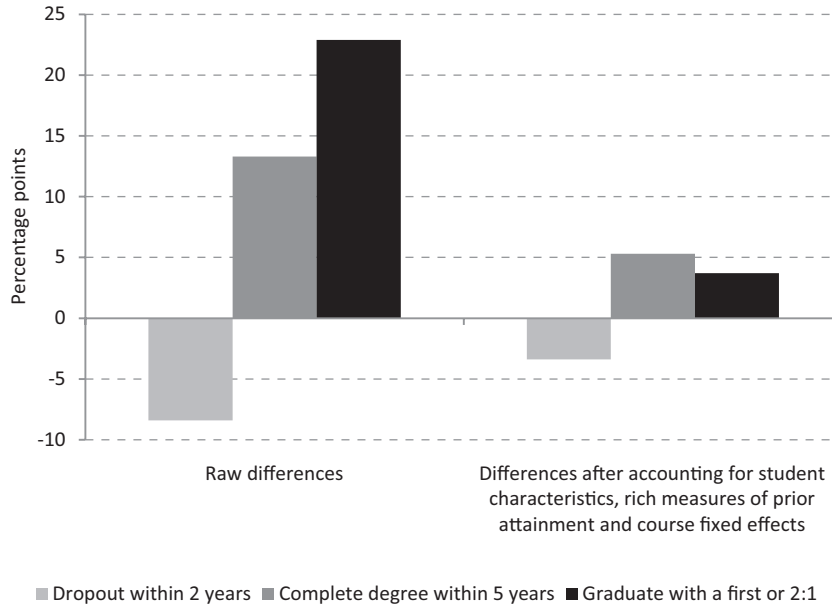
Notes: Based on administrative data on students studying at state secondary schools in England who went to university at age 18 or 19 between 2004–05 and 2011–12. The measure of socio-economic background used is as defined in the previous section.
Source: Crawford (2014*a*).

Research has struggled to identify policies or programmes that are effective at reducing socio-economic differences in degree retention and performance. Existing literature suggests that drop-out decisions in particular are often explained by a complex interaction of factors that can be difficult to measure or predict—including institutional and subject match, or mitigating personal circumstances such as individual or family health issues (e.g. Jones (2008) and the references cited therein)—which can be challenging to overcome.

In recent years, the government has encouraged universities to use financial aid to attract disadvantaged students and to increase retention, largely in the form of bursaries, which were introduced in 2006. Universities typically spend around £300m per year on these forms of support (OFFA, 2015), though the amount of cash given to students varies substantially by university, with students at high-status universities tending to receive the largest bursary amounts (Chowdry *et al.*, 2012; Wyness, 2016). For example, in 2015, the poorest students at Imperial College London received £6,000 per year, while students with similar parental incomes received just £500 per year at Liverpool John Moores.[8]

Given the importance of prior academic attainment in university participation decisions, it is perhaps unsurprising that the small amount of research targeted on bursaries reveals no impact of these forms of aid on participation (Corver, 2010). This, in conjunction with research by OFFA (2014) into the impact of bursary aid on student performance while at university, has led some universities to discontinue these forms of

---

[8] See https://www.theguardian.com/education/2015/jun/10/which-universities-offer-the-best-bursaries.

support. However, more recent research (Murphy and Wyness, 2016) reveals a positive effect of bursary aid on students' degree performance, driven by increases in annual completion rates and test scores, suggesting there may be a role for financial aid in raising retention.

Policies targeted towards ensuring students are sufficiently well prepared for university and that they receive appropriate learning and teaching support once there, have also been highlighted as particularly important, especially in the first year (e.g. Laing and Robinson, 2003; Quinn *et al.*, 2005). Our results highlighting the importance of first-year exam results for subsequent degree performance support this, suggesting that they could potentially be used as an indicator of student vulnerability, with universities targeting further support on students who performed less well at this point.

A different picture emerges if we compare the degree performance of students who attended different secondary schools rather than coming from different socio-economic backgrounds. Figure 5 splits state school students into quintiles on the basis of the proportion of students in the school who achieved five A*–C grades at GCSE.[9] It shows that, while the raw differences (shown in the left-hand bars) are similar in sign and magnitude to those by socio-economic background, they change sign after accounting for other characteristics (the right-hand set of bars)—specifically after accounting for attainment at age 16. This suggests that, comparing students from similar backgrounds, on the same courses, and with similar prior attainment, those from worse-performing schools actually go on to do better at university, on average, than those from better-performing schools.

Figure 5: Differences between state school students from 20 per cent highest-performing schools and 20 per cent lowest-performing schools in likelihood of dropping out, completing degree, and achieving a first or 2:1 degree class

■ Dropout within 2 years ■ Complete degree within 5 years ■ Graduate with a first or 2:1
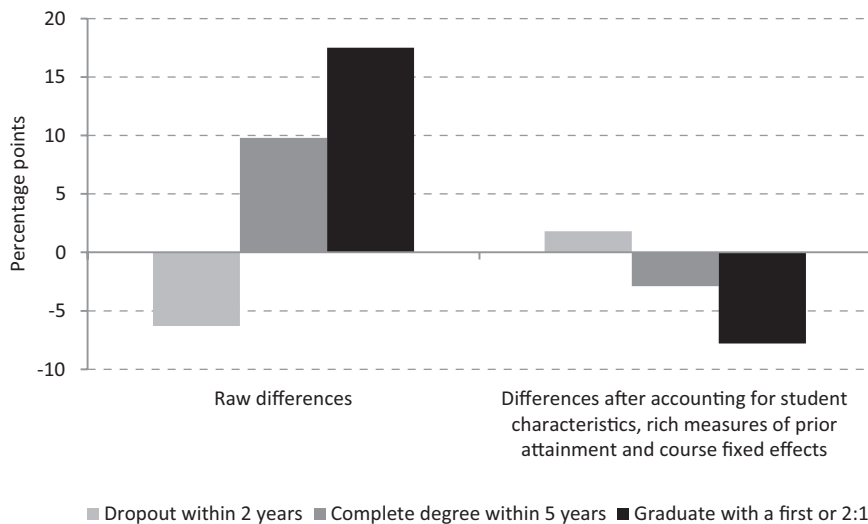
Notes: See notes to Figure 4.
Source: Crawford (2014*b*).

[9] Crawford (2014*b*) shows that a similar pattern emerges when comparing schools on the basis of value-added or school type rather than school performance.

These results could be interpreted as suggesting that, on average, pupils from poorer-performing schools with the same grades as those from better-performing schools have higher 'potential' to do well at university. This may be because they have had to work more independently or received less support from their teachers than students from higher-performing schools, which may reap dividends when they are faced with the more autonomous learning environment at university.

This may, in turn, suggest that university entry requirements could be lowered for pupils from poorly performing schools in order to equalize the potential of all students being admitted to university: in other words, universities may want to contextualize offers on the basis of secondary school attended (and, indeed, some already do). The same does not appear to hold, on average, for individuals from different socio-economic backgrounds, however. That is not to say that universities should not use information on individuals' own socio-economic background to inform their admissions processes; simply that it is more challenging to identify those from lower socio-economic backgrounds with strong potential to succeed academically in higher education.

The results in this section indicate that, even among the selected group of students who make it to university, those from disadvantaged backgrounds perform significantly less well in their first-year exams, are more likely to drop out, less likely to complete their degree, and less likely to achieve a 'good' final degree classification. Given the strong returns to higher education, including by degree class, that are evident in the UK, this may suggest that socio-economic differences will persist once students have left university as well. The next section presents some evidence on these important issues.

IV.   Career opportunities for graduates by family background

While we saw in previous sections that some progress is being made in reducing inequalities in educational attainment and HE participation, the question of how this translates into greater social mobility will also reflect the extent to which increasing educational equality results in greater equality in opportunities in adulthood as well. This section focuses on how graduates from different social backgrounds fare in their early labour market experiences.

Graduate leaver surveys can give us a picture of access to early career opportunities by social background. While measuring earnings early in a career is problematic as they are often a poor proxy for lifetime earnings, focusing on graduates' early transitions into different types of jobs can be informative.

Macmillan *et al.* (2015) consider the importance of family background for graduates leaving university in 2006–07 in terms of whether they are working in a 'top' profession 3.5 years after graduation. Defining top professions as any NS-SEC 1 occupation, Figure 6 replicates some of their findings, showing the differences in access to these top jobs between graduates who previously attended state and private schools. The first bar shows that privately educated graduates are 9.5 percentage points more likely to secure a high-status occupation than state educated graduates, even if they come from similarly affluent families and neighbourhoods.

Figure 6: Marginal effects of private school attendance on being in a high-status occupation (NS-SEC 1) 3.5 years after graduation compared to other occupations (NS-SEC 2–7)

Bar chart. Y-axis: "probability of working in top NS-SEC job if privately educated (percentage points)" ranging 0 to 10. X-axis categories: "Family background" (≈9.5), "+ demographics" (≈8.7), "+ prior attainment" (≈6.0), "+ institution" (≈3.3), "+ postgraduate qualifications" (≈2.5).
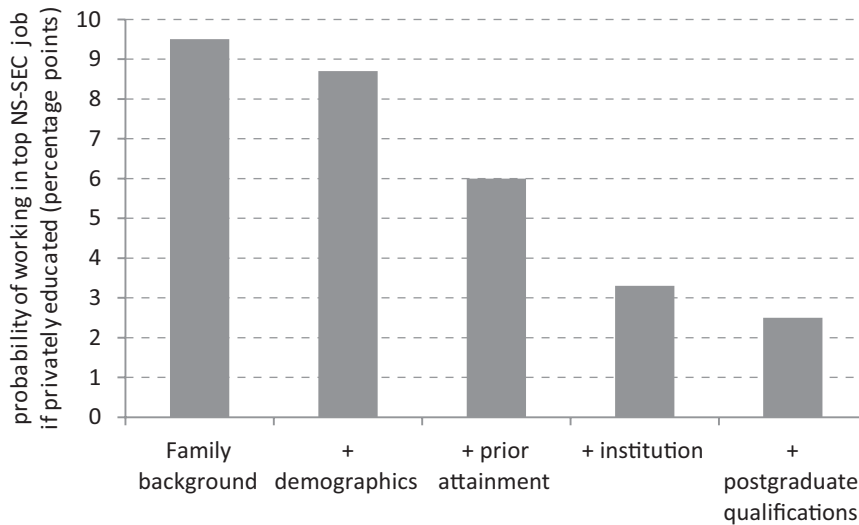
Source: Macmillan *et al.* (2015).

Bars 2 and 3 of Figure 6 indicate that a modest part of this difference is driven by demographics and educational attainment (A-level performance, degree subject, and degree classification). A larger part of the story is which university the graduate attended. This is likely to reflect the fact that privately educated graduates have greater access to elite institutions on which employers typically focus their recruitment strategies. Indeed, Ashley *et al.* (2015) find that one of the main reasons for this over-representation of privileged graduates in top professions is the tendency of large professional firms to recruit the majority of new entrants from a small group of top universities.

The final column of Figure 6 indicates that staying on to do a higher degree is also a (smaller) part of the picture. However, even when accounting for all of these other observed differences between graduates, a privately educated graduate is still 2.5 percentage points more likely to secure a high-status occupation than a state school graduate from a similar family and neighbourhood, with the same educational qualifications, who went to the same university, and who studied the same subject. Similar differences can also be observed within particular types of high-status occupation, including business, the law, and life sciences.

Focusing on one specific employer, the government's flagship graduate development programme, Fast Stream, a recent report from the Bridge Group highlights the extent of inequality in access (Bridge Group, 2016). They state that:

> in relation to socio-economic diversity, the Fast Stream is unrepresentative of the population at large. To put this in context, the profile of the intake is less diverse by social background than the student population at the University of Oxford.

Focusing on applicants, the report finds that candidates from the most selective universities are most likely to apply to the Fast Stream and, within universities, students from higher socio-economic backgrounds are more likely to apply, contributing to a profile

of applicants that looks similar to the profile of students at Oxbridge. However, the selection process exacerbates differences by socio-economic background further, with a higher proportion of high socio-economic status candidates getting through at each stage. The implications of this are stark. Even if the Fast Stream only recruited from Oxford, it would still end up with fewer recruits from working class backgrounds than the student body of that elite institution. The UK Cabinet Office, which oversees the civil service, has announced urgent action to address this imbalance.

These findings provide powerful evidence that degree attainment is not enough to equalize socio-economic differences in early career entry into elite occupations. Attendance at high-status universities partially explains the higher entry rates of those from more privileged backgrounds into these professions, suggesting that recruitment by leading firms may be rather narrowly focused on these top institutions. But even among those attending the same university, attaining the same degree class in the same subject, those from more privileged backgrounds are more likely to access the top professions. This may reflect other aspects of the recruitment process—including, perhaps, the existence of family networks within these occupations or of differences in softer skills, such as greater self-confidence during interviews. But it is clear that degree attainment is not a passport that equalizes access to elite careers.

V. Earnings after attending university

While the early career opportunities of graduates are indicative of likely patterns of intergenerational mobility, it is also important to look at later measures of occupation and earnings, when individuals are fully established in the labour market, in order to get a complete picture of how inequalities persist across generations. While there are clear differences in access to the professions by socio-economic background, are these gradients exacerbated as individuals progress through their careers?

Britton *et al.* (2016) examine the variation in graduates' earnings using administrative tax records associated with student loan repayment. Earnings are measured approximately 10 years after degree completion. Family background is not directly observed, but the database includes the amount the graduate borrowed in their first year of borrowing, which depends on family income. Using this information, they can impute a relatively crude measure of family income, splitting borrowers into the most affluent fifth and the rest.

They show that male graduates from these higher-income backgrounds earn around 30 per cent more than male graduates from all other backgrounds when assessed at the median of the earnings distribution. The equivalent difference for women at the median is 20 per cent, and the gaps were even larger at the 90th percentile of the earnings distribution. Moreover, even after allowing for institution and degree subject, as well as a limited set of student characteristics (but not prior educational attainment), those from the richest backgrounds continue to earn around 10 per cent more than those from poorer backgrounds at the median.

The great advantage of the data used by Britton *et al.* (2016) is its large sample size. However, it is based on fairly recent graduates and captures their earnings relatively early in their careers (up to around age 33), after which many graduates continue to experience significant earnings growth. Focusing on relatively early measures of earnings

may lead us to underestimate the gap between those from different backgrounds—a phenomenon known in the social mobility literature as 'life-cycle bias' (as shown, for example, by Haider and Solon, 2006).

This may be particularly problematic if pay differs even among individuals who go into similar occupations. For example, a recent study by Laurison and Friedman (2016), using data from the Labour Force Survey, shows that those from semi-routine and routine families earn significantly less than colleagues from higher professional and managerial families, even among individuals who go into elite occupations. Similar to findings in Macmillan *et al.* (2015), this pay gap is most pronounced in finance, law, and medicine, with no significant difference in earnings by parental NS-SEC among those who are scientists or engineers.

The data used by both Britton *et al.* (2016) and Laurison and Friedman (2016) has some limitations, however. Both have access to only relatively crude measures of family background, with Britton *et al.* (2016) relying on a severely right-censored measure of income and Laurison and Friedman (2016) relying on recall measures of parental occupation in childhood. Both datasets are also limited in terms of the information they hold on pre-university educational attainment. So as a new, confirmatory, contribution to this literature, we consider the extent to which graduates' lifetime earnings and the returns to a degree vary by family background, using rich measures of family income recorded during childhood and after conditioning on early cognitive and non-cognitive skills, pre-university attainment, university attended, and degree subject studied for a cohort now at their prime-age in terms of earnings levels.

We begin by summarizing the earnings and employment outcomes of members of the British Cohort Study that were born in 1970 (now aged 46) by family background in Table 1. Earnings are measured as an average of those reported at age 38 and age 42[10] and are summarized by the terciles of average family income in childhood (when the survey respondent was aged 10 and 16). This table indicates that inequalities persist across generations for this cohort, with those from more affluent families earning 40 per cent more than those from middle-income families and 60 per cent more than those from poorer families.

If we consider this by graduate status, differences by social background are very large for males (top panel, Table 1). Not only are men from more affluent families more likely to go to university, but there are large inequalities even within groups of similarly educated individuals by social background, with graduates from the richest third of families earning almost 50 per cent more than graduates from the poorest third and approaching 30 per cent more than graduates from middle-income families. Among non-graduates the higher earnings associated with coming from a more affluent family are far less marked, at just over a third more than those from the poorest families. In other words, getting a degree raises earnings for graduates from all family backgrounds but it does very little to level the playing field between those from different backgrounds. The somewhat higher magnitudes in these gaps compared to those found in Britton *et al.* (2016) probably reflects the later point in the life-cycle and more tightly focused low-income group.

Earnings differences are necessarily restricted just to those in work, so we also illustrate employment differences by family background for graduates and non-graduates.

---

[10] Where only one observation is available, that earnings value is used. Missing dummies are included to indicate missing earnings at 38 or 42.

Table 1: Monthly earnings and employment status by family background and degree status

	Low income	Middle income	High income
Males			
Average earnings 38 and 42	£2,013.18	£2,354.72	£3,253.65
Non-graduates	£1,841.26	£2,098.81	£2,568.61
Graduates	£2,882.54	£3,416.89	£4,239.83
N (N with degree)	957 (158)	958 (186)	949 (389)
Proportion non-graduates out of work	3.6	2.2	1.7
Proportion graduates out of work	1.6	0.4	0.7
Females			
Average earnings 38 and 42	£1,104.67	£1,297.10	£1,599.57
Non-graduates	£978.11	£1,097.66	£1,227.26
Graduates	£1,864.87	£2,200.75	£2,231.64
N (N with degree)	1,072 (153)	1,073 (194)	1,071 (397)
Proportion non-graduates out of work	9.5	7.5	7.5
Proportion graduates out of work	3.6	6.8	6.0

Note: Sample based on those with earnings at 38 or 42 and being employed (and not self-employed) in that period, observing income at 10 or 16, gender, and degree status. Figures for proportion out of work for larger sample of individuals where only restricted to observing income at 10/16 and gender and degree status. £ in 2001 prices.

As might be expected, men from poorer families are more likely to be out of work at both age 38 and 42, though only around 2 per cent of the overall sample are out of work at either age. Among graduates, those from poorer families are twice as likely to be out of work as those from the most affluent families, meaning that differences in earnings between those from different socio-economic backgrounds are likely to some-what understate the overall differences as a result of differential employment chances.

The story for women (lower panel, Table 1) is far less acute but in the same direction. While women from high-income families are far more likely to get a degree than their low-income counterparts, women from affluent families earn a little over a third more than those from poorer families. Among graduates, this earnings premium is under 30 per cent, which is a similar earnings differential as for non-graduates. Interestingly, non-employment among graduate women is not focused on those from poorer families; rather, at these ages graduate women from well-off families are less likely to work than those from poorer backgrounds.

These basic summary measures show that graduate earnings differ substantially by family background and this is more marked for men than women, consistent with Britton *et al.* (2016). Higher education *per se* therefore appears to go only some of the way to offering equal labour market opportunities. We might well think that these strik-ing earnings differences among graduates from different socio-economic backgrounds reflect other differences between these individuals, including educational attainment before attending university, the status of university attended, and the course studied, etc. Previous sections have illustrated large socio-economic gradients in these factors across the life course. We therefore consider the extent to which attending the same institution, taking the same degree, and achieving the same degree class accounts for these earning differences.

Moving to a regression framework to explore earnings differentials conditional on these other factors, Panel A of Table 2 estimates earnings differentials within male

graduates by terciles of family background. Column 1, for reference, shows the earnings gaps between terciles of family income for the whole population. Those from the richest third of families earn 26 log points (approximately 26 per cent) more than those from middle-income families, who in turn earn 16 log points more than those from poorer families, with a total earnings gap between those from the richest and poorest families of over 40 per cent.

Column 2 shows this among graduates. Here, the earnings gaps are fourth-fifths of the raw gaps for all men (31 log points between the top and bottom terciles among graduates compared to 42 log points for all men), meaning that earnings gaps by family background are almost as large among graduates as for the population as a whole. Column 3 shows earnings differentials conditional on early measures of literacy, numeracy, and IQ (taken at age 10). These make little difference to the benefit of coming from a rich family among graduates. Column 4 introduces measures of achievement (number of GCSEs at grades A–C and number of A-levels). These can explain around a quarter of the earnings differentials among graduates. Including controls for institution attended[11] and broad subject studied[12] does not explain any of the remaining differentials.

Overall, controlling for a range of measures of pre-university skills and qualifications, as well as university attended and degree subject studied, explains only a third of the earnings gap among male graduates by family background (10 points of a 31 log point raw gap). These large earnings gaps thus cannot be considered meritocratic in the sense that they purely reflect differences in educational attainment.[13]

Within this data the number of male graduates from poorer families is quite small (158) which might raise concerns about common support compared to the larger samples from affluent families, especially when conditioning on educational attainment. We note, though, the similar results obtained by Laurison and Friedman (2016) using the larger

Table 2: Male earnings differentials by family background and graduate status

	All	Graduates	Graduates	Graduates	Graduates
Low parental income	−0.156	−0.125	−0.121	−0.073	−0.088
	(0.03)***	(0.07)*	(0.07)*	(0.07)	(0.07)
Middle income	Baseline	Baseline	Baseline	Baseline	Baseline
High parental income	0.263	0.185	0.160	0.136	0.124
	(0.03)***	(0.06)***	(0.06)***	(0.06)**	(0.06)**
Early skills measures			x	x	x
Education				x	x
Institution FE					x
Subject studied					x
N	2,864	733	733	733	733

Notes: Standard errors in parentheses. *90% confidence, **95% confidence, ***99% confidence. Sample based on those with earnings at age 38 or 42 and being employed (and not self-employed) in that period, observing income at 10 or 16, gender, and degree status. Dummy included if earnings is missing in either period.

[11] Four groupings covering the Golden Triangle, older and newer pre-1992 institutions, and 1992 universities. Expanding this to a full set of university dummies makes little difference to the results.

[12] Seven categories. Again a wider set of categories gives very similar results.

[13] Panel A of Table A2 replicates this analysis for non-graduates and, again, around a third of these earnings gaps are explained by test scores and qualifications achieved (9 out of 31 log points).

Labour Force Survey looking among those in top occupations, and Britton *et al.* (2016) using much larger samples of graduates who are at an earlier stage in their careers.[14]

Given the findings from the previous section, showing that there is differential access to top jobs by family background, together with the findings of Laurison and Friedman (2016), which show that earnings differ sharply by family background even among those that make it into elite occupations, we might hypothesize that family background matters more at the top of the earnings distribution.

To check this, we repeat this analysis at the upper end of the graduate earnings distribution. We use unconditional quantile regression analysis to explore the earnings premium associated with coming from a more affluent family at the 75th percentile of the graduate earnings distribution rather than at the mean (as in Table 2). These results are shown in Table 3. The raw earnings gaps by family background are larger at this point in the distribution, with a 44 log point gap (compared to 31 points at the mean) between those graduates from the highest and lowest terciles. This indicates that the returns to coming from a richer family are strongest in the upper portions of the earnings distribution, consistent with Gregg *et al.* (2015).

Conditioning on test scores through to university attended makes more of a difference in this setting, too, reducing the 44 log point gap between graduates from the most and least affluent families to 28 log points (see the final column of Table 3). However, the remaining earnings gap is still almost as large as the unconditional gap in Table 2, suggesting that family background matters more among high earners than on average, even conditional on a wide range of educational markers.[15]

The story for women is more egalitarian (Table 4). Overall the earnings boost associated with coming from a more affluent family is lower: among graduates it is 21 log points, compared to 31 log points for men, and similar to the 19 log points

Table 3: Graduate male earnings differentials by family background—unconditional quantile regression analysis assessed at 75th percentile

	All	**Graduates**	**Graduates**	**Graduates**	**Graduates**
Low parental income	−0.116 (0.03)***	−0.168 (0.09)*	−0.130 (0.09)	−0.065 (0.09)	−0.099 (0.09)
Middle income	Baseline	Baseline	Baseline	Baseline	Baseline
High parental income	0.300 (0.03)***	0.275 (0.09)***	0.243 (0.09)***	0.213 (0.09)**	0.176 (0.09)**
Early skills measures			x	x	x
Education				x	x
Institution FE					x
Subject studied					x
N	2,864	733	733	733	733

Notes: Standard errors in parentheses. *90% confidence, **95% confidence, ***99% confidence. Sample based on those with earnings at age 38 or 42 and being employed (and not self-employed) in that period, observing income at 10 or 16, gender, and degree status. Dummy included if earnings is missing in either period.

---

[14] We also undertook some additional analysis ourselves using the Labour Force Survey (LFS), with similar findings. Results available from the authors on request.

[15] We repeat this analysis for women in Appendix Table A3.

for non-graduate women (see Panel B of Appendix Table A2).[16] Conditioning on test scores makes no difference to these earnings gaps among female graduates.

It is worth noting that the earnings premium associated with coming from a richer family relative to a middle-income family is much stronger for men than for women, while the difference between middle- and low-income families is much stronger for women than for men. This suggests that family background matters differently for male and female graduates.

These results show that for a cohort now in their mid-40s, earnings of graduates differ substantially by family background. This is most marked among men, especially for those who go on to be high earners. This strongly suggests that a degree, and even a degree from the same type of institution and in the same subject, does not equalize opportunities to access high-paying jobs for those from less affluent families. Taken together with the results from the previous section, it suggests there are clear problems in recruitment into and progression within elite jobs even among those with the same educational achievement, suggesting that equalizing educational achievement does not necessarily translate into equal career opportunities.

Steps are being taken to open up access to top professions. Last year's 'State of the Nation' report by the Social Mobility Commission highlights the Social Mobility Business Compact, a voluntary commitment by employers to improve access to those from lower socio-economic backgrounds and the 'Champion Tier' of firms within this who are committed to collecting and publishing data about the intake of their employees in relation to key characteristics. There is also a movement within professional firms to limit their use of academic criteria such as A-levels when recruiting for graduate jobs, and to increase their use of contextualized and blind applications in order to prevent selection based on institutions (Social Mobility Commission, 2015). But a lot more can

Table 4: Female earnings differentials by family background and graduate status

	All	Graduates	Graduates	Graduates	Graduates
Low parental income	–0.134	–0.180	–0.176	–0.180	–0.187
	(0.03)***	(0.08)**	(0.08)**	(0.08)**	(0.08)**
Middle income	Baseline	Baseline	Baseline	Baseline	Baseline
High parental income	0.205	0.027	0.032	0.005	–0.024
	(0.03)***	(0.07)	(0.07)	(0.07)	(0.07)
Early skills measures			x	x	x
Education				x	x
Institution FE					x
Subject studied					x
N	3,216	744	744	744	744

Notes: Standard errors in parentheses. *90% confidence, **95% confidence, ***99% confidence. Sample based on those with earnings at age 38 or 42 and being employed (and not self-employed) in that period, observing income at 10 or 16, gender, and degree status. Dummy included if earnings is missing in either period.

---

[16] We also checked our results for women using LFS data as discussed in footnote 14 for men. This confirms that earnings gaps by family background among graduates are approximately 10 log points smaller for women than for men.

be done with regards to access, and firms must be equally vigilant about ensuring that career progression is not skewed by socio-economic background.

VI.   Conclusion

In this paper we have sought to draw together established and new facts about the links between socio-economic background and university access and outcomes, taking a life-course approach. We find substantial socio-economic differences at each stage. Young people from poorer backgrounds are, on average, less likely to go to university than their richer peers. Even among the selected group who do go to university, they are less likely to attend the highest status institutions, less likely to graduate, and less likely to achieve the highest degree classes.

These differences in degree outcomes contribute to the reduced likelihood of moving into a professional job and the lower average earnings of graduates from poorer families, but the differences in labour market outcomes that we observe go well beyond these differences in degree achievement. Indeed, in new analysis presented in this paper, we find that the average graduate wage for a child from a poor family is comparable to the average wage of all graduates and non-graduates combined from affluent families, and that these differences persist even once we account for educational attainment, including university attended and subject studied. This highlights that getting a good degree from an elite university is not enough to equalize career opportunities to the professions and prime age earnings for those from different socio-economic backgrounds.

Attendance at any university at age 18 or 19 is similar among those from richer and poorer families with equivalent GCSE and A-level attainment. But even after these factors are taken into account, those from less affluent families remain under-represented at high-status institutions. This suggests that these elite universities could still do more to attract those from deprived backgrounds. One of the ways in which they might—and, indeed, some already do—try and do this is to intervene during secondary school. There is clear evidence that poorer children who are high achieving at age 11 are less likely to go on to be high achieving at the end of secondary school compared to their richer peers (Crawford *et al.*, 2016*a*). This may in part reflect a sense that university is not for 'people like them', reducing their motivation and hence the effort they put into their studies. Universities can help to support young people from poorer backgrounds during this critical period, raising aspirations and hopefully also attainment.

Some universities already use such interventions as one of the ways through which they try to 'widen' access to their institutions. But these programmes are often targeted on a relatively narrow range of pupils or schools, often located close to the university running the intervention, and are frequently run in isolation from similar programmes by neighbouring institutions. Greater coordination of such initiatives, perhaps even a national strategy, would potentially be a better solution. There is also a dearth of robust quantitative evidence of the effectiveness of such interventions, and the evidence base in this area needs to be improved as a matter of urgency. Nevertheless, there is evidence

of some, albeit relatively slow, progress in reducing socio-economic gaps in access to university in recent years.

Yet our research also highlights that the need for policy intervention goes well beyond the first day of university. Greater support for students from poorer backgrounds while they are at university, to ensure that they are able to stay and complete their degrees is also important—and, again, the evidence base on what works to increase retention needs to be improved.

Even beyond university, however, obtaining a degree—even a higher-class degree from a top institution—is not a passport to equality of access to top professions and higher earnings. Here, employers have a responsibility to consider their access and progression rates by socio-economic background. While some firms have begun to collect data on this, there is much room for improvement. Firms should be more transparent about their existing staff mix and actively encourage those from more deprived backgrounds with relevant qualifications to apply and progress.

Overall, the analysis presented in this paper highlights the need for policy action throughout the student life-course to ensure equality of opportunity and outcomes for those from different socio-economic backgrounds, even among those who make it to university. It is the duty of all stakeholders—including schools, universities, and employers—to keep the doors to opportunity open as wide as possible to those from deprived backgrounds. The evidence presented here suggests this is currently far from the case.

Appendix

The analysis of attainment trajectories at university makes use of a unique administrative dataset collected from 11 UK universities. The data comprise the entire undergraduate population of UK and EU students for up to six cohorts of students beginning their studies between 2006 and 2011. These data were collected as part of a bigger project focused on understanding the impact of higher education bursaries on student performance.

In order to obtain this data we contacted all 118 higher education institutions in the UK, asking them for individual-level student data on attainment, parental income, and bursaries awarded. Of these, 50 agreed to share their data, and we finally received data from 25, all based in England, giving us a sample of 341,398 students. As our estimation strategy requires parental income and module score data, we discarded universities who did not provide data on parental income or those at universities that only provided banded parental income, as well as universities that did not provide data on student module scores. We also discarded students studying above or below degree level, and students of non-traditional entry age (those aged 20 or over). This reduced our sample substantially, leaving us with 11 universities and 40,183 students.

The dataset tracks students throughout the course of their degree. Therefore we have information on each student's final degree outcome, including whether they dropped out, their year of drop-out, and their average annual course scores. Since these scores

are not comparable across universities or individuals, we standardized test scores by university subject and year.

The selected nature of the sample means that it is not representative of the university sector. Among the 11 universities represented, five are Russell Group, and six are non-Russell Group. Therefore our sample is over-representative in terms of Russell Group universities.

In Table A1 we present some descriptive statistics on the individuals in our sample. Average annual parental income in our sample is £28,492—though we only observe the parental income data of students who provide their data to the Student Loans Company for means-testing of student maintenance loans and grants. Since the upper limit for means-testing is £50,000 per annum we generally observe the parental income of those at or below this limit. Therefore, our sample is likely to be more disadvantaged than the student population as a whole.

As Table A1 also shows, 46 per cent of the sample are male, the average age is just over 18 and 81 per cent of the sample are white. According to the most recent Higher Education Statistics Agency (HESA) statistics (HESA, 2015: Table 6a), 45 per cent of full-time undergraduates are male, 61 per cent are under 22, and 60 per cent are white. Therefore, our sample is representative in terms of gender, but is younger and more white than the UK undergraduate population, which is expected given our sample restrictions. The average UCAS entry tariff for our students is 287, which is roughly equivalent to BBC in terms of A-level scores.

Thus, when interpreting the results based on this data, readers should be mindful that the sample is potentially more disadvantaged than the UK undergraduate student population. In particular, income data is right censored, so there are fewer students from the most highly advantaged households than there would be with a fully representative sample. This could lead us to underestimate the socio-economic gradient in first-year test scores. Our sample of students are also more likely to be attending a Russell Group institution. This could mean that students are less likely to have low educational attainment, again potentially leading us to underestimate the socio-economic gradient.

Table A1: Summary statistics (universities sampled in section III)

	Mean	Std dev.
Household income	£ 28,492	£ 36,325
UCAS entry points	287.14	81.44
Gender		
Male	0.46	0.5
Female	0.54	0.5
Ethnicity		
White	0.81	0.4
Non-white	0.19	0.39
Age on entry	18.34	0.47
N	40,183	

Table A2: Returns by background—male and female non-graduates

Males	All	Non-graduates	Non-graduates	Non-graduates
Low parental income	−0.156	−0.143	−0.109	−0.084
	(0.03)***	(0.03)***	(0.03)***	(0.03)***
Middle income	Baseline	Baseline	Baseline	Baseline
High parental income	0.263	0.170	0.165	0.139
	(0.03)***	(0.03)***	(0.03)***	(0.03)***
Early skills measures			x	x
Education				x
Institution FE				
Subject studied				
N	2,864	2,131	2,131	2,131

Females	All	Non-graduates	Non-graduates	Non-graduates
Low parental income	−0.134	−0.077	−0.059	−0.040
	(0.03)***	(0.03)**	(0.03)*	(0.03)
Middle income	Baseline	Baseline	Baseline	Baseline
High parental income	0.205	0.115	0.093	0.071
	(0.03)***	(0.04)***	(0.04)**	(0.04)*
Early skills measures			x	x
Education				x
Institution FE				
Subject studied				
N	3,216	2,472	2,472	2,472

Table A3: Returns by background—female graduates at 75th percentile

	All	Graduates	Graduates	Graduates	Graduates
Low parental income	−0.150	−0.078	−0.070	−0.072	−0.081
	(0.04)***	(0.07)	(0.06)	(0.06)	(0.06)
Middle income	Baseline	Baseline	Baseline	Baseline	Baseline
High parental income	0.242	0.128	0.111	0.084	0.058
	(0.04)***	(0.06)**	(0.06)*	(0.06)	(0.06)
Early skills measures			x	x	x
Education				x	x
Institution FE					x
Subject studied					x
N	3,216	744	744	744	744

References

Anders, J. (2012), 'The Link between Household Income, University Applications and University Attendance', *Fiscal Studies*, **33**, 185–210.

Ashley, L., Duberley, J., Sommerlad, H., and Scholarios, D. (2015), *A Qualitative Evaluation of Non-Educational Barriers to the Elite Professions*, Social Mobility and Child Poverty Commission.

Blanden, J., and Machin, S. (2004), 'Educational Inequality and the Expansion of UK Higher Education', *Scottish Journal of Political Economy*, **51**, 230–49.

— — (2008), 'Up and Down the Generational Income Ladder in Britain: Past Changes and Future Prospects', *National Institute Economic Review*, **205**, 101–16.

Blanden, J., Gregg, P., and Machin, S. (2005), *Intergenerational Mobility in Europe and North America: A Report Supported by the Sutton Trust*, Centre for Economic Performance, LSE.

— — Macmillan, L. (2007), 'Accounting for Intergenerational Income Persistence: Non-cognitive Skills, Ability and Education', *The Economic Journal*, **117**, C43–C60.

Boliver, V. (2013), 'How Fair is Access to More Prestigious UK Universities?', *The British Journal of Sociology*, **64**, 344–64.

Bridge Group (2016), *Socio-economic Diversity in the Fast Stream*, February, available at http://www.thebridgegroup.org.uk/wp-content/uploads/2016/02/Bridge-Group-Cabinet-Office-Report.pdf.

Britton, J., Dearden, L., Shephard, N., and Vignoles, A. (2016), 'How English Domiciled Graduate Earnings Vary with Gender, Institution Attended, Subject and Socio-economic Background', Institute for Fiscal Studies Working Paper W16/06.

Chowdry, H., Dearden, L., Jin, W., and Lloyd, B. (2012), 'Fees and Student Support Under the New Higher Education Funding Regime: What are Different Universities Doing?', Institute for Fiscal Studies Briefing Note BN134.

— Crawford, C., Dearden, L., Goodman, A., and Vignoles, A. (2013), 'Widening Participation in Higher Education: Analysis Using Linked Administrative Data', *Journal of the Royal Statistical Society: Series A*, **176**, 431–57.

Corak, M. (2013), 'Income Equality, Equality of Opportunity, and Intergenerational Mobility', *Journal of Economic Perspectives*, **Vol. 27**, 79–102.

Corver, M. (2010), 'Have Bursaries Influenced Choices Between Universities?', Research Paper 2010/06, Office for Fair Access, UK.

Crawford, C. (2012), 'Socio-economic Gaps in Higher Education Participation: How Have They Changed Over Time?', Institute for Fiscal Studies Briefing Note BN133.

— (2014*a*), 'Socio-economic Differences in University Outcomes in the UK: Drop-Out, Degree Completion and Degree Class', Institute for Fiscal Studies Working Paper W14/31.

— (2014*b*), *The Link Between Secondary School Characteristics and HE Participation and Outcomes*, CAYT Research Report to the Department for Education.

— Greaves, E. (2015), 'Socio-economic, Ethnic and Gender Differences in HE Participation', Department for Business, Innovation and Skills Research Paper No. 186.

— Macmillan, L., and Vignoles, A. (2016*a*), 'When and Why do Initially High Attaining Poor Children Fall Behind?', *Oxford Review of Education*, forthcoming.

— Dearden, L., Micklewright, J., and Vignoles, A. (2016*b*), *Family Background and University Success*, Oxford, Oxford University Press, forthcoming.

Dilnot, C. (2016), 'How Does the Choice of A-level Subjects Vary with Students' Socio-economic Status in English State Schools?', *British Educational Research Journal*, forthcoming.

Ermisch, J., and Del Bono, E. (2012), 'Inequality in Achievements during Adolescence', in J. Ermisch, M. Jantti, and T. Smeeding (eds), *Inequality from Childhood to Adulthood: A Cross-national Perspective on the Transmission of Advantage*, New York, Russell Sage Foundation.

Goodman, A., and Gregg, P. (2010), *Poorer Children's Educational Attainment: How Important are Attitudes and Behaviour?*, York, Joseph Rowntree Foundation.

Gregg, P., Macmillan, L., and Vittori, C. (2015), 'Nonlinear Estimation of Lifetime Intergenerational Economic Mobility and the Role of Education', Department of Quantitative Social Science Working Paper 15-03, University College London.

— — — (2016), 'Moving Towards Estimating Sons' Lifetime Intergenerational Economic Mobility', *Oxford Bulletin of Economics and Statistics*, forthcoming.

Haider, S., and Solon, G. (2006), 'Life-cycle Variation in the Association between Current and Lifetime Earnings', *American Economic Review*, **96**(4), 1308–20.

HESA (2015), Higher Education Statistics Agency 2015 Statistical Release 224, available at https://www.hesa.ac.uk/dox/pressOffice/sfr224/061046_student_sfr224_1415_table_6a.xlsx.

Jerrim, J., and Macmillan, L. (2015), 'Income Inequality, Intergenerational Mobility and the Great Gatsby Curve: Is Education the Key?', *Social Forces*, **94**, 505–33.

— — Vignoles, A. (2015), 'University Access for Disadvantaged Children: A Comparison across Countries', *Higher Education*, **70**, 903–21.

Jones, R. (2008), *Student Retention and Success: A Synthesis of Research*, Higher Education Academy Report.

Laing, C., and Robinson, A. (2003), 'The Withdrawal of Non-traditional Students: Developing an Explanatory Model', *Journal of Further and Higher Education*, 27, 175–85.

Laurison, D., and Freeman, S. (2016), 'The Class Pay Gap in Britain's Higher Professional and Managerial Occupations', *American Sociological Review*, forthcoming.

Macmillan, L., Tyler, C., and Vignoles, A. (2015), 'Who Gets the Top Jobs? The Role of Family Background and Networks in Recent Graduates' Access to High-status Professions', *Journal of Social Policy*, 44(3), 487–515.

Murphy, R., and Wyness, G. (2016), 'Testing Means-tested Aid', CEP Working Paper No. 139, Centre for Economic Performance, London School of Economics.

OFFA (2014), 'Do Bursaries Have an Effect on Retention Rates?', Research Paper 2014/02, Bristol, Office for Fair Access.

— (2015), 'Access Agreements for 2015–16: Key Statistics and Analysis', Report No. 2014/06, Bristol, Office for Fair Access.

Quinn, J., Thomas, L., Slack, K., Casey, L., Thexton, W., and Noble, J. (2005), *From Life Crisis to Lifelong Learning: Rethinking Working Class 'Drop Out' from Higher Education*, York, Joseph Rowntree Foundation.

Social Mobility Commission (2015), *State of the Nation 2015 Report*, available at https://www.gov.uk/government/news/state-of-the-nation-2015-report-published.

Sutton Trust (2015), 'Evaluating Access', Sutton Trust Research Brief, available at http://www.sutton-trust.com/researcharchive/evaluating-access/.

UCAS (2015), 'Analysis Note 2015/01', available at: https://www.ucas.com/sites/default/files/analysis_note_2015_01.pdf.

Walker, I., and Zhu, Y. (2011), 'Differences by Degree: Evidence of the Net Financial Rates of Return to Undergraduate Study for England and Wales', *Economics of Education Review*, 30, 1177–86.

Wyness, G. (2016), 'Deserving Poor: Are Higher Education Bursaries Going to the Right Students?', *Education Sciences*, 6(1), 5.