Understanding the determinants of participation in higher education and the quality of institute attended: analysis using administrative data[1]

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1 Background & Motivation

1.1 Introduction

Higher education (HE) participation has expanded dramatically in England over the last half century. There has been almost continually rising participation since the late 1960s and currently 43% of 17-30 year olds participate in higher education[2]. Further expansion to 50% participation is very likely, given that this is the government's target.

Although participation has been rising, 'widening participation' in HE remains a major policy concern[3]. This is reflected in the myriad of initiatives designed to improve the participation rate of non-traditional students, such as the Higher Education Funding Council for England's (HEFCE) AimHigher scheme (as detailed in http://www.hefce.ac.uk/widen/aimhigh/). Much of the widening participation policy agenda has been focused on the under representation of socio-economically disadvantaged pupils in HE. This is partly because the empirical evidence suggests that the gap in the HE participation rate between richer and poorer students actually widened in the mid and late 1990s (Blanden and Machin, 2004; Machin and Vignoles, 2004; HEFCE, 2005). This means that although poorer students are certainly more likely to go on to higher education now than they were in the past, the likelihood of them doing so relative to their richer peers was actually lower in the late 1990s than in earlier decades. Recent evidence from HEFCE indicates that the 20% most disadvantaged students were around 6 times less likely to participate in higher education compared to the 20% most advantaged pupils[4]. This therefore remains one of the key policy challenges facing the UK government (DfES 2003). Other disparities in the HE participation rates of different types of student are also of concern however. For example, HEFCE (2005) noted the rise in gender inequality, as higher female attainment in school continues into higher education. Further, there are substantial differences in HE participation rates across different ethnic minority groups (Dearing, 1997; Tomlinson, 2001).

Concerns about who is accessing HE also increased following the introduction of tuition fees in 1998. Although the fees were means tested, there were fears that the prospect of fees would create another barrier to HE participation by poorer students (Callender, 2003). Whilst there is evidence that poorer students leave university with more debt and may be more debt averse in the first place (Pennell and West, 2005), there is no strong empirical evidence that the introduction of fees reduced the relative HE participation rate of poorer students (UUK, 2007). Certainly, as Figure 1 below suggests, the introduction of fees in 1998 was not associated with any sustained overall fall in the number of students applying to English higher education

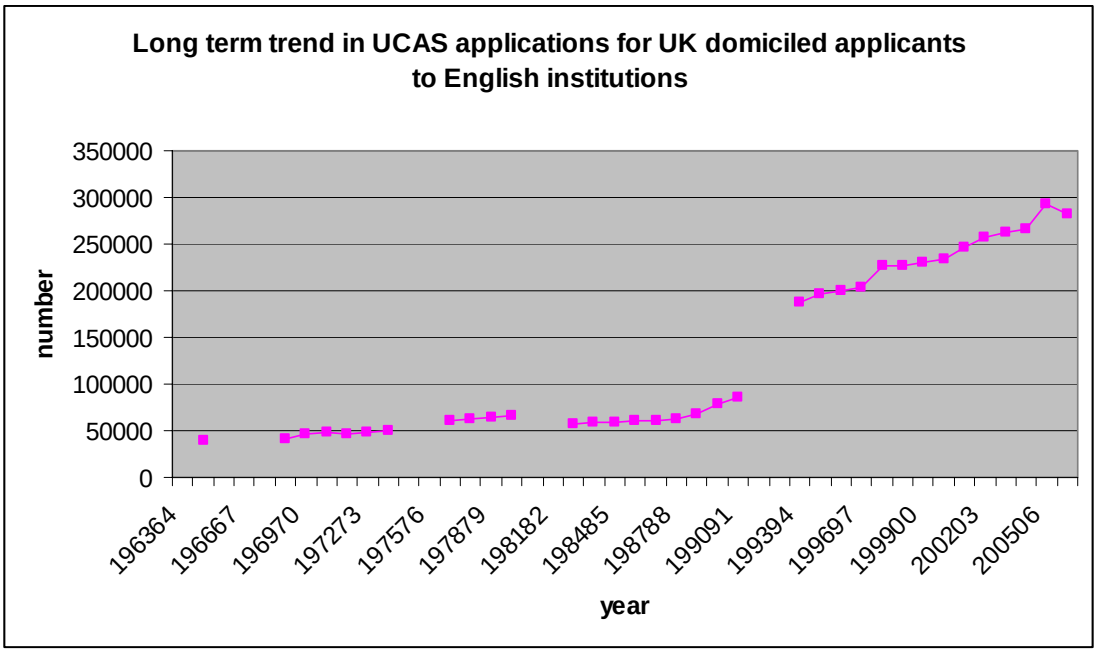
[2] The Higher Education Initial Participation Rate (HEIPR) is calculated for ages 17-30 and can be found at http://www.dcsf.gov.uk/rsgateway/DB/SFR/s000716/SFR10_2007v1.pdf. Much of the focus in this paer is on the age 18 participation rate, which in 2005/06 stood at 23% (see Table 2 of this DCSF link)

[3] See for example Department for Education and Skills (2006) Widening Participation in Higher Education, http://www.dcsf.gov.uk/hegateway/uploads/6820-DfES-WideningParticipation2.pdf .

[4] (HEFCE) 2005 *Young Participation in Higher Education* http://www.hefce.ac.uk/pubs/hefce/2005/05_03/05_03.pdf

institutions. Recent policy developments may however, affect trends in participation amongst different groups of students. The 2004 Higher Education Act introduced further changes, with higher and variable tuition fees starting in 2006/07 (which are no longer payable up front) alongside increased support for students, particularly those from lower income backgrounds. Further reforms to student support announced in July 2007 will also affect new cohorts of HE students (starting from 2007/08). This report analyses the participation decisions of a cohort that could have participated in HE from 2004/05 onwards, and therefore sets out a baseline analysis of HE participation rates amongst different types of students at a point in time before the main reforms to HE funding were put in place, with a view to assessing the impact of all these funding reforms over the longer term.

Figure 1.1



Source: UCAS data constructed by Gill Wyness. Note that there is a structural break in the data in 1992 caused by the abolition of the "binary line" between Universities and Polytechnics.

This report sets out an empirical analysis of HE participation for a number of different types of student – in particular, students facing socio-economic disadvantage, minority ethnic groups, women, and those entering HE with low prior attainment. A central aim of this report, and indeed of our ESRC-TLRP project as a whole, is to understand the importance of achievement at school from a young age in explaining the under-representation of these groups in HE. Our research is innovative because, unlike many studies that seek to explain the socio-economic and other gaps in HE participation, we have new large-scale administrative data on both HE participants and non-participants, including information about their schooling from a young age. Specifically, our data covers all students in the state education system, and contains detailed information on their educational achievement in primary and secondary school. This enables us to analyse whether the big disparities in HE participation rates between different groups of students are simply attributable to differences in choices made at age 17 and 18, or whether earlier educational achievement plays a more significant role. Specifically, if young people with similar A level scores are making similar HE choices regardless of their economic backgrounds, ethnicity and gender, then this would suggest that much of the inequality in HE participation is due to

events occurring earlier in their schooling careers. This has important policy implications. For example if inequality in prior education achievement is at the root of inequalities in HE participation then making more money available for poorer students at the point of entry into HE, for example in the form of bursaries, might not be particularly effective at increasing their likelihood of participating. This could be one potential explanation for why universities are spending much less than they expected on bursary support for non-traditional students, and why they are struggling to get poorer students to take up the support available (see Times Higher Education Supplement, 24 January 2008).

For much of the paper we focus simply on access to HE, i.e. differences in the HE participation rate across different groups of students. However, widening participation is not simply about access to higher education. It is also about the type of HE experienced by different types of students[5]. Connor et al. (1999) note that although the numbers of non-traditional students in HE have increased, they are concentrated in the post-1992 universities. This is important for many reasons, not least because the economic value of a student's investment in HE will vary substantially according to the type of degree he or she acquires. For example, Chevalier and Conlon (2003) find that male graduates from 'prestigious' universities[6] can expect to earn up to 6% more than similar individuals taking the same subject in 'modern' universities[7]. Indeed, amongst UK educationalists, the discourse has shifted from an emphasis on access to broader notions of participation and the extent to which under-represented groups experience different types of HE provision (Tonks and Farr, 2003; Connor et al. 2004). In this report we provide new empirical evidence on the nature of the HE experience for different types of student, by assessing how participation by under-represented groups varies by institution.

1.2 Previous Research

Part of the motivation for this study is research that has suggested that inequality of access to HE, at least for socio-economically disadvantaged students, actually worsened in the UK during the 1980s and early 1990s (Blanden and Machin, 2004; Galindo-Rueda, Marcenaro-Gutierrez & Vignoles 2004, Machin & Vignoles 2004). Work by sociologists on the relationship between social class and HE participation finds similar results. For example, Glennerster (2001) found a strengthening of the relationship between social class and HE participation in the 1990s, although the social class gap in HE participation appears to have narrowed somewhat since then (Raffe et al. 2006).

In addition to the above studies that have looked at changes in patterns of HE participation over time, there is a related empirical literature that has examined the factors influencing the educational achievement of different types of pupils. Much of this literature has focused on the role of parental characteristics specifically – including income, ethnicity, education and socio-economic status – in determining young people's likelihood of attending HE (Blanden and Gregg, 2004; Carneiro and

[5] See Tonks and Farr (2003), for example, for the distinction between widening access to HE and widening participation.
[6] Defined in that paper as the Russell Group of universities.
[7] Walker and Zhu (2005) also find substantial differences in the return to a degree by subject. In future work we will consider differences in enrolment in different subject areas.

Heckman, 2002 and 2003; Gayle et al. 2002; Meghir and Palme, 2005; Haveman and Wolfe, 1995). Such studies have generally found that an individual's probability of participating in higher education is significantly determined by their parents' characteristics, particularly their parents' education level and/or socio-economic status[8].

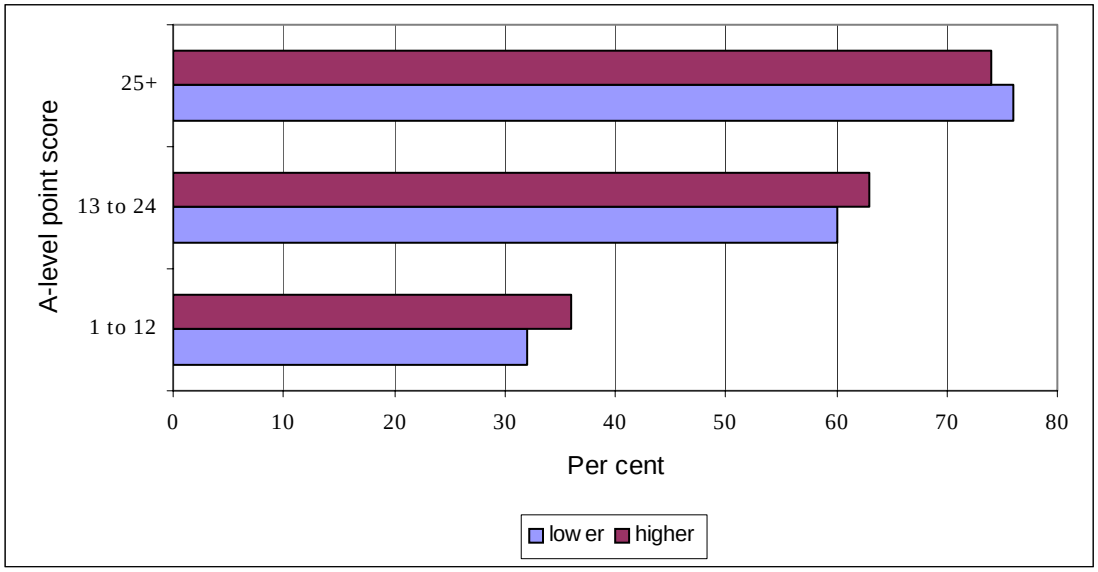
Of course, knowing that parental education and socio-economic status significantly affect the likelihood of a young person attending university is useful information, but it tells us very little about why this relationship exists and how policy-makers can address the problem of inequality in higher education outcomes. For this, we need to understand when and why the gaps in education achievement that lead to later HE inequalities emerge.

An important and intimately related literature has thus focused on the timing of when gaps in the cognitive development and educational achievement of different groups of children emerge (see CMPO, 2006 and Feinstein, 2003 for the UK; Cunha and Heckman, 2007 and Cunha et al., 2006 for the US). This literature suggests that gaps in educational achievement emerge early in pre-school and primary school (Cunha and Heckman, 2007; Demack et al., 2000) and that by contrast potential barriers at the point of entry into HE, such as low parental income, do not play a large role in determining HE participation (Cunha et al. 2006).

While these studies suggest the role of early educational attainment is key in determining whether or not a young person attends university, this extent to which this drives certain observed inequalities in HE participation can also be addressed more directly. Here the evidence thus far for the UK is tentative and mixed. Gayle et al. (2002) found that differences in HE participation across different socio-economic groups remained significant, even after allowing for educational achievement in secondary school, suggesting that choices at 18 also drive the inequalities we observe. Bekhradnia (2003), on the other hand, suggested that for a given level of educational achievement at age 18 (as measured by A level point score), there is no significant difference by socio-economic background in the participation rates of young people in higher education. As Figure 1.2 (which uses data from the Youth Cohort Study (YCS)) shows, contingent on A level point score, there is almost no difference in HE participation rates at age 18 by parents' socio-economic status. In fact, for individuals scoring 25 points or above – approximately equivalent to 3 B grades using the old tariff system – individuals from lower socio-economic backgrounds are actually *more* likely to go on to university than individuals from higher socio-economic backgrounds. This implies that the reason students from poorer socio-economic backgrounds do not participate in HE is because they are much less likely to gain the requisite A level grades required to get into university. This would indicate that socio-economic differences in HE participation are actually related to the well documented education inequality in primary and secondary schools in the UK (Sammons, 1995; Strand, 1999; Gorard, 2000).

[8] There is another literature which has focused on the difficulties in identifying the distinct effects of family and school environmental factors and the pupil's genetic ability. There is growing recognition that gene-environment interactions are such that attempting to isolate the separate effects of genetic and environmental factors is fruitless (Rutter et al. 2006). See also Cunha and Heckman (2007) for an overview of this area of research.

Figure 1.2 Participation in HE at age 18 in 2000, by A-level point score and parents' socio-economic status



Source: Bekhradnia (2003) (calculated from Youth Cohort Study 2000 data).

A major purpose of this report is to determine the extent to which the message from Figure 1.2 holds true using more detailed and recent data, and with information on the entire population of potential young HE entrants, rather than a selected sample.

Of course even if prior achievement explains much (or all) of the difference in HE participation rates of different groups, there remain potential barriers to participation at point of entry into HE[9]. These factors include financial barriers, lack of career advice, childcare and other forms of caring responsibilities, lack of time and difficulties students face trying to manage their time, attitudes and motivation of potential students, the ethos and culture of higher education institutions (HEIs), admissions procedures in HEIs, geographical distance to an HEI and lack of flexibility in delivery. Quantifying the relative importance of these factors has proved difficult. However, the qualitative and quantitative evidence on the role of these factors was reviewed in Dearing, 1997 and has since been comprehensively surveyed for HEFCE by Gorard et al., 2006[10]. Whilst the Gorard et al. (2006) review covered a whole range of potential influences on HE participation, the role of prior qualification was highlighted as being of particular importance, not least because of the philosophical issues it throws up. For example, Gorard et al. (2006) ask whether, if prior qualification does indeed signal merit and the ability to benefit from HE, making it easier for individuals without prior qualifications to enter HE is the right policy response? Gorard et al. (2006) (in his Appendix A) also make the case for further careful quantitative analysis of HE participation using data that includes information on participants and non-participants, and measures of prior education achievement. This is precisely what we aim to do in this report.

[9] This research literature has focused in particular on the barriers to participation in HE facing women (Burke, 2004; Heenan, 2002; Reay, 2003); minority ethnic students (Dearing, 1997; Connor et al., 2004), mature students (Osborne et al, 2004; Reay, 2003) and students from lower socio-economic groups (Connor et al. 2001; Forsyth and Furlong, 2003; Haggis and Pouget, 2002; Quinn, 2004).

[10] Goard et al. (2006) have made available a database of references on widening participation in HE at http://www.york.ac.uk/depts/educ/equity/barriers.htm

1.3 Research Objectives

The aim of this report is to look at the determinants of HE participation decisions from age 11 onwards. Previous research has suggested that steep socio-economic, ethnic and gender gaps in educational outcomes and progression originate early in life, and Figure 1.2 above suggests that the reason why there is a socio-economic gap is due to socio-economic inequalities in the likelihood of achieving good academic outcomes at age 18 (rather than inequalities in HE admission contingent on A level score).

For the first time, our report will be able to investigate this in detail using a unique new dataset. Our approach involves using a new combination of large-scale, individual-level administrative data sets[11], to examine some of the factors determining participation in higher education for a cohort of individuals who were in Year 11 in 2001/02 and who could therefore first enter HE in 2004/05. These data give a new and detailed picture of the factors affecting pupils during schooling, and which contribute to their HE choices. In particular, it enables us to look at the attainment paths of people from disadvantaged and vulnerable groups, such as ethnic minorities (at a relatively disaggregated level), students from deprived backgrounds, and those coming from less well-educated families. Unlike previous work using individual-level administrative data from HE records alone (e.g. from HESA data), our analysis is based on both participants and non-participants in HE, allowing robust conclusions to be drawn about the factors determining HE participation.

With this in mind, our report will now move on to explore the following questions:

1. How does the likelihood of HE participation vary according to gender, ethnicity and socio-economic background?
2. How much is this variation between groups driven by differences in the quality of schooling, special educational needs, month of birth and other individual characteristics?
3. When do the differences in attainment, which drive variations in the likelihood of attending and progressing in HE, appear?
4. What is the role of early ability – as measured by performance at Key Stage 2, Key Stage 3 and Key Stage 4 – in determining the decision to enter HE? Are there differences in the academic trajectories of students depending on their ethnicity and whether they come from a deprived background or a poorly educated family?
5. If an individual changes their academic trajectory between Key Stage 2 and Key Stage 4, how does this affect their HE participation rate?
6. Does the quality of the HE institution attended vary by gender, ethnicity, deprivation status and parental education status, and if so, how much is this variation driven by prior attainment and other individual-level characteristics?

[11] See Section 2 for a detailed description of the data we use in this report.

2 Data

We have been granted access to newly linked individual-level administrative datasets that enable us to follow every state school student in England in Year 11 in 2001/02. So far we are able to observe whether they continued into post compulsory education in 2002/03 and/or 2003/04, and Higher Education (HE) in 2004/05. This means that at present we are only able to consider the decision to participate in HE at the earliest possible opportunity (at the age of 18); we are not yet able to distinguish from non-participants at 18 those who may have decided to take a gap year or who may return to higher education later in life. In future work, we intend to extend our measure of HE participation to include individuals who started university at either 18 or 19 (although with these data we will remain unable to consider mature student entry into HE[12]).

2.1 The datasets that we use

Our analysis uses data from the English National Pupil Database (NPD) and individual student records kept by the Higher Education Statistics Agency (HESA). The former is an administrative dataset maintained by the Department for Children, Schools and Families (DCSF), comprising academic outcomes in the form of Key Stage test results for all children aged between 7 and 16 (and some at age 18), and background pupil characteristics from the Pupil Level Annual School Census (PLASC). The HESA data contain information on all students studying a first degree at Higher Education Institutions (HEIs) in the UK. With these two sources of data linked together, we have longitudinal data on our cohort of students from Key Stage 2 through to potential age 18 HE participation. Additionally, these two data sets are linked to a third data set, the Individual Learner Record (ILR) provided by the Learning and Skills Council, which allows us to observe whether or not individuals in our sample enrolled in Further Education institutions.

Our information on test and examination results is further enhanced by an additional derived dataset provided by DCSF, known as the "cumulative Key Stage 4 and Key Stage 5" file. This provides an important addition to the NPD, as it records both vocational and academic qualifications that were achieved after the age of 16.

2.1.1 Key Stage tests (from the NPD)

The Key Stage tests are national achievement tests sat by all children in state schools in England: Key Stage 1 is taken at age 7, Key Stage 2 at age 11, Key Stage 3 at age 14 and Key Stage 4 (GCSEs) at age 16. For individuals who choose to remain in the education system beyond statutory school-leaving age (16 in England), Key Stage 5 (A levels or equivalent) is sat at age 18. For the cohort used in this analysis, results are not available at Key Stage 1, as the individuals in question would have sat the exams before such data was recorded. However, we make use of the Key Stage 2 data from 1996–97, the Key Stage 3 data from 1999–00, the Key Stage 4 data from 2001–02 and the Key Stage 5 data from 2002–2003 and 2003–04.

[12] We do, however, consider mature students in other work for our ESRC-TLRP project. See Powdthavee and Vignoles (2008), 'Mature students: a success story?', Institute of Education working paper.

To measure attainment at Key Stages 2 and 3, we make use of the "raw" information available regarding the tier of each exam sat and the actual marks obtained in English, Maths and Science. Based on this data, we use an interpolation formula to calculate "exact" attainment levels (measured on the same scale as the final levels awarded). To illustrate this, consider the following examples. Children who were awarded Level 3 in English at Key Stage 2 would have achieved a mark between 28 and 51 on the English paper. The method we use assigns an attainment level of 3.125 to a child who scored 31, for instance, and 3.917 to a child who scored 50; a child whose score was in the middle of the two thresholds (i.e. 40) is assigned a level of 3.5. At Key Stage 3 the process is complicated somewhat by the existence of different tiers in Mathematics and Science, which represent different levels of difficulty. Children sitting Mathematics at Key Stage 3 could achieve Level 5 by scoring above 104 on the lowest tier (3-5) or, alternatively, by scoring between 37 and 42 on the most advanced tier (6-8). According to our method, a child who scores 129 on the Tier 3-5 paper would be assigned an exact level of 5.532, while a child with a mark of 41 on the Tier 6-8 paper would get an exact level of 5.667.

The advantage of our approach is that in producing a more continuous measure of attainment, we are better able to rank pupils in terms of their achievement at each Key Stage. In our analysis, we take the continuous attainment scores in each subject – English, Mathematics and Science – at each Key Stage and calculate the average across all three scores. We then order pupils in terms of their average score by placing them into five evenly sized "quintile groups" according to Key Stage 2 and Key Stage 3 attainment.

At Key Stage 4 (GCSEs and equivalent), we use the capped total point score: this gives the total number of points accumulated from the student's eight highest GCSE grades. At Key Stage 5, we use the total (uncapped) point score. As with Key Stages 2 and 3, we divide the population into five evenly sized quintile groups ranked according to their score at Key Stage 4 and Key Stage 5 to capture attainment at these levels.

2.1.2 Cumulative Key Stage 4 and Key Stage 5 dataset

Our second source of Key Stage 4 outcomes – and our only source of Key Stage 5 outcomes for those who do not take A-levels – is a cumulative dataset that captures details of a pupil's highest qualification by age 18. Here, we make use of information identifying whether individuals had achieved the National Qualifications Framework (NQF) Level 3 threshold (equivalent to two A Level passes at grade A–E) via any route by age 18. Unfortunately, this dataset does not contain more detailed test results; thus we cannot construct a broader average point score than that available through the NPD for Key Stage 5. We therefore use the indicator of attainment of the Level 3 threshold in addition to the Key Stage 5 test scores to provide attainment information for those individuals who do not sit any A Levels. In other words, we have richer data on the achievement of A level students (point score) than we do for students who achieved Level 3 via some other (generally vocational) route.

2.1.3 Pupil Level Annual School Census (PLASC)

This census was first carried out in January 2001 and covers all pupils attending state schools in England. It records pupil-level information – such as date of birth, home

postcode, ethnicity, special educational needs, entitlement to free school meals[13] and whether English is an additional language – plus a school identifier.

2.1.3 HESA

This dataset, collected by the Higher Education Statistics Agency, is used to identify all Higher Education participants at age 18 in our cohort of interest. It includes administrative details of the student's institution, subject studied, progression, mode of attendance, qualification aimed for, and year of programme. Based on the institution identifier, we have linked in institution-level average RAE scores from the 2001 RAE exercise, in order to analyse whether different types of students attend HE institutions of differing quality. Our measure of HE quality combines this indicator of the quality of each institution's research, with an indicator of whether or not the institution is a Russell Group university. Specifically our definition of high quality includes all 20 of the research-intensive Russell Group institutions, plus any UK Higher Education Institution (HEI) with an average 2001 RAE rating that exceeds the lowest average RAE found among Russell Group universities. This leads to the following definition of a "high quality" university:

Table 2.1 "high quality" universities (on our definition)

Russell Group universities	**2001 RAE > lowest Russell Group university**
University of Birmingham	Homerton College
University of Bristol	University of the Arts, London
University of Cambridge	Aston University
Cardiff University	University of Bath
University of Edinburgh	University of Durham
University of Glasgow	University of East Anglia
Imperial College London	University of Essex
King's College London	University of Exeter
University of Leeds	University of Lancaster
University of Liverpool	Birkbeck College
London School of Economics & Political Science	Queen Mary and Westfield College
University of Manchester	Royal Holloway and Bedford New College
Newcastle University	Royal Veterinary College
University of Nottingham	School of Oriental and African Studies
Queen's University Belfast	School of Pharmacy
University of Oxford	University of London (Institutes and activities)
University of Sheffield	University of Reading
University of Southampton	University of Surrey
University College London	University of Sussex
University of Warwick	University of York
	Courtauld Institute of Art

We recognise that such definitions of institution quality are, by their very nature, contentious and to some extent arbitrary. That said, this type of measure provides a useful indicator of the types of HEI being accessed by different students, not least because the wage premium associated with having a degree tends to be greater from such high quality institutions (Chevalier and Conlon, 2003). By this definition, 37% of HE participants attend a "high quality" university, which equates to 8% of our sample as a whole (including participants and non-participants).

[13] This can be thought of as a proxy for very low family income. Pupils are eligible for Free School Meals (FSM) if their parents receive Income Support, income-based Jobseeker's Allowance, or Child Tax Credits, with a gross household income of £14,495 (in 2007–08 prices).

2.2 Control variables

2.2.1 Key variables of interest

The three key characteristics that we consider with regard to the issue of widening participation in Higher Education (and widening access to high quality HE institutions) are: material deprivation, a neighbourhood-level proxy for parental education, and ethnicity, acknowledging that most of these factors also interact with gender.

Our material deprivation index is constructed by combining together (using principal component analysis[14]) three different measures of deprivation: the pupil's eligibility for Free School Meals (recorded at age 16), their Index of Multiple Deprivation (IMD) score (derived from Census data on the characteristics of individuals living in their neighbourhood[15]) and their Income Deprivation Affecting Children Index (IDACI) score, again constructed on the basis of Census data on individuals living in their neighbourhood[16]. The IMD and IDACI scores are mapped in using the pupil's home postcode (recorded at age 16). The population is split into five quintiles on the basis of this index, of which we include the top four (least deprived) quintiles in our model, with the base case being individuals in the most deprived quintile. Whilst these measures of family deprivation are not ideal (family income would be preferable, for example), taken together they provide a clear indicator of the deprivation of any given pupil.

As we do not observe individual parental education in any of our datasets, we make use of a local neighbourhood measure of educational attainment from the 2001 Census. This is recorded at Output Area (OA) level (approximately 150 households) and is mapped in using pupil's home postcode at age 16. We calculate the proportion of individuals in each OA whose highest educational qualification is at NVQ Level 3 or above (in other words, the proportion of individuals with post-compulsory schooling qualifications). We then split the population into quintiles on the basis of this index, and include the top four (highest educated) quintiles in our models. Thus, where we refer to neighbourhood parental education in this paper, we are referring to the mean education level of individuals living in the pupil's neighbourhood, which we use as a proxy for the child's own parents' education level.

PLASC contains a fairly disaggregated measure of pupil's ethnicity, which we make use of in our model via dummy variables. Our omitted category contains students of White British ethnic origin, with the following other groups included: Other White, Black Caribbean, Black African, Other Black, Indian, Pakistani, Bangladeshi, Chinese, Other Asian, Mixed or Other ethnic origin.

[14] This method takes into account the different scales of the contributing variables.
[15] This is available at Super Output Area (SOA) level (comprising approximately 700 households), and makes use of information from seven different domains: income; employment; health and disability; education, skills and training; barriers to housing and services; living environment; and crime.
[16] IDACI is an additional supplementary element to the Index of Multiple Deprivation.

2.2.2 Other controls

In addition to material deprivation, neighbourhood parental education and ethnicity (described in Section 2.2.1 above) and Key Stage 2, Key Stage 3, Key Stage 4 and Key Stage 5 results (discussed in Sections 2.1.1 and 2.1.2 above), we also include controls for school quality[17], month of birth, whether English is an additional language for the student, and whether they have statemented or non-statemented special educational needs (recorded at age 16).

2.3 Sample selection

The analysis of HE participation presented in this report is computed on our core estimation sample[18], which contains 262,516 males and 254,512 females. (The quality of HEI attended is estimated for HE participants only, so the sample is restricted to 46,275 males and 61,216 females.) We use several criteria to select the final estimation sample. Firstly, it requires a non-missing deprivation index, so any pupil for whom FSM status, IMD score or IDACI score is missing, is not included in the final sample. Secondly, it requires non-missing ethnicity[19] and Census education data, which therefore excludes all individuals in our cohort with a missing or invalid home postcode.

Finally, we restrict our analysis to those who are in the correct academic year given their age: for individuals in Year 11 in 2001–02, this requires being born between 1 September 1985 and 31 August 1986 inclusive. We have multiple records of each pupil's date of birth (potentially from PLASC and all Key Stage tests) which we combine to ensure that we make use of the most reliable information.

Around 1,000 individuals are excluded on the basis of missing FSM status, while a further 6,000 pupils have missing or invalid postcode information and therefore do not have IMD, IDACI or Census education data mapped in. We do not observe ethnicity for approximately 12,000 pupils, while we exclude an extra 12,500 pupils for not being born in the expected academic year. In total, therefore, our sample selection criteria exclude around 32,000 individuals (approximately 5.8% of the total PLASC Year 11 cohort) from the analysis.

[17] We do this by including fixed effects on the basis of secondary school attended at age 16. This essentially means that we only compare students who attend the same school.
[18] Except the analyses of HE quality and participation among high achievers, which are based on restricted samples within this group.
[19] Some pupils have their ethnicity recorded as "not obtained", "not sought" or "refused". These values were treated as missing so such individuals did not appear in the final sample.

3 Data description

In this section, we paint a very broad picture of who participates in HE at age 18 and who does not (Section 3.1), as well as the type of age 18 participant who attends a "high quality" university (Section 3.2). While Sections 3.1 and 3.2 provide simple comparisons of the characteristics of HE participants, non-participants, and participants in different types of HE institutions, Section 3.3 moves on to briefly consider the impact of prior attainment on HE participation rates at age 18. These differences will be explored in more detail in Section 4 (HE participation rates) and Section 5 (quality of HE institution attended).

3.1 Who participates in Higher Education?

Table 3.1 Personal characteristics of HE participants and non-participants

Characteristic	HE participants	HE non-participants	Difference
Reached expected level at Key Stage 2	0.929	0.635	0.294***
Reached expected level at Key Stage 3	0.960	0.62	0.339***
Average Key Stage 2 level	4.744	4.163	0.581***
Average Key Stage 3 level	6.363	5.268	1.095***
Capped KS4 points at 16	49.477	31.496	17.981***
Achieved 5 A*-C GCSE grades	0.949	0.382	0.568***
Key Stage 5 points by 18	312.775	213.549	99.227***
Achieved 3 A A-Level grades	0.096	0.006	0.090***
Reached Level 3 threshold by 18 via any route	0.952	0.292	0.659***
Eligible for Free School Meals	0.055	0.166	-0.111***
Speaks English as an additional language	0.120	0.081	0.040***
White British	0.813	0.864	-0.051***
Other White	0.027	0.025	0.002***
Black African	0.013	0.012	0.001***
Black Caribbean	0.010	0.015	-0.005***
Other Black	0.005	0.008	-0.003***
Indian	0.055	0.018	0.037***
Pakistani	0.027	0.026	0.001**
Bangladeshi	0.010	0.009	0.001**
Chinese	0.008	0.002	0.006***
Other Asian	0.006	0.001	0.004***
Mixed ethnicity	0.011	0.003	0.008***
Other ethnicity	0.015	0.016	-0.001***
Male	0.431	0.528	-0.098***
Least deprived quintile	0.323	0.166	0.158***
2nd deprivation quintile	0.253	0.185	0.068***
3rd deprivation quintile	0.198	0.200	-0.002*
4th deprivation quintile	0.135	0.218	-0.083***
Most deprived quintile	0.090	0.231	-0.141***
Least educated quintile	0.075	0.235	-0.159***
2nd OA education quintile	0.143	0.216	-0.073***
3rd OA education quintile	0.204	0.199	0.004***
4th OA education quintile	0.259	0.184	0.075***
Most educated quintile	0.318	0.166	0.152***

Notes: The numbers presented in each column are: the mean values of each characteristic for HE participants (column 1) and non-participants (column 2), and the difference between these means (column 3). For all those characteristics taking values either 0 or 1, the mean values in columns 1 and 2 are interpretable as the proportion of participants or non-participants who take the value 1 for that characteristic.

*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 3.1 presents personal characteristics of those who participate in HE (first column, accounting for 21.3% of our sample population) and those who do not (second column, accounting for 78.7% of our sample population), and the difference between these groups, including whether these differences are statistically significant (third column).[20]

Unsurprisingly, HE participants achieve more in school, from Key Stage 2 (age 11) through Key Stage 4 (age 16) and on to Key Stage 5 (age 18). For example, 95% of those attending university achieve at least 5 good GCSEs (that is, at least 5 A*-C grades) at age 16, whilst only 38% of those not participating in higher education achieve this level. There are substantial differences between participants and non-participants at A level as well. For instance, 10% of those participating in HE achieve at least three A grades at A level, while less than 1% of non-participants achieve this. More generally, participants score on average 313 points (roughly equivalent to one A and two B grades) at A level compared with 214 points (two C and one D grade) for non-participants.[21]

Apart from achieving more at school, those who go to university differ from non-participants in a number of other important ways as well. Boys are less likely to go to university than girls, with only 43% of HE participants at age 18 being men. Interestingly, students for whom English is an additional language (EAL) are more likely to participate in HE than those for whom English is their first language, consistent with research that has shown that such students catch up in secondary school with their non-EAL counterparts (Wilson, Burgess and Briggs, 2005).

Much of the focus of this report is on socio-economic differences specifically. The raw socio-economic gap in HE participation is stark. Poorer students, defined as those who are eligible for Free School Meals (FSM) at age 16, are much less likely to enter HE at age 18: just under 6% of HE participants were FSM eligible, compared to 17% of non-participants. Similarly, if we focus on those who are in our most deprived quintile[22], we see a similar picture to that shown for students on free school meals, with those in the bottom quintile much less likely to participate in HE than those in higher quintiles: Table 3.1 shows that 9% of HE participants were in the bottom deprivation quintile compared to 23% of non-HE participants.

Figures 3.1 and 3.2 also take account of gender differences, by comparing the HE participation rate[23] of the 20% most deprived state school students with the remaining 80%, for boys and girls respectively[24]. In both cases, there is a large socio-economic gap in HE participation rates:, only 7.4% of males in the bottom quintile of our

[20] Note that even small differences in average personal characteristics between participants and non-participants are likely to be statistically significant, due to the very large sample sizes used in our analysis.
[21] Of course, these average A level scores are based on a highly selected sample of students, because not all individuals stay on in education beyond age 16 and only a small minority attain A levels.
[22] This contains 20% of our sample by definition. We define material deprivation using FSM status alongside IMD and IDACI scores (see Section 2 for more details).
[23] Appendix A provides a more detailed look-up table of HE participation rates across different groups.
[24] This measure is based on Free School Meal status and neighbourhood deprivation status – see section 2 for details. If we do this by free school meal status, a similar picture is shown.

deprivation index attend HE at age 18, compared to 20.2% of those in the top four quintiles – a gap of 12.8 percentage points. Similarly, only 11.2% of females in the bottom quintile attend HE at age 18, compared to 27.3% of those in the top four quintiles – a gap of 16.1 percentage points.

Figure 3.1 Raw socio-economic gap in male HE participation rates at age 18

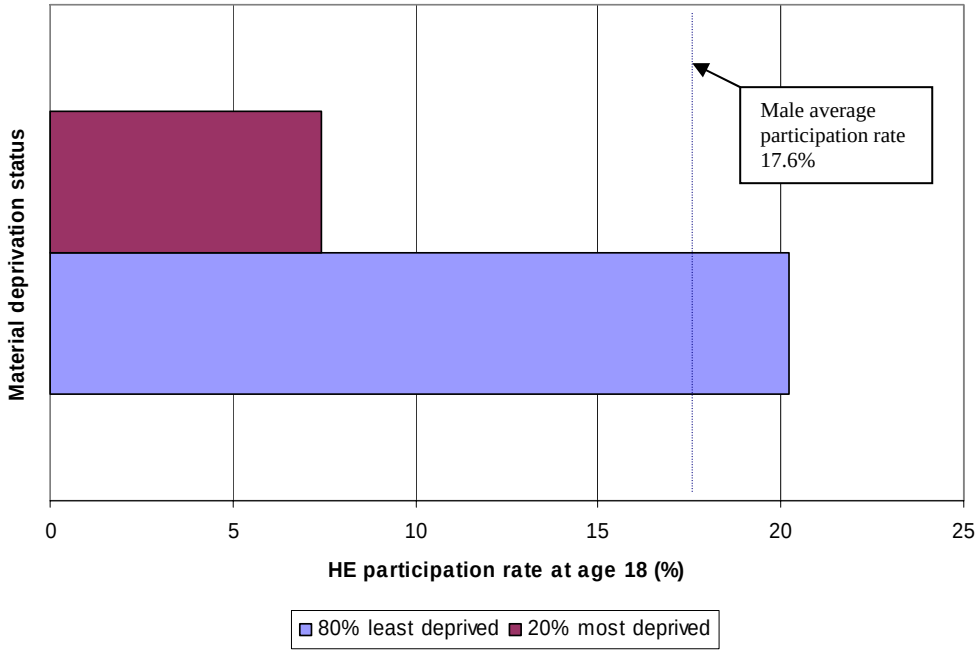
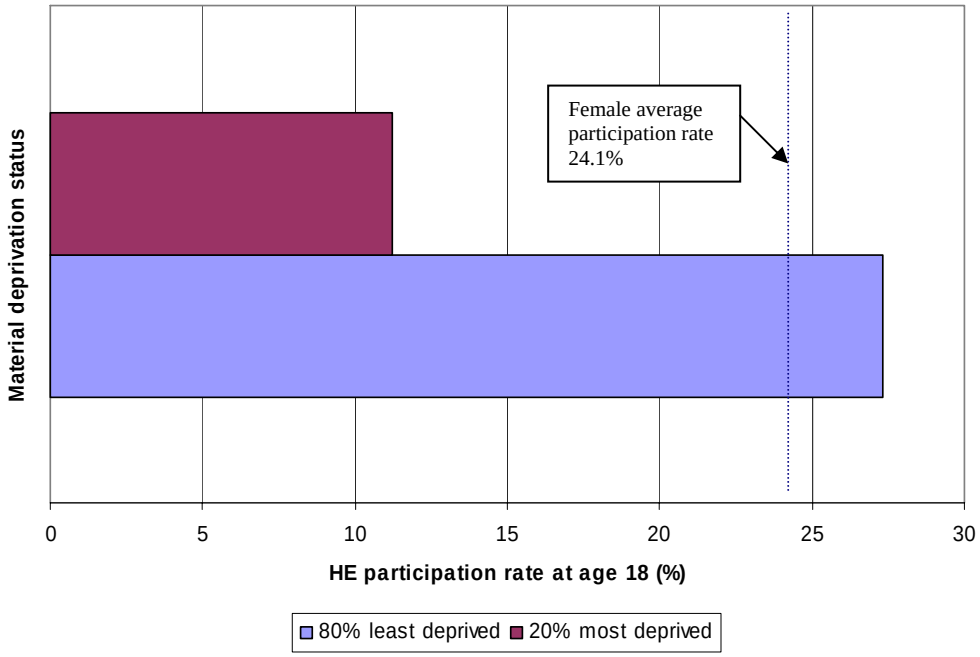


Figure 3.2 Raw socio-economic gap in female HE participation rates at age 18

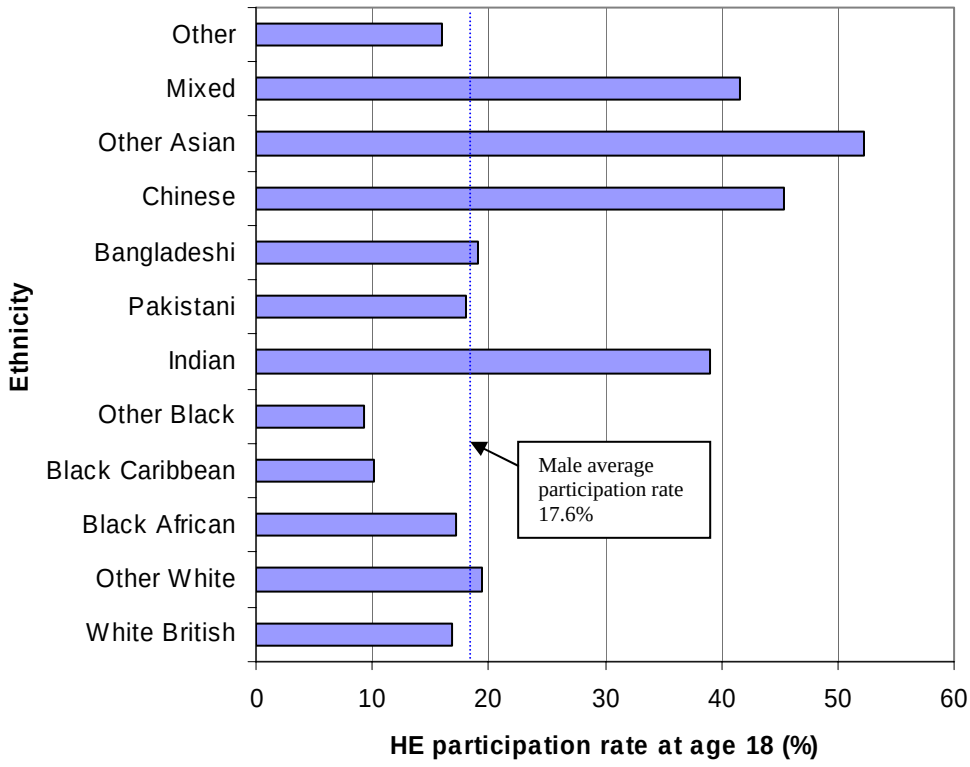


Our data does not allow us to observe information on pupils' parental education levels. However, as was discussed in Section 2, we do have an indicator of the average education levels in the pupil's neighbourhood. If we compare individuals who come from the 20% of neighbourhoods with the lowest levels of education with

individuals who come from the 20% of neighbourhoods with the highest levels of education, we see a similar story emerging: only 7.5% of HE participants came from neighbourhoods in the bottom education quintile (compared to 23.5% of non-participants), while 31.8% of HE participants come from neighbourhoods in the top education quintile (compared to 16.6% of non-participants).(See Table 3.1)[25]

Participation in HE also varies by ethnicity. Figures 3.3 and 3.4 illustrate HE participation rates for different ethnic groups for males and females respectively.[26] These figures show that a much smaller proportion of White British males participate in HE (17%) compared to White British females (23%). Similarly, Table 3.1 confirms that some ethnic groups (such as Black Caribbean, Other Black and White British students) appear to be under-represented in HE, while others (such as Chinese and Indian students) appear to be over represented in HE – this in the sense that the proportion of such students amongst HE participants is lower (higher) than amongst the non-participant group (although the difference in absolute numbers is often relatively small).

Figure 3.3 HE participation rates at age 18 for males, by ethnicity



Thus far we have focused on the individual characteristics of pupils or the characteristics of their neighbourhoods. From an education perspective, however, it is also important to consider what types of schools HE participants attend, relative to non-participants. This is shown in Table 3.2. From these figures, it appears that HE participants are not only high achievers themselves, but also tend to attend schools with other higher achieving pupils, as measured by their school's average number of capped Key Stage 4 points. Similarly, pupils who attend schools with a higher

[25] Graphs illustrating these differences can be found in Appendix A.
[26] Table A1 in Appendix A provides a look-up table of these participation rates.

proportion of poor children (measured by eligibility for Free School Meals) are significantly less likely to participate in HE: participants attend schools with an average of 11% of pupils eligible for Free School Meals, while non-participants attend schools where an average of 17% of pupils are FSM-eligible. There are also significant differences in the type of school attended between HE participants and non-participants. Taken together, this suggests that school quality may also be an important determinant of HE participation rates.

Figure 3.4 HE participation rates at age 18 for females, by ethnicity

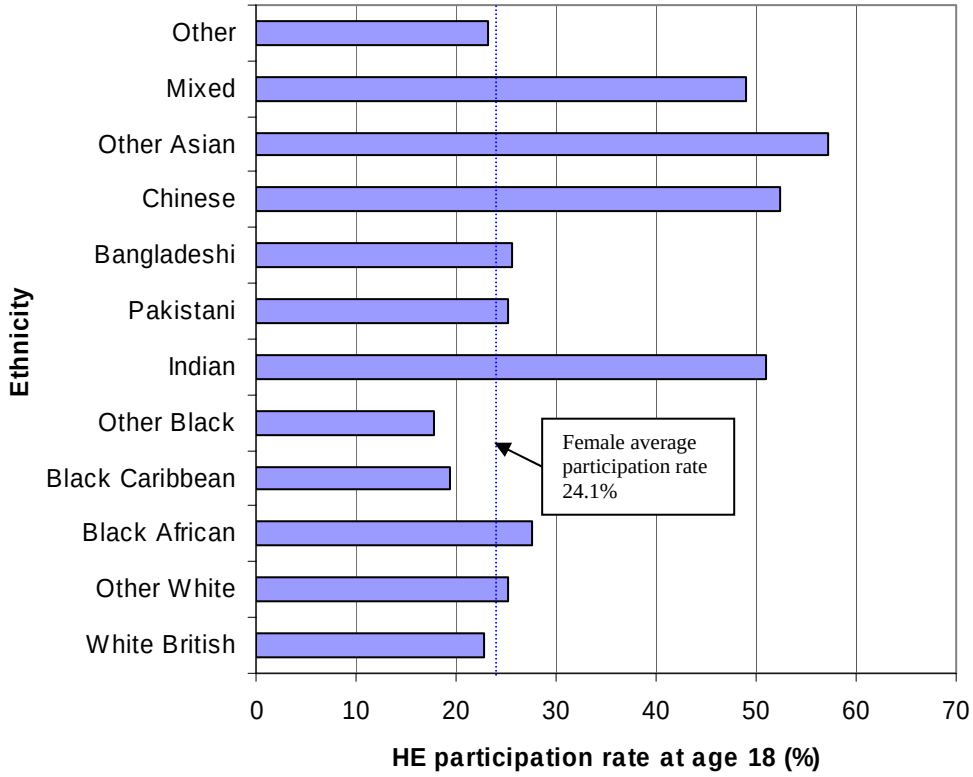


Table 3.2 The schools attended by HE participants and non-participants

Characteristic	HE participants	HE non-participants	Difference
School average capped Key Stage 4 points	38.15	32.89	5.258***
School-level proportion of FSM pupils	0.112	0.168	-0.056***
Attends a community school	0.568	0.665	-0.097***
Attends a foundation school	0.195	0.15	0.046***
Attends a voluntary aided school	0.185	0.127	0.058***

Notes: See notes to table 3.1 *** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

3.2 Accounting for University Quality

In this report we also consider the nature of HE participation for different groups of students. Specifically, we consider the socio-economic, ethnic and neighbourhood parental education gradient in the quality of university attended. Our measure of HE quality classifies as high quality those universities that are defined as prestigious on account of their membership of the Russell Group (Russell Group institutions) and those that are undertaking high quality research (as measured by their average RAE score) (see Section 2 for more details). Of course it may be that particular types of

student value other features of universities more highly, such as teaching quality, pastoral care and practical factors such as the distance from one's home. We should not therefore assume that the gaps we observe in access to "high quality" universities necessarily reflect barriers to entry, as opposed to pupils' choices.

Table 3.3 Personal characteristics of HE participants who attend a high quality institution and HE participants who do not

Characteristic	Attend a high quality institution	In HE but do not attend a high quality institution	Difference
Reached expected level at Key Stage 2	0.975	0.903	0.072***
Reached expected level at Key Stage 3	0.99	0.944	0.046***
Average Key Stage 2 level	4.964	4.625	0.338***
Average Key Stage 3 level	6.806	6.123	0.683***
Capped KS4 points at 16	54.812	46.598	8.214***
Achieved 5 A*-C GCSE grades	0.989	0.928	0.061***
Key Stage 5 points by 18	398.319	261.634	136.685***
Achieved 3 A A-Level grades	0.246	0.015	0.230***
Reached Level 3 threshold by 18 via any route	0.982	0.935	0.046***
Eligible for Free School Meals	0.034	0.067	-0.034***
Speaks English as an additional language	0.105	0.128	-0.023***
White British	0.824	0.807	0.017***
Other White	0.031	0.025	0.005***
Black African	0.011	0.014	-0.004***
Black Caribbean	0.006	0.013	-0.007***
Other Black	0.004	0.005	-0.002***
Indian	0.05	0.058	-0.008***
Pakistani	0.019	0.031	-0.012***
Bangladeshi	0.008	0.011	-0.002***
Chinese	0.012	0.006	0.006***
Other Asian	0.008	0.005	0.003***
Mixed ethnicity	0.014	0.01	0.004***
Other ethnicity	0.015	0.015	0
Male	0.449	0.421	0.028***
Least deprived quintile	0.387	0.289	0.098***
2nd deprivation quintile	0.268	0.246	0.023***
3rd deprivation quintile	0.18	0.208	-0.028***
4th deprivation quintile	0.104	0.152	-0.048***
Most deprived quintile	0.061	0.106	-0.045***
Least educated quintile	0.046	0.091	-0.045***
2nd OA education quintile	0.107	0.163	-0.057***
3rd OA education quintile	0.176	0.218	-0.042***
4th OA education quintile	0.266	0.256	0.010***
Most educated quintile	0.405	0.272	0.133***

Notes: The numbers presented in each column are: the mean values of each characteristic for HE participants who attend a high quality institute (column 1) and HE participants who do not attend a high quality institution (column 2), and the difference between these means (column 3). For all those characteristics taking values either 0 or 1, the mean values in columns 1 and 2 are interpretable as the proportion of HE participants who take the value 1 for that characteristic.

*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 3.3 provides an indication of the characteristics of students participating in high quality HE institutions (second column) as compared to those participating in HE at all institutions (column 3). It is apparent that prior attainment and the likelihood of attending a high quality institution are intertwined. Certainly a very high proportion of students with three A grades at A level attend a high quality university, as we have

defined it. In fact one quarter of those attending a high quality institution have three A grades at A level. Equally certain types of student have only a very low probability of attending a high quality institution, relative to their proportion in the HE population as a whole. In particular students eligible for Free School Meals and from deprived backgrounds, as well as students from some ethnic minority groups, namely Black Caribbean and Other Black are disproportionately less likely to attend a high quality institution. Equally, Chinese and other Asian students are disproportionately more likely to attend a high quality university.

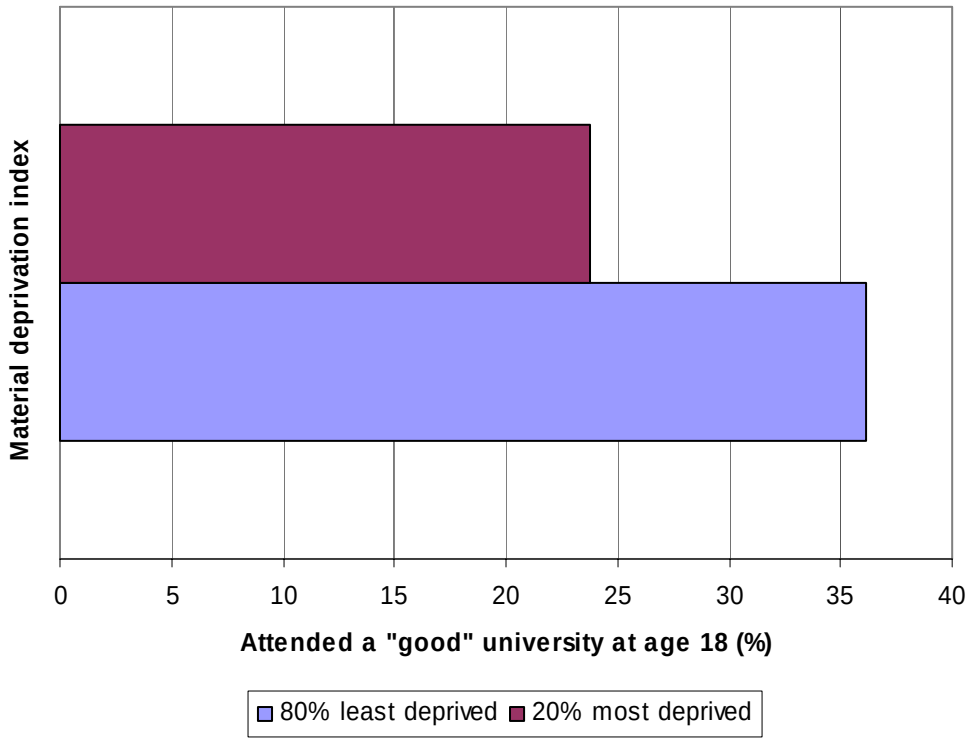
Table 3.4 then shows the types of schools attended by HE participants who attend a high quality university, in contrast to school types attended by all HE participants. Students participating in high quality institutions are more likely to attend a foundation or VA school but interestingly they attend schools with a higher proportion of FSM pupils.

Table 3.4 The schools attended by HE participants who attend a high quality institution and HE participants who do not

Characteristic	Attend a high quality institution	Do not attend a high quality institution	Difference
School average capped Key Stage 4 points	40.623	36.816	3.808***
School-level proportion of FSM pupils	0.091	0.124	-0.033***
Attends a community school	0.518	0.595	-0.077***
Attends a foundation school	0.219	0.183	0.036***
Attends a voluntary aided school	0.207	0.173	0.034***

Notes: See notes to Table 3.3.
*** indicates significance at the 1% level, ** at the 5% level, and * at the 10% level.

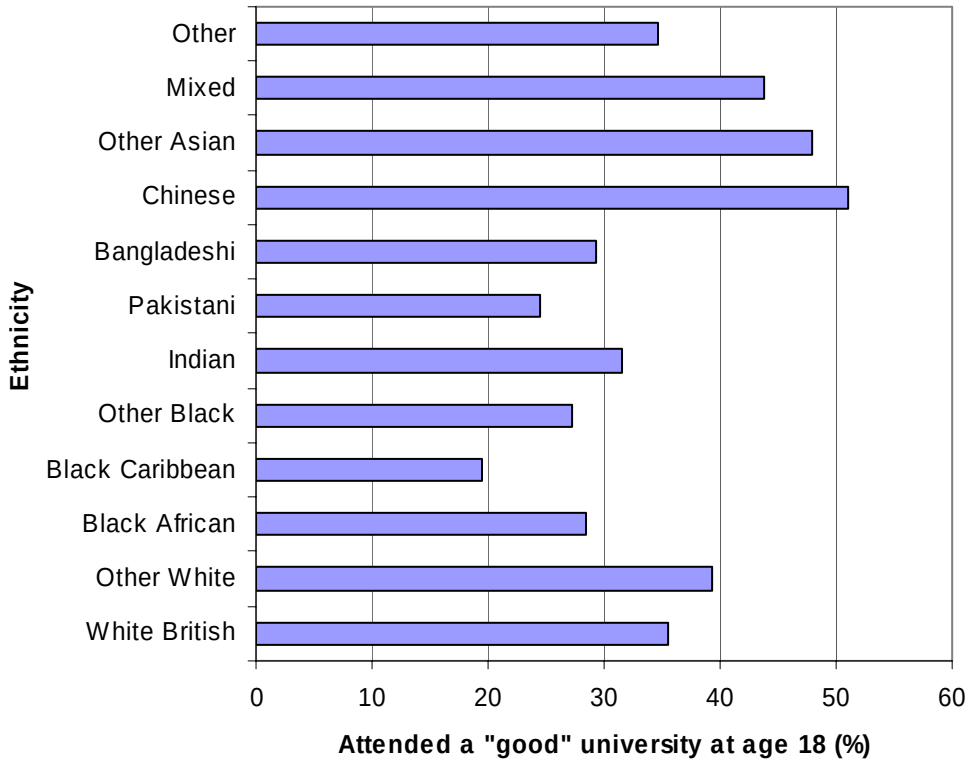
Figure 3.5 Attended a "high quality" HE institution, by material deprivation



That said, Figure 3.5 illustrates a striking difference in the probability of attending a "high quality" university according to material deprivation status: amongst those who do participate in university at age 18, around 24% of the most materially deprived HE participants attend a "high quality" university compared with 36% of the less materially deprived participants, implying a raw socio-economic gap in the probability of attending a higher quality university of approximately 12 percentage points.[27]

There are also ethnic differences in the probability of attending a "high quality" HE institution (shown in Figure 3.6 below): these are quite similar to the patterns described earlier in terms of HE participation rates per se. Individuals of Mixed, Asian and Chinese ethnic origin exhibit a higher than average probability of attending a "high quality" university, whilst individuals of Black African, Black Caribbean and Pakistani ethnic origin exhibit a lower than average probability of attending a "high quality" HE institution.

Figure 3.6 Attended a "high quality" HE institution, by ethnicity



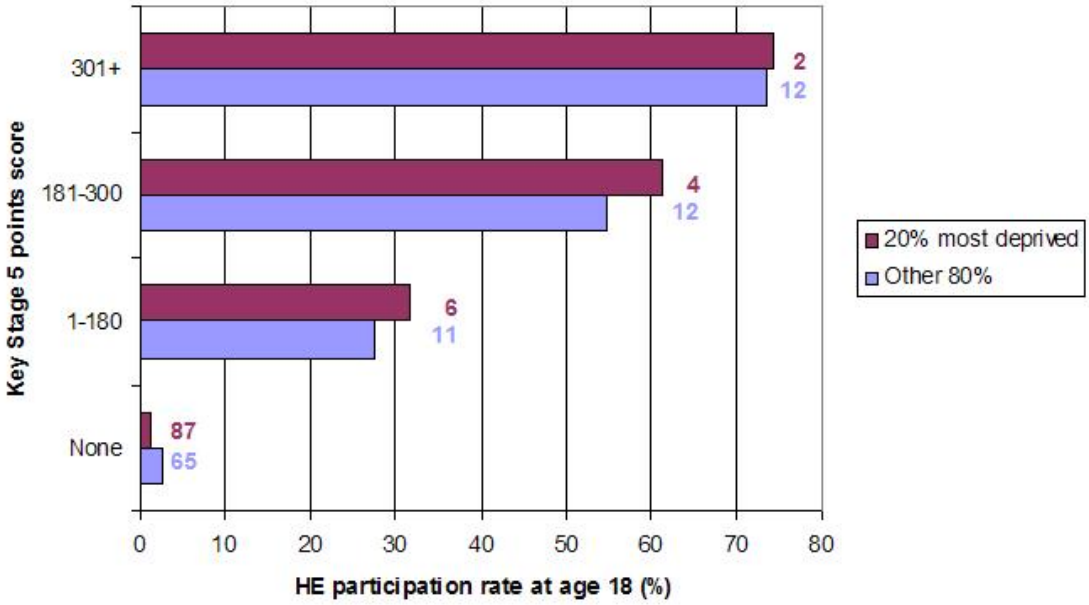
3.2 Accounting for prior attainment

If we use our data to produce a diagram along the lines of the well known one from the YCS (presented in Figure 1.2 above), we find a very similar story: that is, that amongst state school students in England, there is no socio-economic gradient in HE participation, *contingent on A level score*. This is shown in Figures 3.8 and 3.9 for males and females respectively. If anything, high performing individuals in the most deprived quintile have slightly higher participation rates in HE than those in the top

[27] The difference between the 20% of pupils living amongst the least well-educated neighbourhoods and the remaining 80% are of similar magnitude.

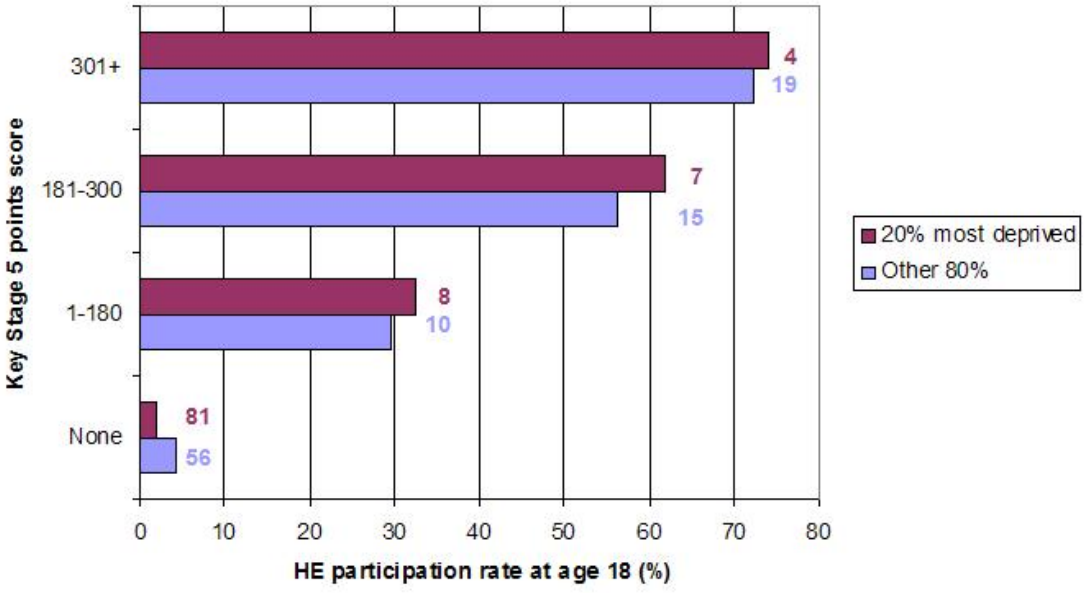
four quintiles[28]. However, only 12% of boys and 19% of girls in the bottom quintile of our deprivation index achieve any A level points, compared to 35% of males and 44% of females in the top four quintiles. Hence it is clear that the raw socio-economic gradient must emerge earlier in school.

Figure 3.7 HE participation gradient for males, by Key Stage 5 point score



Note: Numbers provided at the end of each bar show the percentage of the relevant group, defined according to deprivation status, falling into each A level point band. Thus all of the red numbers on the chart add up to 100%, and all of the blue numbers also add up to 100%.

Figure 3.8 HE participation gradient for females, by Key Stage 5 point score

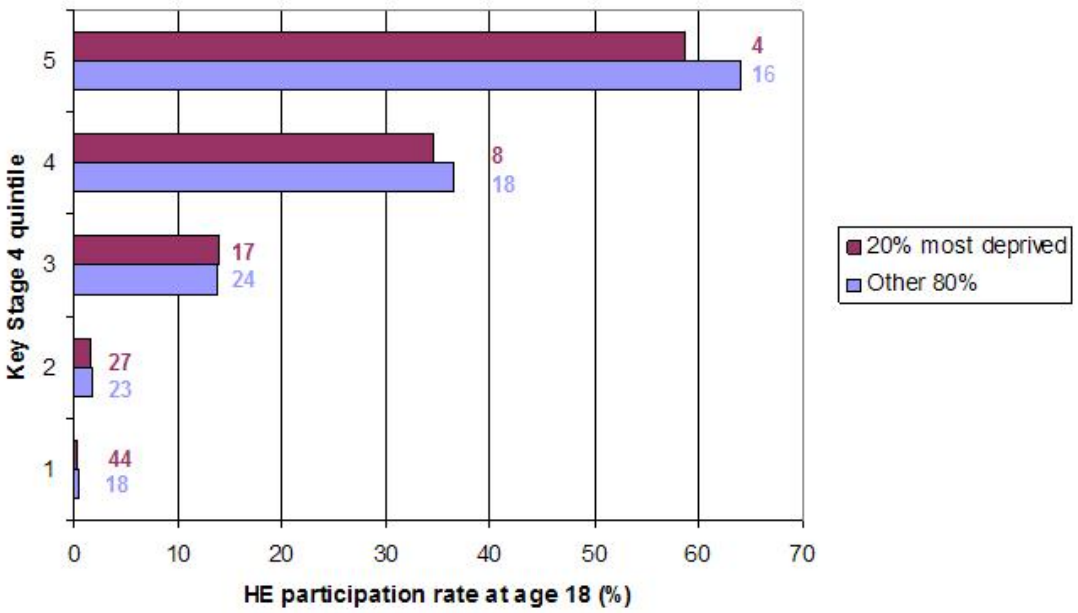


Note: See note to Figure 3.7.

[28] This may simply reflect the fact that students from higher socio-economic backgrounds are more likely to take gap years. We will be able to investigate this in more detail once we have access to age 19 participation data.

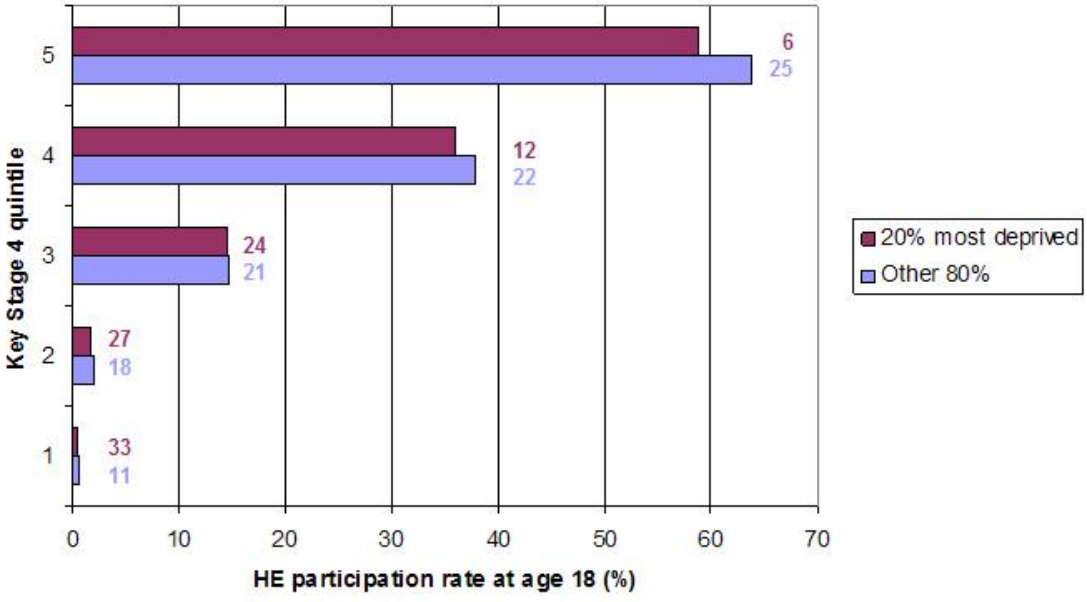
If we take a step backwards and compare HE participation rates contingent on Key Stage 4 quintile (at the end of compulsory education), then a similar story emerges. Figures 3.10 and 3.11 (below) illustrate these differences for males and females respectively.

Figure 3.9 HE participation gradient for males, by Key Stage 4 quintile



Note: See note to Figure 3.7.

Figure 3.10 HE participation gradient for females, by Key Stage 4 quintile



Note: See note to Figure 3.7.

From these figures, it is clear that people from the most deprived backgrounds are under-represented at the top of the GCSE achievement scale: only 12% of boys and 18% of girls in the most deprived quintile are in the top 40% of academic achievement at the age of 16, compared to 34% of males and 47% of females from the

top four socio-economic quintiles. While young people from deprived backgrounds are less likely to attend HE at 18 given a good GCSE performance[29], the socio-economic gap is again relatively small once academic achievement is taken into account. This suggests that we need to go back even further in time to understand when the raw gaps HE participation (contingent on prior educational attainment) really start to appear.

Figure 3.11 HE participation gradient for males, by Key Stage 2 quintile

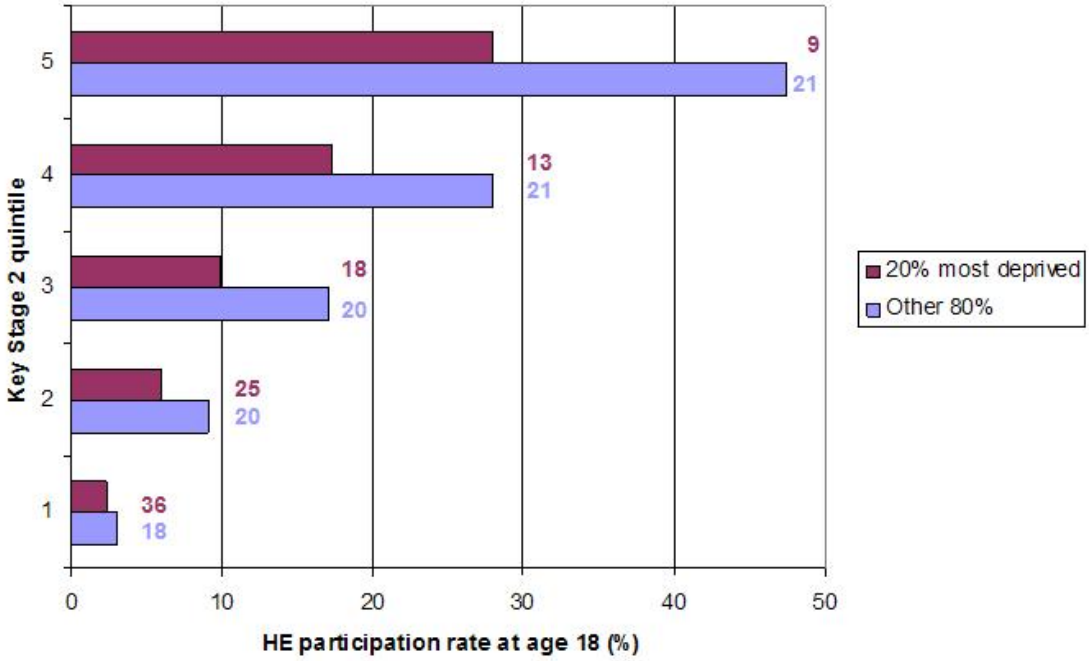
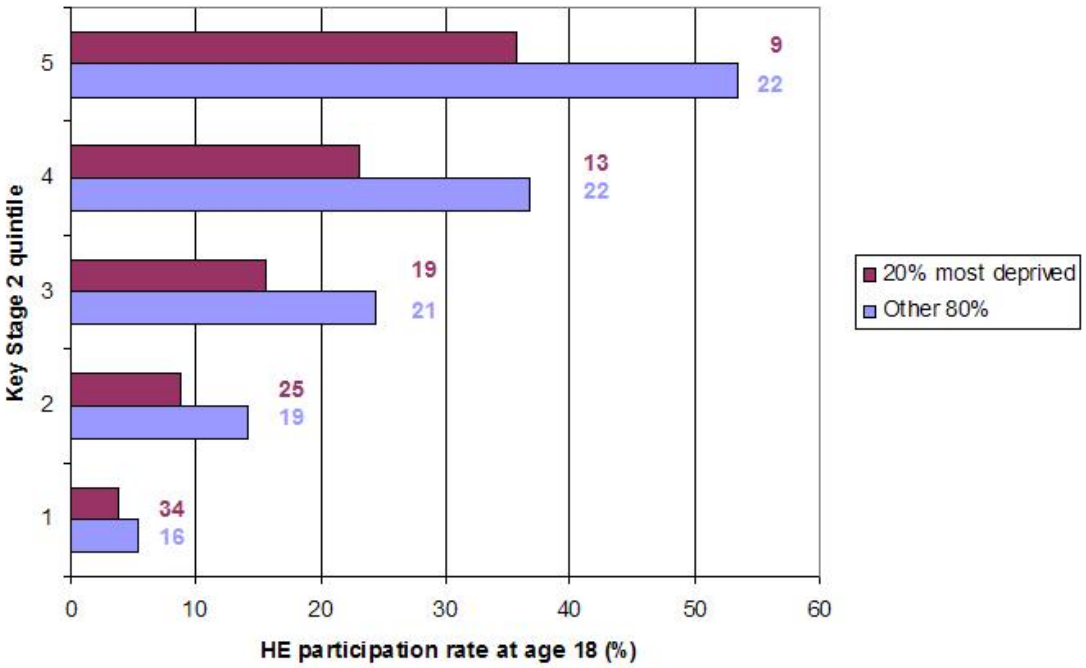


Figure 3.12 HE participation gradient for females, by Key Stage 2 quintile



[29] Defined here as being in the top 40% of Key Stage 4 scores.

If we repeat the same exercise, now controlling for Key Stage 2 outcomes, then it becomes clear that there is a strong socio-economic gap in HE attendance *within* Key Stage 2 quintiles, as well as *between* them: students from the most deprived backgrounds who achieve amongst the top quintiles at Key Stage 2 are significantly less likely to go to university than similarly bright children from the least deprived backgrounds, whilst this gap has virtually disappeared by the time the same individuals reach Key Stage 4. This is illustrated in Figure 3.12 for males and Figure 3.13 for females. However, it should be noted that even by Key Stage 2 (age 11), children from the most deprived backgrounds are under-represented amongst the highest achievers: only 21% of males and 22% of females amongst the 20% most deprived students are in the top two quintiles at Key Stage 2, compared to 42% of males and 44% of females from the other four quintiles. Whilst this is an alarming gap, it does suggest that children from more disadvantaged backgrounds have the opportunity to "catch up" with their more advantaged peers between ages 11 and 16 (an issue to which we will return in Section 4).

We now move on to consider the impact of controlling for prior educational attainment – amongst other factors – in more detail (for HE participation rates in Section 4 and quality of university attended in Section 5).

4 Understanding Differences in HE Participation Rates

In this section, we consider the associations between material deprivation[30], parental education (measured at the neighbourhood level), and ethnicity and participation in Higher Education (HE) at age 18. More specifically, we estimate the impact of being amongst the 20% most materially deprived secondary school pupils (compared to other quintiles), the impact of being amongst the 20% of secondary school pupils living in the least well-educated neighbourhoods (compared to other quintiles), and the impact of being of Other White, Black African, Black Caribbean, Other Black, Indian, Pakistani, Bangladeshi, Chinese, Other Asian, Mixed or Other ethnic origin (compared to White British ethnic origin).[31] Due to the well-established differences in educational attainment by gender, we do this separately for males and females.

Our approach involves first looking at the raw gaps between of each of these groups – classified according to material deprivation, neighbourhood parental education and ethnicity – in the likelihood of HE participation at age 18 (described graphically in section 3), and then examining the extent to which the resultant gaps can be explained away by differences in other observable characteristics. To do this, we add in characteristics of interest successively to our model (as controls).

First, we include secondary school quality, to investigate the extent to which differences in HE participation rates stem from differences in the quality of secondary schools to which different types of pupils have access: these form our baseline estimates. As discussed in Section 2, we do not measure school quality directly but rather include a dummy variable for each school in our sample, thereby focusing on differences in HE participation rates across different types of student within the same school (a school fixed effects model). This is important because if, for example, pupils from more materially deprived backgrounds are more likely to attend poorly performing schools than those from less materially deprived backgrounds, then by comparing pupils across schools, we are essentially conflating the impact of material deprivation with the impact of the quality of secondary school attended. In this case, we would expect the across schools model to overstate the direct impact of material deprivation on HE participation rates. Of course in interpreting these results we must be aware that fully identifying the effects of school quality on HE participation is a difficult task, one beyond the scope of this paper.[32] Moreover material deprivation is likely to impact on the quality of secondary school attended and therefore be one route by which disadvantaged pupils have lower achievement.

We then build on these baseline estimates by adding in other individual characteristics (in particular, month of birth, special educational needs status and whether the pupil

[30] See Section 2 for more information on our measure of material deprivation.

[31] We use the term 'impact' in this Section to describe the statistical association between material deprivation (and other factors) and the probability of attending HE at the age of 18. A much more difficult task would be to identify the *causal* effects of material deprivation on HE attendance, and this is beyond the scope of this report (for a survey of the literature that attempts to do this, see Havemann and Wolfe (1995).

[32] In particular our methods do not allow us to separate out the effects of school quality from either peer effects, or the effects of any unobserved differences between pupils correlated with both their choice of school and their HE decision. For a fuller discussion of the difficulties in measuring the effects of school quality on pupil attainment and decisions, see [Card and Krueger, 1992].

has English as an additional language) available from the administrative datasets. Finally, we add in measures of prior attainment – Key Stage 2 results (age 11), Key Stage 3 results (age 14), Key Stage 4 results (age 16), and finally Key Stage 5 results (age 18)[33]. We do this to better understand whether material deprivation, neighbourhood parental education and ethnicity affect HE participation rates directly, or through their impact on prior attainment (which in turn affects the likelihood of attending university at age 18), or both. This is not discernible from the results discussed in the previous section, and can only be done using modelling techniques.

This chapter now proceeds as follows: in Section 4.1, we report the raw differences in HE participation rates by material deprivation, neighbourhood parental education and ethnicity, and show how these gaps change once school quality and other individual-level characteristics are included in the model; in Section 4.2, we go on to illustrate how these estimates alter once we add in academic attainment from age 11 through to age 18; in Section 4.3, we examine the impact of prior attainment on HE participation rates in more detail, by considering how changes in attainment over time (specifically, between Key Stage 2 and Key Stage 4) affect the likelihood of going on to university at age 18; Section 4.4 offers some brief conclusions.

4.1 Baseline estimates of differences in HE participation rates

In this section, we discuss estimates of the impact of material deprivation[34], neighbourhood parental education and ethnicity on the likelihood of participating in Higher Education at age 18 for males (Section 4.1.1) and females (Section 4.1.2). For each factor, we present both raw differences (across schools) and estimates controlling for school quality (within schools).

4.1.1 Males

Table 4.1.1 presents estimates of the impact of material deprivation, neighbourhood parental education and ethnicity on the likelihood of going to university at age 18 for males. It is clear from this table that both material deprivation and low neighbourhood parental education are associated with low HE participation rates amongst boys. For example, being among the 20% *least* materially deprived pupils (compared with the 20% *most* materially deprived pupils) more than trebles the likelihood that you will go on to university, from 7.4% to 29.6% (a gap of 22.2 percentage points). Similarly, being among the 20% of pupils living in the best-educated neighbourhood (compared with the 20% of pupils in the least well-educated neighbourhood) almost quadruples the probability of HE participation, from 6.0% to 29.4% (a gap of 23.4 percentage points). Once we take school quality into account, these gaps fall to 18.3 percentage points and 18.0 percentage points respectively, suggesting that materially deprived pupils and pupils living in poorly educated neighbourhoods are more likely to attend poorly performing secondary schools than non-materially deprived pupils and pupils in highly educated neighbourhoods. This means that increasing HE participation rates amongst these pupils may, at least partly, be down to providing greater access to better secondary schools.

[33] Of course, we do not have Key Stage 5 results for all pupils, as some will have chosen not to stay on in education beyond age 16. For these individuals, we include a missing Key Stage 5 results dummy and ascribe them a Key Stage 5 score of zero.

[34] Appendix B contains results using FSM status alone as an indicator of material disadvantage.

Table 4.1.1 Raw gradients in HE participation rates for males, by deprivation quintile, neighbourhood parental education quintile and ethnicity

	Material Deprivation		Neighbourhood parental education		Ethnicity	
	Across schools	Within schools	Across schools	Within schools	Across schools	Within schools
4th deprivation quintile	0.040***	0.035***				
3rd deprivation quintile	0.098***	0.087***				
2nd deprivation quintile	0.152***	0.132***				
Least deprived quintile	0.222***	0.183***				
2nd OA education quintile			0.062***	0.047***		
3rd OA education quintile			0.116***	0.089***		
4th OA education quintile			0.169***	0.129***		
Most educated quintile			0.234***	0.180***		
Other White					0.026***	0.025***
Black African					0.005	0.057***
Black Caribbean					-0.066***	-0.013**
Other Black					-0.076***	-0.030***
Indian					0.223***	0.223***
Pakistani					0.014*	0.079***
Bangladeshi					0.018*	0.101***
Chinese					0.286***	0.255***
Other Asian					0.355***	0.271***
Mixed ethnicity					0.249***	0.199***
Other ethnicity					-0.009	0.020***
Constant	0.074***	0.089***	0.060***	0.087***	0.168***	0.164***
Observations	262,516	262,516	262,516	262,516	262,516	262,516
R-squared	0.043	0.043	0.045	0.045	0.015	0.013
Number of clusters		3,452		3,452		3,452

Notes to Table 4.1.1:
1) The within schools specification includes school fixed effects (using school attended at age 16).
2) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

The raw findings from Table 4.1.1 indicate that boys from most ethnic minority subgroups are significantly *more* likely to go on to university at age 18 than White British boys. These differences are largest for pupils of Indian (22.3 percentage points), Chinese (28.6 percentage points), Other Asian (35.5 percentage points) and Mixed (24.9 percentage points) ethnic origin. Boys of Black Caribbean and Other Black ethnic origin are the only groups that are significantly *less* likely to participate in HE than White British boys, with gaps of 6.6 and 7.6 percentage points respectively. This finding is consistent with recent research, which suggested that the educational achievement of some groups of ethnic minority students exceeds that of White British students (Wilson et al. 2005).

Once we compare pupils of different ethnic origin within the same schools, some interesting patterns emerge. It appears that boys of Black[35], Pakistani and Bangladeshi ethnic origin are more likely to attend poorly performing schools than White British boys, while boys of Chinese, Other Asian or Mixed ethnic origin are more likely to

[35] We use the term Black ethnic origin to refer collectively to individuals of Black Caribbean, Black African and Other Black ethnic origin.

attend high performing schools than White British boys. We make these inferences on the basis that forcing comparisons within schools favourably affects the participation rates of Black, Pakistani and Bangladeshi boys relative to White British boys, but harms the participation rates of boys of Chinese, Other Asian or Mixed ethnic origin relative to White British boys. For example, while the raw results suggest that boys of Other Asian ethnic origin are 35.5 percentage points more likely to participate in HE at age 18 than White British boys, they are only 27.1 percentage points more likely to participate once we control for school quality.

Table 4.1.2 Gradients in HE participation rates for males, controlling for individual-level characteristics (excluding prior attainment)

	Controlling for deprivation, neighbourhood parental education and ethnicity	Plus other individual level characteristics
4th deprivation quintile	0.023***	0.016***
3rd deprivation quintile	0.062***	0.050***
2nd deprivation quintile	0.095***	0.080***
Least deprived quintile	0.133***	0.115***
2nd OA education quintile	0.022***	0.019***
3rd OA education quintile	0.045***	0.040***
4th OA education quintile	0.071***	0.064***
Most educated quintile	0.112***	0.104***
Other White	0.025***	0.016***
Black African	0.070***	0.051***
Black Caribbean	0.001	0.007
Other Black	-0.017**	-0.015*
Indian	0.219***	0.187***
Pakistani	0.093***	0.067***
Bangladeshi	0.117***	0.086***
Chinese	0.250***	0.220***
Other Asian	0.272***	0.242***
Mixed ethnicity	0.202***	0.189***
Other ethnicity	0.028***	0.013**
Constant	0.050***	0.098***
Observations	262,516	262,516
R-squared	0.072	0.094
Number of clusters	3,452	3,452
F-test of additional controls (P value)		0.000

Notes to Table 4.1.2:
1) All models include school fixed effects (on the basis of school attended at age 16).
2) In addition to deprivation quintile, neighbourhood parental education quintile and ethnicity, Column 2 also includes controls for month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (measured at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Table 4.1.2 extends this analysis, by controlling for material deprivation, neighbourhood parental education and ethnicity in the same model (within schools).[36] Given the likely correlation between low neighbourhood parental education and high

[36] Table C.1 in Appendix C presents the same estimates using the across schools model.

material deprivation, it is not surprising to see that the estimated impacts of each of these factors on HE participation at age 18 fall, once we control for both measures in the same model. This is particularly true for neighbourhood parental education: for example, while the raw results suggest that the 20% of boys from the most highly educated neighbourhoods were 23.3 percentage points more likely to go on to university than the 20% of boys from the least highly educated neighbourhoods, once we control for material deprivation and ethnicity, this disparity falls to 11.2 percentage points.

Interestingly, controlling for material deprivation and neighbourhood parental education has differential effects for different ethnic groups. For Indian and Chinese boys, controlling for material deprivation and neighbourhood parental education reduces the advantage that they have over White British boys in terms of HE participation rates, while for boys of Black, Pakistani, Bangladeshi or Other ethnic origin, controlling for these factors increases the advantage (or reduces the disadvantage) that they face relative to White British boys. This suggests that Indian and Chinese boys are less materially deprived and/or have better-educated parents than White British boys, while the reverse is true for boys of Black, Pakistani, Bangladeshi or Other ethnic origin.[37]

The results reported in Column 2 of Table 4.1.2 also control for month of birth, whether English is an additional language for the pupil and special educational needs status. These figures show an almost universal reduction in the absolute values of the estimates of the impact of material deprivation, neighbourhood parental education and ethnicity on HE participation rates at age 18.[38] For example, controlling for these additional factors reduces the gap in participation rates between boys of Bangladeshi and White British ethnic origin from 11.7 percentage points to 8.6 percentage points.

4.1.2 Females

Table 4.1.3 provides estimates of the impact of material deprivation, neighbourhood parental education and ethnicity on the likelihood of going to university at age 18 for girls, with (within schools) and without (across schools) controls for school quality. These figures exhibit a largely similar pattern to those found for boys (see Section 4.1.1 above), with the exception that, for girls, the point estimates of the gap between different types of female students tend to be larger. However, because, in general, females tend to have higher participation rates than males, we need to be careful how we interpret these results. For example, the raw results show that girls among the 20% least materially deprived secondary school pupils are, on average, 27.1 percentage points more likely to participate in Higher Education at age 18 than girls among the 20% most materially deprived secondary school pupils; this compares with a difference of 22.2 percentage points for boys. However, in percentage terms, girls from the least materially deprived quintile are 2.5 times more likely to go on to university than girls from the most materially deprived quintile, while non-materially deprived boys are 3 times more likely to participate.

[37] The same is also true for girls from these groups (see Table 4.1.4 for details).
[38] The exception is for Black Caribbean boys, for whom the point estimate increases (from 0.001 to 0.007), although neither estimate is significant at the 10% level.

Interestingly, while controlling for school quality reduces the estimates of the effect of neighbourhood parental education on HE participation by approximately the same amount for girls and boys, the same cannot be said for the estimates of the effect of material deprivation: only for girls in the least materially deprived quintile is the estimate significantly reduced; for girls in the remaining quintiles, forcing comparisons to occur within schools does not make much difference. For example, while the impact of being in the middle quintile of the material deprivation index for boys is reduced by 1.2 percentage points following the inclusion of controls for school quality, for girls in the same quintile, the estimate is reduced by only 0.3 percentage points. This suggests that material deprivation exerts a greater influence over the quality of secondary school attended by boys than it does for girls.

Table 4.1.3 Raw gradients in HE participation rates for females, by deprivation quintile, neighbourhood parental education quintile and ethnicity

	Material Deprivation		Neighbourhood parental education		Ethnicity	
	Across schools	Within schools	Across schools	Within schools	Across schools	Within schools
4th deprivation quintile	0.055***	0.057***				
3rd deprivation quintile	0.129***	0.126***				
2nd deprivation quintile	0.191***	0.180***				
Least deprived quintile	0.271***	0.241***				
2nd OA education quintile			0.080***	0.064***		
3rd OA education quintile			0.153***	0.123***		
4th OA education quintile			0.218***	0.174***		
Most educated quintile			0.281***	0.222***		
Other White					0.023**	0.017***
Black African					0.048***	0.106***
Black Caribbean					-0.035***	0.020***
Other Black					-0.050***	-0.003
Indian					0.281***	0.280***
Pakistani					0.024***	0.093***
Bangladeshi					0.028**	0.118***
Chinese					0.295***	0.265***
Other Asian					0.343***	0.278***
Mixed ethnicity					0.262***	0.211***
Other ethnicity					0.004	0.030***
Constant	0.112***	0.120***	0.095***	0.125***	0.229***	0.225***
Observations	254,512	254,512	254,512	254,512	254,512	254,512
R-squared	0.051	0.05	0.054	0.054	0.016	0.014
Number of clusters		3,381		3,381		3,381

Notes to Table 4.1.3:
1) The within schools specification includes school fixed effects (using school attended at age 16).
2) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

In terms of ethnicity, two groups are worthy of note: firstly, Black African girls seem to perform much better (relative to White British girls) than Black African boys do (relative to White British boys): this is true for both the raw results and those controlling for school quality. We see from Table 4.1.3 that Black African girls are

4.8 percentage points more likely to participate in Higher Education at age 18 than White British girls (using the across schools model), and 10.6 percentage points more likely to participate once we add in controls for school quality (within schools). This compares with no difference between Black African and White British boys in the raw results, and a gap of 5.7 percentage points once we allow for school quality. Secondly, while the raw results suggest that Black Caribbean girls and boys are both significantly less likely to go on to university at age 18 than White British girls and boys, once we account for school quality, Black Caribbean girls are now significantly *more* likely to participate than White British girls (while Black Caribbean boys remain significantly less likely to participate than White British boys).[39]

Table 4.1.4 Gradients in HE participation rates for females, controlling for individual-level characteristics (excluding prior attainment)

	Controlling for deprivation, neighbourhood parental education and ethnicity	Plus other individual level characteristics
4th deprivation quintile	0.042***	0.034***
3rd deprivation quintile	0.095***	0.082***
2nd deprivation quintile	0.133***	0.119***
Least deprived quintile	0.178***	0.160***
2nd OA education quintile	0.029***	0.026***
3rd OA education quintile	0.064***	0.059***
4th OA education quintile	0.098***	0.092***
Most educated quintile	0.133***	0.126***
Other White	0.020***	0.008
Black African	0.126***	0.095***
Black Caribbean	0.039***	0.043***
Other Black	0.015*	0.014
Indian	0.272***	0.226***
Pakistani	0.110***	0.067***
Bangladeshi	0.144***	0.097***
Chinese	0.260***	0.221***
Other Asian	0.282***	0.242***
Mixed ethnicity	0.216***	0.201***
Other ethnicity	0.044***	0.024***
Constant	0.070***	0.105***
Observations	254,512	254,512
R-squared	0.084	0.101
Number of clusters	3,381	3,381
F-test of additional controls (P value)		0.000

Notes to Table 4.1.4:
1) All models include school fixed effects (on the basis of school attended at age 16).
2) In addition to deprivation quintile, neighbourhood parental education quintile and ethnicity, Column 2 also includes controls for month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (measured at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

[39] Of course, both groups experience a similar percentage point change following the inclusion of controls for school quality – it is just that the change for Black Caribbean boys comes from a lower base.

Table 4.1.4 illustrates how the estimates of the impact of material deprivation, neighbourhood parental education and ethnicity change once we control for all three factors in the same model (Column 1), and after including other individual-level characteristics, namely month of birth, whether English is the pupil's first language and special educational needs status (Column 2).[40] In both cases, the changes observed for girls exactly parallel those for boys (see Section 4.1.1 above for further details).

4.2 The importance of prior attainment

In this section, we move on to consider how the inclusion of successive measures of prior educational attainment (starting with Key Stage 2 and finishing with Key Stage 5[41]) affect our estimates of the impact of material deprivation, neighbourhood parental education and ethnicity on HE participation rates using the within schools model.[42] We do this for males (Table 4.2.1) and females (Table 4.2.2) separately, but discuss the results simultaneously. The first column of each table replicates the results shown in the second column of Tables 4.1.2 (for males) and 4.1.4 (for females), i.e. it presents estimates of the impact of material deprivation, neighbourhood parental education and ethnicity on HE participation rates, having controlled for school quality, month of birth, whether English is the pupil's first language, and whether they have special educational needs. Columns 2 through 5 go on to illustrate how these estimates change once we add in Key Stage 2 results (age 11), Key Stage 3 results (age 14), Key Stage 4 results (age 16) and Key Stage 5 results (age 18). By doing this, we show how HE participation rates differ across different types of student with the same pattern of earlier school attainment.

In terms of material deprivation and neighbourhood parental education, the inclusion of Key Stage 2 results reduces the advantage associated with each quintile by around 30% for boys and girls. For example, the impact (on the likelihood of going to university at age 18) of being amongst the 20% of pupils from the best-educated neighbourhoods (compared with the 20% of pupils from the least well-educated neighbourhoods) falls from 10.4 percentage points to around 7.6 percentage points for boys – and from 12.6 percentage points to 9.0 percentage points for girls – once we add in Key Stage 2 results. This suggests that socio-economic disadvantage has already had a significant impact on school outcomes at the age of 11, and that this disadvantage can explain a significant amount of the gap in HE attendance at age 18. Given that our data does not contain earlier test results, it is not possible to see when these differences start emerging. We will be able to look at this issue with future cohorts for whom we will have results at age 7 (Key Stage 1).

The addition of Key Stage 3 results produces a reduction of similar magnitude in most cases, while the inclusion of Key Stage 4 results decreases the estimates by a further 50%. For example, for boys, adding in GCSE results reduces the advantage associated with being in the 20% of secondary school pupils who are least materially deprived (compared with the 20% of pupils who are most materially deprived) from 6.1 percentage points to 3.2 percentage points, while for girls, the reduction is from 8.4

[40] Table C.2 in Appendix C presents these estimates using the across schools model.
[41] We include a missing dummy for all individuals for whom we do not observe Key Stage 5 results.
[42] Tables C.1 and C.2 in Appendix C present these estimates using the across schools model for males and females respectively.

percentage points to 4.8 percentage points. Including controls for educational attainment at age 16 is also sufficient to eliminate the gap between boys in the most materially deprived quintile and those in the quintile above – the only group of boys for which this elimination occurs. These results suggest that an important part of the HE participation story is what happens to the academic trajectories of the most disadvantaged students between the ages of 11 and 16, but particularly between the ages of 14 and 16. We will look at this again in more detail in Section 4.3 below.

Table 4.2.1 Gradients in HE participation for males, controlling for individual-level characteristics and prior attainment

	Individual-level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
4th deprivation quintile	0.016***	0.009***	0.005***	0.001	0.002
3rd deprivation quintile	0.050***	0.034***	0.023***	0.010***	0.006***
2nd deprivation quintile	0.080***	0.057***	0.040***	0.019***	0.009***
Least deprived quintile	0.115***	0.085***	0.061***	0.032***	0.016***
2nd OA education quintile	0.019***	0.013***	0.009***	0.004***	0.003**
3rd OA education quintile	0.040***	0.027***	0.019***	0.009***	0.005***
4th OA education quintile	0.064***	0.045***	0.032***	0.016***	0.004**
Most educated quintile	0.104***	0.076***	0.053***	0.027***	0.006***
Other White	0.016***	0.027***	0.024***	0.016***	0.011**
Black African	0.051***	0.076***	0.082***	0.065***	0.051***
Black Caribbean	0.007	0.030***	0.043***	0.043***	0.035***
Other Black	-0.015*	0.006	0.015**	0.018***	0.016***
Indian	0.187***	0.200***	0.183***	0.143***	0.102***
Pakistani	0.067***	0.087***	0.086***	0.064***	0.043***
Bangladeshi	0.086***	0.097***	0.089***	0.063***	0.053***
Chinese	0.220***	0.212***	0.171***	0.131***	0.095***
Other Asian	0.242***	0.243***	0.203***	0.134***	0.077***
Mixed ethnicity	0.189***	0.166***	0.143***	0.094***	0.037***
Other ethnicity	0.013**	0.031***	0.032***	0.026***	0.024***
Constant	0.098***	-0.009***	-0.032***	-0.025***	0.114***
Observations	262,516	262,516	262,516	262,516	262,516
R-squared	0.094	0.183	0.251	0.338	0.462
Number of clusters	3,452	3,452	3,452	3,452	3,452
F-test of additional controls (P value)		0.000	0.000	0.000	0.000

Notes to Table 4.2.1:
1) The results presented in Column 1 replicate those found in Column 2 of Table 4.1.2.
2) All models are within-school. Across-school models can be found in Appendix C.
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

When we go on to add in Key Stage 5 results, the disparity associated with material deprivation and/or low neighbourhood parental education is again halved, such that boys amongst the 20% of pupils who are least materially deprived are now only 1.6 percentage points more likely to go to university than boys amongst the 20% who are most materially deprived, while for girls, the percentage point difference remains slightly larger at 2.6 percentage points. Similarly, boys and girls amongst the 20% of pupils from the best-educated neighbourhoods are now only 0.6 percentage points more likely to go to university than boys and girls amongst the 20% of pupils from the

least well-educated neighbourhood: this compares with raw differences of 22.2 and 23.4 percentage points for boys, and 27.1 and 28.1 percentage points for girls respectively.

For individuals from poorer socio-economic backgrounds (including those facing material deprivation and those from low educated neighbourhoods), the inclusion of prior educational attainment – particularly Key Stage 4 and Key Stage 5 results – significantly reduces the HE participation gap. This suggests that one of the main challenges in widening participation in HE for these groups is to increase the proportion of pupils getting good GCSE and A-level (or equivalent) results.

Table 4.2.2 Gradients in HE participation rates for females, controlling for individual-level characteristics and prior attainment

	Individual-level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
4th deprivation quintile	0.034***	0.023***	0.015***	0.007***	0.006***
3rd deprivation quintile	0.082***	0.058***	0.040***	0.021***	0.013***
2nd deprivation quintile	0.119***	0.085***	0.060***	0.031***	0.017***
Least deprived quintile	0.160***	0.117***	0.084***	0.048***	0.026***
2nd OA education quintile	0.026***	0.015***	0.010***	0.004**	0.002
3rd OA education quintile	0.059***	0.041***	0.030***	0.018***	0.009***
4th OA education quintile	0.092***	0.065***	0.047***	0.028***	0.012***
Most educated quintile	0.126***	0.090***	0.064***	0.034***	0.006**
Other White	0.008	0.023***	0.025***	0.008	0.005
Black African	0.095***	0.121***	0.125***	0.098***	0.066***
Black Caribbean	0.043***	0.070***	0.081***	0.072***	0.052***
Other Black	0.014	0.034***	0.043***	0.040***	0.032***
Indian	0.226***	0.235***	0.210***	0.169***	0.132***
Pakistani	0.067***	0.093***	0.092***	0.063***	0.044***
Bangladeshi	0.097***	0.115***	0.105***	0.066***	0.053***
Chinese	0.221***	0.220***	0.166***	0.118***	0.085***
Other Asian	0.242***	0.247***	0.204***	0.140***	0.090***
Mixed ethnicity	0.201***	0.177***	0.152***	0.114***	0.057***
Other ethnicity	0.024***	0.041***	0.038***	0.024***	0.026***
Constant	0.105***	-0.023***	-0.044***	-0.028***	0.111***
Observations	254,512	254,512	254,512	254,512	254,512
R-squared	0.101	0.188	0.25	0.325	0.441
Number of clusters	3,381	3,381	3,381	3,381	3,381
F-test of additional controls (P value)		0.000	0.000	0.000	0.000

Notes to Table 4.2.2:
1) The results presented in Column 1 replicate those found in Column 3 of Table 4.1.4.
2) All models are within-school. Across-school models can be found in Appendix C.
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Turning our attention now to the impact of ethnicity on the likelihood of going to university at age 18, it is interesting to note that for all ethnic minority groups except those of Chinese or Mixed ethnic origin, the inclusion of Key Stage 2 results actually *increases* the impact of ethnicity on HE participation rates, such that all ethnic minority groups are now, on average, significantly more likely to go to university at

age 18 than White British students. For example, Black African boys are, on average, 5.1 percentage points more likely (than White British boys) to go to university before the inclusion of Key Stage 2 results, and 7.6 percentage points more likely afterwards. Similarly, Black African girls are 9.5 percentage points more likely to go to university (than White British girls) before the inclusion of Key Stage 2 results and 12.1 percentage points more likely thereafter.

Furthermore, the inclusion of Key Stage 3 results gives rise to the same relative increase in participation for boys and girls of Black ethnic origin, but not for pupils from other ethnic groups. For example, while the participation gap between Black Caribbean and White British boys is 3 percentage points before the inclusion of Key Stage 3 results, it increases to 4.3 percentage points thereafter. For Indian boys, on the other hand, an advantage of 20 percentage points (in terms of HE participation rates) over White British boys before the inclusion of Key Stage 3 results is reduced to 18.3 percentage points thereafter.

Once we start adding in Key Stage 4 and Key Stage 5 results, however, the effect of including prior attainment is almost unambiguously to reduce the participation gap between ethnic minority and White British students. For example, Black African boys are 8.2 percentage points more likely to participate in Higher Education at age 18 than White British boys when we control for Key Stage 2 and Key Stage 3 results, but this advantage falls to 6.5 percentage points once we include GCSE results and 5.1 percentage points once we include A-level (or equivalent) results. Similarly, a gap of 12.5 percentage points for Black African girls using Key Stage 2 and Key Stage 3 results as controls falls to 9.8 percentage points and then to 6.6 percentage points once we include Key Stage 4 and Key Stage 5 results respectively.

The fact that, for most ethnic minority groups, the inclusion of Key Stage 2 results seems to increase the observed participation gap, while the inclusion of Key Stage 4 results seems to reduce it, suggests that the attainment of ethnic minority students may rise relative to that of White British students between the ages of 11 and 16. This is supported by findings from Wilson, Burgess & Briggs (2005). Furthermore, given that the majority of raw results suggest that significantly more ethnic minorities than White British students go to university at age 18, perhaps the issue of widening participation in this context is more to do with increasing the representation of White British students in universities at age 18?[43]

4.3 Changes in attainment over time and HE participation rates

In this section, we consider the impact of changes in attainment over time on Higher Education participation rates for selected subgroups. Specifically, we split the population up into quintiles according to their Key Stage 2 and Key Stage 4 results, and then plot one against the other – to show how the academic progression of various subgroups evolves over time, and to highlight how this progression affects the

[43].Of course ethnic differences in the *quality* of HE institution accessed is a very important issue here, and one which we consider in Section 5 of this report. It will also be interesting to see whether ethnic minorities retain their advantage once participation at age 19 (i.e. including individuals who have taken gap years) is taken into account. We plan to do this in future work.

likelihood of going to university at age 18. We do this for males in Section 4.3.1 and females in Section 4.3.2.

4.3.1 Males

Table 4.3.1 plots Key Stage 2 and Key Stage 4 results for males amongst the 20% most materially deprived pupils (measured at age 16[44]).[45] For these individuals, it is clear that as well as being more likely to have low Key Stage 2 scores than their less deprived peers (see Section 3 for further discussion), there is more immobility at the bottom of the distribution than there is at the top: for example, while 65% of boys with the lowest scores at Key Stage 2 also have the lowest scores at Key Stage 4, only 28% of those with the highest scores at Key Stage 2 also have the highest scores at Key Stage 4. Similarly, very few students move up the distribution: for example, only 0.2% of boys with scores in the bottom quintile at Key Stage 2 move up to the top quintile by Key Stage 4, while 5% of pupils drop from the top quintile at Key Stage 2 to the bottom quintile at Key Stage 4.

Table 4.3.1 Transition matrix showing changes in attainment over time for males amongst the 20% most materially deprived pupils

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	8,588	3,562	924	140	26	13,240
	64.86	**26.9**	**6.98**	**1.06**	**0.2**	**100**
	0.20	*1.94*	*17.86*	*42.86*	*46.15*	*2.44*
2	3,172	3,679	1,869	418	92	9,230
	34.37	**39.86**	**20.25**	**4.53**	**1**	**100**
	0.25	*1.20*	*15.89*	*37.56*	*65.22*	*6.13*
3	1,373	2,336	2,204	771	200	6,884
	19.94	**33.93**	**32.02**	**11.2**	**2.91**	**100**
	0.51	*1.24*	*12.48*	*35.41*	*60.00*	*10.23*
4	564	1,099	1,710	1,067	463	4,903
	11.5	**22.41**	**34.88**	**21.76**	**9.44**	**100**
	0.35	*1.18*	*12.63*	*34.11*	*58.10*	*17.62*
Highest scores	165	359	858	995	927	3,304
	4.99	**10.87**	**25.97**	**30.12**	**28.06**	**100**
	0.00	*1.67*	*8.39*	*30.65*	*59.76*	*28.36*
Total	13,862	11,035	7,565	3,391	1,708	37,561
	36.91	**29.38**	**20.14**	**9.03**	**4.55**	**100**
	0.25	*1.46*	*13.55*	*34.18*	*59.43*	*9.04*

Notes to Table 4.3.1:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

More worryingly, there is some evidence to support the notion that boys whose performance has improved over time are still less likely to go to university at age 18 than boys whose performance has remained consistently high: whilst 60% of

[44] We do not observe the relevant information (i.e. Free School Meal status and home postcode) to derive the material deprivation index for pupils at age 11 (Key Stage 2), hence we classify pupils according to material deprivation status at age 16 only.
[45] Table D.1 in Appendix D replicates these results for boys who are eligible for Free School Meals.

individuals with scores in the highest quintile at Key Stage 2 and Key Stage 4 go on to university at age 18, only 46% of boys who move up from the bottom quintile at Key Stage 2 to the top quintile at Key Stage 4 go on to participate in HE. However, this finding is estimated from a very small sample of individuals, and when we assess the relative likelihood of participation for individuals who move up from the first or second quintile at Key Stage 2 to the third or fourth quintile at Key Stage 4, we see this pattern reversed: for example, while 34% of boys who score in the fourth quintile at Key Stage 2 and Key Stage 4 go on to university at age 18, 43% of those who move up from the first to the fourth quintile move into Higher Education at the same age. For these individuals, therefore, investment between Key Stage 2 and Key Stage 4 may be one way to increase participation rates at age 18.

Table 4.3.2 Transition matrix showing changes in attainment over time for males amongst the 80% least materially deprived pupils

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	15,961 **49.94** *0.38*	12,098 **37.85** *1.63*	3,333 **10.43** *15.54*	463 **1.45** *38.44*	104 **0.33** *49.04*	31,959 **100** *3.14*
2	6,652 **19.04** *0.56*	14,205 **40.66** *1.68*	10,683 **30.58** *14.28*	2,904 **8.31** *39.67*	491 **1.41** *60.49*	34,935 **100** *9.31*
3	2,984 **8.09** *0.23*	9,594 **26** *1.93*	14,696 **39.83** *13.83*	7,628 **20.67** *37.87*	1,995 **5.41** *60.75*	36,897 **100** *17.15*
4	1,177 **3.12** *1.10*	4,429 **11.74** *1.49*	12,329 **32.68** *12.94*	12,717 **33.71** *35.91*	7,077 **18.76** *62.06*	37,729 **100** *28.18*
Highest scores	397 **1.05** *1.51*	1,170 **3.09** *2.39*	4,940 **13.04** *12.09*	10,642 **28.09** *35.40*	20,741 **54.74** *65.73*	37,890 **100** *47.59*
Total	27,171 **15.14** *0.45*	41,496 **23.13** *1.72*	45,981 **25.63** *13.63*	34,354 **19.15** *36.54*	30,408 **16.95** *64.41*	179,410 **100** *21.87*

Notes to Table 4.3.2:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

Table 4.3.2 repeats this exercise for boys amongst the 80% least materially deprived pupils at age 16.[46] These figures make clear that, as well as showing better performance at age 11 compared to the most deprived pupils, there is less mobility at the top of the distribution and more mobility at the bottom of the distribution than there was for boys amongst the 20% most materially deprived pupils. For example, whilst 65% of the most materially deprived boys with the lowest scores at Key Stage 2 also had the lowest scores at Key Stage 4, only 50% of the least materially deprived boys were in the same position. Similarly, whilst 28% of the most materially deprived boys with scores in the top quintile at Key Stage 2 also had scores in the top quintile at Key Stage 4, 55% of the least materially deprived boys were in a similar situation.

[46] Table D.2 in Appendix D presents these results for boys who are not eligible for Free School Meals.

Furthermore, even for boys with the same attainment trajectories, those from amongst the 20% most materially deprived pupils are still less likely to go on to university than those from amongst the 80% least materially deprived pupils. For example, amongst those moving from the bottom of the distribution at Key Stage 2 to the top of the distribution at Key Stage 4, 49% of boys amongst the 80% least materially deprived pupils go on to university, compared with 46% of boys amongst the 20% most materially deprived. This is a somewhat worrying finding, and may be one of the issues that need to be dealt with in addressing any gap in HE participation rates at age 18 by material deprivation status.[47]

Table 4.3.3 Transition matrix showing changes in attainment over time for White British males

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	21,066 **56.53** *0.26*	12,681 **34.03** *1.20*	3,062 **8.22** *10.55*	372 **1** *32.80*	83 **0.22** *42.17*	37,264 **100** *1.84*
2	8,767 **23.1** *0.43*	15,704 **41.38** *1.33*	10,578 **27.87** *11.44*	2,522 **6.65** *35.01*	377 **0.99** *57.29*	37,948 **100** *6.74*
3	3,927 **10.17** *0.31*	10,825 **28.04** *1.61*	15,058 **39** *12.15*	7,126 **18.46** *35.15*	1,673 **4.33** *58.40*	38,609 **100** *14.24*
4	1,571 **4.11** *0.76*	5,028 **13.15** *1.31*	12,885 **33.71** *11.78*	12,359 **32.33** *34.32*	6,380 **16.69** *60.80*	38,223 **100** *25.42*
Highest scores	496 **1.33** *1.01*	1,377 **3.7** *2.03*	5,322 **14.29** *10.79*	10,650 **28.59** *34.15*	19,404 **52.09** *64.97*	37,249 **100** *45.24*
Total	35,827 **18.93** *0.34*	45,615 **24.1** *1.38*	46,905 **24.78** *11.63*	33,029 **17.45** *34.48*	27,917 **14.75** *63.45*	189,293 **100** *18.65*

Notes to Table 4.3.3:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

Tables 4.3.3 and 4.3.4 illustrate how academic performance changes between Key Stage 2 and Key Stage 4 for boys of White British and non-White British ethnic origin respectively.[48] We see from these tables that non-White British boys are both less likely to remain at the bottom of the distribution and more likely to remain at the top of the distribution than White British boys: 44% of non-White British boys score amongst the bottom 20% at both Key Stage 2 and Key Stage 4 (compared with 57%

[47] Appendix E presents transition matrices for boys amongst the 20% of pupils living in the least well-educated neighbourhoods (Table E.1) and amongst the 80% of pupils living in the best-educated neighbourhoods (Table E.2). These results exhibit similar patterns to those found for material deprivation status.

[48] We have grouped all ethnic minority groups together here, mainly because of sample size problems. However, this rationale is borne out by the fact that, as discussed in Section 3.2, all ethnic minority students appear to improve their academic performance relative to White British students between Key Stage 2 and Key Stage 4, thus we do not believe that grouping all ethnic minority students together will conflate opposing effects for different groups in this case.

of White British boys), and 70% of non-White British boys score amongst the top 20% at both Key Stage 2 and Key Stage 4 (compared with 65% of White British boys).

Non-White British boys are also more likely to move up the distribution between Key Stage 2 and Key Stage 4 than White British boys: for example, 10% of non-White British boys move up from the middle of the distribution at Key Stage 2 to the top of the distribution at Key Stage 4, compared with 4% of White British boys. Furthermore, amongst those who move up the distribution, non-White British boys are significantly more likely to go to university than White British boys (and by more than their generally higher participation rates might otherwise suggest): for example, amongst non-White British boys who move up from the bottom quintile at Key Stage 2 to the top quintile at Key Stage 4, 60% go on to university, compared with 42% of White British boys who make the same improvement in performance. This suggests that White British boys face a similar problem to boys amongst the 20% most materially deprived pupils (discussed above) – that is, improved academic performance does not guarantee that the observed raw gap in participation rates amongst White British and non-White British students will be entirely eliminated.

Table 4.3.4 Transition matrix showing changes in attainment over time for non-White British males

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	3,483 **43.89** *0.63*	2,979 **37.54** *3.83*	1,195 **15.06** *30.13*	231 **2.91** *50.22*	47 **0.59** *59.57*	7,935 **100** *8.07*
2	1,057 **17** *0.66*	2,180 **35.07** *3.39*	1,974 **31.75** *31.05*	800 **12.87** *53.25*	206 **3.31** *68.45*	6,217 **100** *20.28*
3	430 **8.31** *0.47*	1,105 **21.37** *3.62*	1,842 **35.61** *26.00*	1,273 **24.61** *51.61*	522 **10.09** *68.01*	5,172 **100** *29.64*
4	170 **3.86** *1.76*	500 **11.34** *2.60*	1,154 **26.17** *25.39*	1,425 **32.32** *48.35*	1,160 **26.31** *67.41*	4,409 **100** *40.37*
Highest scores	66 **1.67** *1.52*	152 **3.85** *3.95*	476 **12.07** *19.96*	987 **25.02** *44.07*	2,264 **57.39** *69.79*	3,945 **100** *53.66*
Total	5,206 **18.81** *0.67*	6,916 **24.99** *3.57*	6,641 **23.99** *27.71*	4,716 **17.04** *49.26*	4,199 **15.17** *68.73*	27,678 **100** *26.49*

Notes to Table 4.3.4:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

4.3.2 Females

Tables 4.3.5 and 4.3.6 illustrate how academic performance changes between Key Stage 2 and Key Stage 4 for girls amongst the 20% most materially deprived pupils and amongst the 80% least materially deprived pupils (measured at age 16)

respectively.[49] These tables show that the effect of material deprivation on the likelihood of improving test scores between age 11 and age 16 is similar to that for boys (discussed in Section 4.3.1 above): that is to say, girls amongst the 20% most materially deprived pupils are significantly more likely to remain in the bottom quintile (and significantly less likely to remain in the top quintile) than girls amongst the 80% least materially deprived pupils.

Table 4.3.5 Transition matrix showing changes in attainment over time for females amongst the 20% most materially deprived pupils

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	7,035 **53.13** *0.44*	4,413 **33.33** *1.74*	1,478 **11.16** *18.20*	273 **2.06** *41.76*	42 **0.32** *64.29*	13,241 **100** *3.91*
2	2,401 **24.01** *0.58*	3,746 **37.46** *1.23*	2,844 **28.44** *14.59*	843 **8.43** *39.62*	166 **1.66** *57.23*	10,000 **100** *9.04*
3	1,019 **13.59** *0.49*	1,920 **25.6** *1.56*	2,633 **35.11** *12.91*	1,474 **19.65** *37.52*	454 **6.05** *57.49*	7,500 **100** *15.85*
4	409 **7.56** *0.73*	801 **14.81** *1.50*	1,742 **32.2** *12.46*	1,622 **29.98** *33.91*	836 **15.45** *59.33*	5,410 **100** *23.62*
Highest scores	158 **4.57** *0.00*	233 **6.74** *1.72*	626 **18.12** *11.66*	1,064 **30.8** *32.24*	1,374 **39.77** *60.26*	3,455 **100** *36.12*
Total	11,022 **27.83** *0.48*	11,113 **28.06** *1.52*	9,323 **23.54** *14.09*	5,276 **13.32** *35.90*	2,872 **7.25** *59.44*	39,606 **100** *12.97*

Notes to Table 4.3.5:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

Similarly, materially deprived girls are less likely to move up the distribution (and more likely to move down the distribution) than girls from non-materially deprived backgrounds over the same period. In contrast to the findings for boys, however, girls who move up the distribution – whether materially deprived or not – are at least as likely to go on to university as those who perform at a high level throughout. For example, for girls amongst the 80% least deprived pupils, 66% of those with the lowest scores at Key Stage 2 – but the highest scores at Key Stage 4 – go on to university, compared with 65% of those who remain at the top of the distribution throughout. In fact, for girls amongst the 20% most deprived pupils, girls who move from the bottom of the distribution to the top are more likely to go on to university (64%) than girls who remain at the top throughout (60%). Having said this, however, materially deprived girls remain less likely to go on to university at age 18 than non-

[49] Tables D.3 and D.4 in Appendix D present the same findings for girls who are and are not eligible for Free School Meals.

materially deprived girls, regardless of their academic trajectory (as was the case for boys – discussed in Section 4.3.1 above).[50]

Table 4.3.6 Transition matrix showing changes in attainment over time for females amongst the 80% least materially deprived pupils

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	10,237 **36.75** *0.41*	11,893 **42.70** *2.09*	4,699 **16.87** *16.73*	886 **3.18** *40.52*	137 **0.49** *66.42*	27,852 **100** *5.48*
2	3,769 **11.07** *0.58*	11,351 **33.34** *1.99*	12,764 **37.49** *14.97*	5,227 **15.35** *41.04*	938 **2.75** *63.01*	34,049 **100** *14.38*
3	1,643 **4.40** *0.73*	6,056 **16.22** *1.95*	13,922 **37.29** *14.16*	11,316 **30.31** *38.54*	4,396 **11.78** *61.65*	37,333 **100** *24.57*
4	798 **2.01** *1.38*	2,500 **6.29** *1.68*	9,285 **23.37** *14.16*	14,468 **36.42** *37.72*	12,678 **31.91** *62.04*	39,729 **100** *36.98*
Highest scores	273 **0.68** *3.66*	603 **1.51** *2.99*	2,961 **7.42** *12.93*	8,768 **21.96** *35.39*	27,319 **68.43** *65.48*	39,924 **100** *53.61*
Total	16,720 **9.35** *0.58*	32,403 **18.11** *2.02*	43,631 **24.39** *14.59*	40,665 **22.73** *37.93*	45,468 **25.42** *64.10*	178,887 **100** *28.89*

Notes to Table 4.3.6:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

Tables 4.3.7 and 4.3.8 move on to compare changes in performance over time for White British and non-White British girls respectively. These figures tell a similar story to that observed for boys (described in Section 4.3.1 above): that is, non-White British girls are less likely to remain at the bottom of the distribution (and more likely to remain at the top of the distribution) than White British girls; they are also more likely to improve their academic performance between Key Stage 2 and Key Stage 4. For example, while 10% of White British girls move from the middle of the distribution at Key Stage 2 to the top of the distribution at Key Stage 4, 19% of non-White British girls make the same improvement in performance. Furthermore, amongst girls who improve their performance significantly, non-White British girls are more likely to go on to university than White British girls (and by a greater margin than might be expected from their generally higher participation rates). For example, amongst girls who have the lowest scores at Key Stage 2 – but the highest scores at Key Stage 4 – 74% of non-White British girls go on to university at age 18, compared with 58% of White British girls.

[50] Tables E.3 and E.4 in Appendix E illustrate the same transition matrices for girls amongst the 20% of pupils living in the least well-educated neighbourhoods and girls amongst the 80% of pupils living in the best-educated neighbourhoods respectively.

Table 4.3.7 Transition matrix showing changes in attainment over time for White British females

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	15,102 **44.89** *0.29*	13,346 **39.67** *1.56*	4,421 **13.14** *11.92*	683 **2.03** *33.82*	88 **0.26** *57.95*	33,640 **100** *3.15*
2	5,611 **14.86** *0.43*	13,468 **35.67** *1.44*	13,267 **35.14** *12.34*	4,683 **12.4** *35.98*	728 **1.93** *57.69*	37,757 **100** *10.49*
3	2,438 **6.19** *0.57*	7,289 **18.51** *1.55*	14,864 **37.75** *12.37*	10,995 **27.92** *35.71*	3,788 **9.62** *59.08*	39,374 **100** *20.65*
4	1,094 **2.71** *1.19*	3,041 **7.54** *1.64*	10,081 **25** *12.85*	14,498 **35.95** *35.89*	11,610 **28.79** *60.26*	40,324 **100** *33.62*
Highest scores	392 **1** *2.55*	768 **1.95** *2.47*	3,287 **8.35** *11.62*	9,049 **22.98** *34.05*	25,889 **65.73** *64.66*	39,385 **100** *51.37*
Total	24,637 **12.93** *0.43*	37,912 **19.9** *1.54*	45,920 **24.11** *12.37*	39,908 **20.95** *35.40*	42,103 **22.1** *62.81*	190,480 **100** *24.64*

Notes to Table 4.3.7:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

Table 4.3.8 Transition matrix showing changes in attainment over time for non-White British females

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	2,170 **29.12** *1.34*	2,960 **39.72** *3.99*	1,756 **23.56** *30.07*	476 **6.39** *50.84*	91 **1.22** *73.63*	7,453 **100** *13.20*
2	559 **8.88** *2.15*	1,629 **25.89** *4.79*	2,341 **37.21** *29.43*	1,387 **22.04** *57.25*	376 **5.98** *70.74*	6,292 **100** *29.23*
3	224 **4.1** *1.34*	687 **12.58** *5.09*	1,691 **30.98** *27.91*	1,795 **32.88** *55.04*	1,062 **19.45** *69.02*	5,459 **100** *40.87*
4	113 **2.35** *0.88*	260 **5.4** *1.54*	946 **19.65** *25.05*	1,592 **33.06** *50.57*	1,904 **39.54** *71.74*	4,815 **100** *50.11*
Highest scores	39 **0.98** *0.00*	68 **1.7** *4.41*	300 **7.51** *24.67*	783 **19.6** *46.62*	2,804 **70.21** *70.47*	3,994 **100** *60.54*
Total	3,105 **11.08** *1.45*	5,604 **20** *4.25*	7,034 **25.11** *28.43*	6,033 **21.54** *52.94*	6,237 **22.26** *70.68*	28,013 **100** *35.29*

Notes to Table 4.3.8:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

4.4 Conclusions

Thus far, our analysis clearly indicates the importance of material deprivation, neighbourhood parental education and ethnicity in determining HE participation rates at age 18. The raw differences between advantaged and disadvantaged students, and between different ethnic groups, are sizeable. Generally, disadvantaged students are much less likely to attend HE than more advantaged students; many ethnic minority students are more likely to participate in HE than their White British peers, and females have higher participation rates than males.

Some of the large raw gap in HE participation rates between advantaged and less advantaged students is attributable to the quality of schools accessed by poorer children, particularly disadvantaged boys. The role of school quality and its association with HE participation rates is complex, however, with interactions between school quality, ethnicity and gender. In any case, this work cannot prove a causal link between the quality of secondary schooling accessed by a pupil and his or her academic achievement. We merely note that different types of students are accessing different quality schools and that this is likely to explain part of the story behind the large raw gaps in HE participation that we observe.

The key finding from this chapter however, is that once we take into account the prior attainment of students, the apparently large gaps in HE participation rates between different types of students are reduced markedly. For example, after allowing for prior achievement (to Key Stage 5), the most 20% most materially deprived males (females) are just 1.6 (2.6) percentage points less likely to participate in HE than their more advantaged counterparts. Equally some of the apparent advantage of ethnic minority students, in terms of their higher HE participation rates, is reduced once we take into account their prior educational attainment. This means that some ethnic minority groups have higher rates of HE participation largely because they have higher achievement in secondary school. This pattern is not consistent at every stage though, because many ethnic minority groups make greater improvements in attainment from Key Stage 2 to Key Stage 5 than do Whites. Thus when we do not allow for prior attainment, Black African males are 5.1 percentage points more likely to go to university than their White British male counterparts. After taking into account their Key Stage 2 and Key Stage 3 attainment, this gap *increases* to 8.2 percentage points, but falls back to 5.1 percentage points once we allow for prior attainment at GCSE and A level. This is one example of the way in which different groups of students take very different trajectories, in terms of achievement, as they progress through secondary school and on to HE.

The richness of our analysis has shown that widening participation in higher education requires closer attention to be paid to when gaps in achievement occur and how they develop during different phases of schooling. The transitions of different students between Key Stage 2 and Key Stage 5 highlight some important features. Firstly, disadvantaged children who are low achievers as they enter secondary school are more likely to remain low achievers than more advantaged children. Equally there is more upward mobility for most ethnic minority groups compared to White British children. However, by and large it is reassuring that for most pupils, if they do improve their educational performance between Key Stage 2 and Key Stage 5, they are as likely to participate in HE as their more advantaged counterparts.

5 Understanding HE Quality

In this section we analyse the importance of the same three factors – material deprivation, neighbourhood parental education and ethnicity – on the quality of Higher Education (HE) Institution attended. The impact of these characteristics on the quality of universities attended by participants is clearly important, but there has been little quantitative analysis of this issue in the literature (see HEFCE (2006) for a summary). Clearly, an effective Widening Participation agenda ought to target disparities in participation not only in HE as a binary decision, but also across the spectrum of HE institutions.

We adopt the same modelling approach as in Section 4 – that is, we consider whether or not individuals who participate in HE at age 18 are enrolled at a "high quality" UK university, adding in controls for school quality, individual-level characteristics (including month of birth, English as an additional language and special educational needs) and prior educational attainment from age 11 to age 18 successively. In this case our sample only includes HE *participants* and then explores the relationship between the pupil's family background and the likelihood of his or her attending a "high quality" HE institution. Broadly, our definition of a "high quality" institution includes Russell Group institutions and similarly research intensive institutions (as measured by their 2001 average RAE score) (see Section 2 for more details about this definition). Around 37% of HE participants attend a "high quality" university by our measure.

This section now proceeds as follows: in Section 5.1, we report raw differences in the quality of HE institution attended according to material deprivation status, neighbourhood parental education and ethnicity, and show how these gaps change once school quality and other individual-level characteristics are included in the model; in Section 5.2, we go on to illustrate how these estimates are affected by the inclusion of educational attainment measures from Key Stage 2 (age 11) to Key Stage 5 (age 18); Section 5.3 offers some brief conclusions.

5.1 Baseline estimates of differences in quality of HEI attended

In this section, we first present raw estimates of the impact of material deprivation[51], neighbourhood parental education and ethnicity on the probability of attending a "high quality" university for HE participants, and then move on to see how these estimates change once we add measures of school quality and other individual-level characteristics to our model. We do this separately for males (Section 5.1.1) and females (Section 5.1.2).

5.1.1 Males

Table 5.1.1 presents raw estimates (across schools) and estimates controlling for school quality (within schools) of the impact of material deprivation, neighbourhood

[51] Appendix F presents estimates using FSM status alone as our indicator of material deprivation.

parental education and ethnicity on the likelihood of going to a high quality higher education institute (HEI) for boys who participate in higher education at age 18.

Table 5.1.1 Raw gradients in probability of attending a "high quality" HE institution by deprivation quintile, neighbourhood parental education quintile and ethnicity: males.

	Material Deprivation		Neighbourhood parental education		Ethnicity	
	Across schools	Within schools	Across schools	Within schools	Across schools	Within schools
4th deprivation quintile	0.030***	0.017*				
3rd deprivation quintile	0.082***	0.055***				
2nd deprivation quintile	0.132***	0.087***				
Least deprived quintile	0.172***	0.106***				
2nd OA education quintile			0.041***	0.027***		
3rd OA education quintile			0.087***	0.056***		
4th OA education quintile			0.140***	0.088***		
Most educated quintile			0.215***	0.127***		
Other White					0.026*	0.016
Black African					-0.098***	-0.090***
Black Caribbean					-0.177***	-0.141***
Other Black					-0.028	-0.021
Indian					-0.035***	-0.028**
Pakistani					-0.133***	-0.089***
Bangladeshi					-0.032	0.005
Chinese					0.146***	0.120***
Other Asian					0.142***	0.070**
Mixed ethnicity					0.064***	0.026
Other ethnicity					-0.047**	-0.057***
Constant	0.254***	0.294***	0.234***	0.285***	0.371***	0.370***
Observations	46,275	46,275	46,275	46,275	46,275	46,275
R-squared	0.015	0.015	0.022	0.022	0.006	0.005
Number of clusters		2,763		2,763		2,763

Notes to Table 5.1.1:
1) The within schools specification includes school fixed effects (using school attended at age 16).
2) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

The raw estimates suggest large differences in the probability of attending a "high quality" university by material deprivation status: for example, male participants amongst the 20% of secondary school pupils who are least materially deprived are 17.2 percentage points more likely to attend a high quality university than male participants amongst the 20% of pupils who are most materially deprived. The impact of neighbourhood parental education is even greater: for example, males amongst the 20% of secondary school pupils from the most highly educated neighbourhoods are 21.5 percentage points more likely to attend a high quality HEI than males amongst the 20% of secondary school pupils from the least well-educated neighbourhoods. The raw estimates also reveal some striking differences by ethnic group: while male HE participants of Black[52], Indian, Pakistani, Bangladeshi and Other ethnic origin are less

[52] We refer to individuals of Black Caribbean, Black African and Other Black ethnic origin collectively as being of Black ethnic origin.

likely to go to a high quality university than White British male participants, males of Chinese, Other Asian and Mixed ethnicity are more likely to do so. For example, while Black Caribbean males are 17.7 percentage points less likely to attend a high quality HEI than White British males, Chinese males are 14.6 percentage points more likely to do so.

Table 5.1.1 also demonstrates the importance of school quality (the within schools model) in determining the quality of university attended (at age 18). In terms of material deprivation, the difference between the most deprived quintile and the least deprived quintile is reduced from 17.2 percentage points to 10.6 percentage points. Similarly, the difference between the 20% of boys from the best educated neighbourhoods and the 20% of boys from the most poorly educated neighbourhoods falls from 21.5 percentage points to 12.7 percentage points. It thus appears that approximately 40% of the observed raw disparities are accounted for by differences in the quality of secondary school attended by different types of students (with those from the least materially deprived backgrounds and/or those from highly educated neighbourhoods typically going to better schools).[53]

On the other hand, the inclusion of controls for school quality tends to make only a small difference to the impact of ethnicity on the quality of university attended. For most ethnic groups, this impact reduces the absolute value of the difference – so, for example, Black Caribbean male participants are now only 14.1 percentage points less likely to go to a high quality university than White British male participants (compared to 17.7 percentage points before the inclusion of controls for school quality), while Other Asian male participants are now only 7.0 percentage points more likely to go to a high quality university than White British male participants (compared to a raw difference of 14.2 percentage points). For individuals of Other ethnic origin, the impact of school quality seems to go in the opposite direction, such that these individuals are now significantly less likely to go to a high quality university (compared to White British males) than they were before the inclusion of such controls. Furthermore, the inclusion of measures of school quality in our model eliminates the advantage (evident in the raw figures) of individuals of Mixed ethnic origin over White British students (in terms of attending a high quality HEI).

Table 5.1.2 moves on to include all three factors – material deprivation, neighbourhood parental education and ethnicity – in the same model, such that the impact of each characteristic is now conditional on the other two.[54] To the extent that materially deprived students tend to come from poorly educated neighbourhoods (and ethnic minority students tend to be more materially deprived and to come from less well-educated neighbourhoods), we would expect the inclusion of all three factors in the same model to reduce the magnitude of the impact of each characteristic individually.

This expectation is borne out by the results shown in Table 5.1.2. For example, the impact (for male participants) of being amongst the 20% least materially deprived pupils (compared with the 20% most materially deprived pupils) on the likelihood of going to a good university at age 18 approximately halves once we control for

[53] But see discussion on page 28, and in Footnote 32 about the difficulties in fully identifying the effects of school quality in models such as ours.
[54] The results presented in Table 5.1.2 use the within schools model (i.e. we control for school quality).

neighbourhood parental education and ethnicity – from 10.6 percentage points to 5.5 percentage points. Whilst the effects on the estimates of neighbourhood parental education and ethnicity are somewhat smaller, the inclusion of additional controls still makes a significant difference in most cases: for example, the advantage (in terms of the likelihood of attending a high quality HEI) of male participants from the most highly educated neighbourhoods falls from 12.7 percentage points to 9.6 percentage points; similarly, the disadvantage faced by males of Black African ethnic origin (compared to males of White British ethnic origin) falls from 9.0 percentage points to 7.0 percentage points.

Table 5.1.2 Gradients in probability of attending "high quality" HE institution, controlling for individual-level characteristics (excluding prior attainment). Males.

	Controlling for deprivation, neighbourhood parental education and ethnicity	Plus other individual level characteristics
4th deprivation quintile	0.001	-0.000
3rd deprivation quintile	0.027**	0.025**
2nd deprivation quintile	0.047***	0.044***
Least deprived quintile	0.055***	0.052***
2nd OA education quintile	0.017	0.017
3rd OA education quintile	0.036***	0.037***
4th OA education quintile	0.062***	0.062***
Most educated quintile	0.096***	0.098***
Other White	0.017	0.020
Black African	-0.070***	-0.068***
Black Caribbean	-0.124***	-0.124***
Other Black	-0.006	-0.002
Indian	-0.021*	-0.014
Pakistani	-0.069***	-0.059***
Bangladeshi	0.023	0.032
Chinese	0.128***	0.137***
Other Asian	0.081***	0.086***
Mixed ethnicity	0.034	0.036*
Other ethnicity	-0.046**	-0.040**
Constant	0.275***	0.289***
Observations	46,275	46,275
R-squared	0.029	0.031
Number of clusters	2,763	2,763
F-test of additional controls (P value)		0.000

Notes to Table 5.1.2:
1) All models include school fixed effects (on the basis of school attended at age 16).
2) In addition to deprivation quintile, neighbourhood parental education quintile and ethnicity, Column 2 also includes controls for month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (measured at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

The second column of Table 5.1.2 further controls for month of birth, whether English is the pupil's first language and whether they have special educational needs (measured at age 16). In most cases, the inclusion of these characteristics makes little

difference to the estimated effects of material deprivation, neighbourhood parental education and ethnicity on the likelihood of attending a high quality university at age 18 for HE participants: this is in contrast to the results for HE participation (discussed in Section 4.1), for which the inclusion of these characteristics made a significant difference. In terms of HE quality, the only changes of note are for males of Pakistani ethnic origin – for whom the inclusion of these additional controls reduces the disadvantage they face relative to White British male participants (from 6.9 to 5.9 percentage points) – and for males of Chinese ethnic origin – for whom the advantage (relative to White British males) actually increases (from 12.8 to 13.7 percentage points).

5.1.1 Females

Table 5.1.3 presents our raw (across schools) and baseline (within schools) estimates of the impact of material deprivation, neighbourhood parental education and ethnicity on the likelihood of attending a high quality HE institution at age 18 for female HE participants.

Table 5.1.3 Raw gradients in probability of attending a "high quality" HE institution by deprivation quintile, neighbourhood parental education quintile and ethnicity: females

	Material Deprivation		Neighbourhood parental education		Ethnicity	
	Across schools	Within schools	Across schools	Within schools	Across schools	Within schools
4th deprivation quintile	0.032***	0.028***				
3rd deprivation quintile	0.078***	0.057***				
2nd deprivation quintile	0.132***	0.097***				
Least deprived quintile	0.188***	0.123***				
2nd OA education quintile			0.045***	0.028***		
3rd OA education quintile			0.086***	0.057***		
4th OA education quintile			0.144***	0.090***		
Most educated quintile			0.238***	0.145***		
Other White					0.048***	0.019
Black African					-0.051***	-0.033*
Black Caribbean					-0.147***	-0.106***
Other Black					-0.108***	-0.083***
Indian					-0.043***	-0.013
Pakistani					-0.094***	-0.056***
Bangladeshi					-0.082***	-0.047**
Chinese					0.161***	0.130***
Other Asian					0.108***	0.036
Mixed ethnicity					0.098***	0.039**
Other ethnicity					0.021	0.024
Constant	0.227***	0.261***	0.204***	0.255***	0.343***	0.342***
Observations	61,216	61,216	61,216	61,216	61,216	61,216
R-squared	0.019	0.019	0.029	0.029	0.005	0.005
Number of clusters		2,822		2,822		2,822

Notes to Table 5.1.3:
1) The within schools specification includes school fixed effects (using school attended at age 16).
2) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

As was the case for males, the raw estimates of the effect of material deprivation and neighbourhood parental education on the likelihood of going to a high quality university are large and significant for female HE participants. For example, female participants amongst the 20% of secondary school pupils who are least materially deprived are 18.8 percentage points more likely (than female participants amongst the 20% of pupils who are most materially deprived) to attend a high quality HEI at age 18. Similarly, females amongst the 20% of pupils from the most highly educated neighbourhoods are 23.8 percentage points more likely to attend a high quality university than females amongst the 20% of pupils from the least well-educated neighbourhoods.

A similar pattern to that found for males is also evident in terms of the impact of ethnicity on the likelihood of attending a good university, with females of Chinese, Other Asian or Mixed ethnic origin significantly more likely – and females of Black, Indian, Pakistani or Bangladeshi ethnic origin significantly less likely – to attend a high quality HEI than females of White British ethnic origin. Some interesting differences to note (compared to the findings for boys) are: firstly, that while females of Other Black ethnic origin are 10.8 percentage points significantly less likely to attend a high quality university than females of White ethnic origin, the difference observed for males of Other Black ethnic origin is negative but insignificant. Secondly, while males of Other ethnic origin are 4.7 percentage points significantly less likely to attend a high quality university than White British males, the raw effect for females of Other ethnic origin is positive (but insignificant).

The inclusion of controls for school quality (the "within schools" model) has a similar effect on the estimates of the impact of material deprivation and neighbourhood parental education for female participants as it does for male participants. For example, the advantage (in terms of quality of HEI attended) of being a female in the least materially deprived quintile (relative to the most materially deprived quintile) falls from 18.8 to 12.3 percentage points; similarly it falls from 23.8 to 14.5 percentage points for females amongst the 20% of pupils from the best-educated neighbourhoods (compared to those amongst the 20% of pupils from the most poorly educated neighbourhoods).

In terms of ethnicity, it appears that controlling for school quality has a greater impact on female participants than it does on male participants. For example, females of Other White or Other Asian ethnic origin go from being significantly more likely to attend a good university than females of White British origin, to being no more or less likely once school quality is taken into account. This suggests that females from these ethic groups are more likely to attend good quality secondary schools than females of White British origin.[55] On the other hand, females of Indian ethnic origin see a negative and significant raw differential become insignificant following the inclusion of controls for school quality, suggesting that Indian females, on average, attend lower quality schools than White British females.

The first column of Table 5.1.4 shows how these within-school estimates change once we include material deprivation, neighbourhood parental education and ethnicity in

[55] The estimate for boys of Other White ethnic origin also becomes insignificant following the inclusion of controls for school quality, but it only starts off being significant at the 10% level (and displays a smaller reduction in absolute terms).

the same model, while the second column illustrates the impact of additionally controlling for month of birth, English as an additional language and special educational needs status for females.

Table 5.1.4 Gradients in probability of attending "high quality" HE institution, controlling for individual-level characteristics (excluding prior attainment). Females.

	Controlling for deprivation, neighbourhood parental education and ethnicity	Plus other individual level characteristics
4th deprivation quintile	0.014*	0.013
3rd deprivation quintile	0.030***	0.028***
2nd deprivation quintile	0.058***	0.056***
Least deprived quintile	0.070***	0.068***
2nd OA education quintile	0.015**	0.015*
3rd OA education quintile	0.034***	0.035***
4th OA education quintile	0.061***	0.061***
Most educated quintile	0.110***	0.110***
Other White	0.022*	0.024*
Black African	-0.011	-0.006
Black Caribbean	-0.085***	-0.085***
Other Black	-0.064***	-0.063**
Indian	-0.006	0.001
Pakistani	-0.037***	-0.029*
Bangladeshi	-0.022	-0.014
Chinese	0.139***	0.147***
Other Asian	0.050*	0.056**
Mixed ethnicity	0.050***	0.051***
Other ethnicity	0.036**	0.041**
Constant	0.236***	0.245***
Observations	61,216	61,216
R-squared	0.037	0.038
Number of clusters	2,822	2,822
F-test of additional controls (P value)		0.000

Notes to Table 5.1.4:

1) All models include school fixed effects (on the basis of school attended at age 16).
2) In addition to deprivation quintile, neighbourhood parental education quintile and ethnicity, Column 2 also includes controls for month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (measured at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Conditional on neighbourhood parental education and ethnicity, female HE participants amongst the 20% of secondary school pupils experiencing the lowest material deprivation are 7.0 percentage points more likely to attend a good university than female participants amongst the 20% of pupils experiencing the greatest material deprivation; this is a reduction of just over 40% compared to controlling for material deprivation and school quality alone. Similarly, the impact of being amongst the 20% of pupils from the best-educated neighbourhoods (compared to amongst the 20% of pupils from the most poorly educated neighbourhoods) falls from 14.5 percentage

points to 11.0 percentage points once we account for material deprivation and ethnicity. These effects are somewhat smaller than they were for boys.

Table 5.1.4 highlights some interesting differences in terms of the changing impact of ethnicity on the probability of attending a high quality HEI (once we account for material deprivation and neighbourhood parental education). For example, for Bangladeshi females, the difference in the likelihood of attending a high quality university (relative to White British females) goes from being negative and significant (when we control for school quality alone) to insignificant; similarly, for female participants of Other ethnic origin, it goes from being insignificant to being positive and significant. This suggests that females of Bangladeshi or Other ethnic origin are more likely to face material deprivation and/or to come from more poorly educated neighbourhoods than White British females.

Again, as was the case for boys, the inclusion of controls for month of birth, English as an additional language and special educational needs (shown in Column 2 of Table 5.1.4) makes little difference to our estimates of the effect of material deprivation, neighbourhood parental education and ethnicity on the likelihood of attending a good quality university, suggesting that these characteristics are more likely to affect HE participation (at age 18) per se rather than the quality of institution attended (conditional on participation at age 18).

5.2 The role of prior attainment in the HE quality gradient

Up to now, one of the key determinants of the quality of HE institution attended – prior attainment – has been omitted from the analysis. To the extent that participation decisions at age 18 are the result of previous schooling decisions and outcomes, disparities in the types of universities attended by pupils according to material deprivation status, neighbourhood parental education levels and ethnicity may potentially be traced back to differences in earlier academic outcomes for these individuals. In this section, we exploit the retrospective information available to us and sequentially consider the impact of test scores from age 11 to age 18 on the estimated effects of material deprivation, neighbourhood parental education and ethnicity on the likelihood of going to a good university at age 18. We do this separately for males (in Section 5.2.1) and females (in Section 5.2.2).

5.2.1 Males

The first column of Table 5.2.1 replicates the results found in Column 2 of Table 5.1.3, i.e. it shows the impact of material deprivation, neighbourhood parental education and ethnicity on the likelihood of attending a high quality university for HE participants, controlling for school quality, month of birth, whether English is the student's first language and whether they have special educational needs. Columns 2 through 5 illustrate how these estimates change once we include test results from Key Stage 2 (age 11), Key Stage 3 (age 14), Key Stage 4 (age 16) and Key Stage 5 (age 18) respectively.

We see from Table 5.1.2 that the inclusion of prior educational attainment significantly reduces the impact of material deprivation status and neighbourhood parental education levels on the quality of HE institution attended by male

participants. The inclusion of Key Stage 2 and Key Stage 3 results reduces, but does not eliminate, the penalty faced by boys amongst the 20% of secondary school pupils facing the greatest material deprivation and boys amongst the 20% of pupils from the most poorly neighbourhoods. However, the inclusion of Key Stage 4 (GCSE and equivalent) results has a greater impact on material deprivation than it does on neighbourhood parental education: while material deprivation status no longer affects the probability of attending a good university, neighbourhood parental education does – at least for males amongst the 20% of pupils from the most poorly educated neighbourhoods vis-a-vis males amongst the 40% of pupils from the most highly educated neighbourhoods. This is an interesting finding, and provides some evidence to suggest that highly educated parents may be better-equipped to help their children apply for the top universities than less highly educated parents. (Of course it must be remembered that we do not have individual-level measures of parental education, but are using a proxy measure based on neighbourhood characteristics instead.) Indeed, these differences according to neighbourhood parental education levels persist even after Key Stage 5 results are taken into account – with male participants from the most highly educated neighbourhoods being 2.2 percentage points more likely to attend a good university at age 18 than boys from more poorly educated neighbourhoods.

Table 5.2.1 Gradients in quality of HE institution attended by males, controlling for individual-level characteristics and prior attainment

	Individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
4th deprivation quintile	-0.000	-0.004	-0.007	-0.007	-0.003
3rd deprivation quintile	0.025**	0.015	0.010	0.001	0.001
2nd deprivation quintile	0.044***	0.029***	0.018*	0.008	0.009
Least deprived quintile	0.052***	0.036***	0.023**	0.010	0.008
2nd OA education quintile	0.017	0.014	0.005	-0.003	-0.007
3rd OA education quintile	0.037***	0.029***	0.018*	0.005	-0.006
4th OA education quintile	0.062***	0.049***	0.037***	0.020**	0.005
Most educated quintile	0.098***	0.082***	0.065***	0.040***	0.022**
Other White	0.020	0.034**	0.029**	0.025*	0.021*
Black African	-0.068***	-0.022	-0.001	0.003	0.008
Black Caribbean	-0.124***	-0.078***	-0.037*	-0.018	0.004
Other Black	-0.002	0.042	0.061*	0.075**	0.083***
Indian	-0.014	0.036**	0.035**	0.022*	0.020*
Pakistani	-0.059***	0.000	0.015	0.010	0.018
Bangladeshi	0.032	0.070**	0.060**	0.045*	0.059**
Chinese	0.137***	0.141***	0.115***	0.099***	0.083***
Other Asian	0.086***	0.097***	0.075***	0.051*	0.043*
Mixed ethnicity	0.036*	0.033	0.023	0.017	0.023
Other ethnicity	-0.040**	-0.013	-0.010	-0.012	-0.003
Constant	0.289***	0.077***	0.020	0.072**	0.023
Observations	46,275	46,275	46,275	46,275	46,275
R-squared	0.031	0.128	0.193	0.276	0.394
Number of clusters	2,763	2,763	2,763	2,763	2,763
F-test of additional controls (p-value)		0.000	0.000	0.000	0.000

Notes to Table 5.2.1:
1) The results presented in Column 1 replicate those found in Column 2 of Table 5.1.3.
2) All models are within-school (i.e. we include school fixed effects on the basis of secondary school attended at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

The inclusion of controls for prior attainment is particularly important in understanding the influence of ethnicity on the probability of attending a high quality HE institution (conditional on participation at age 18). Once we include Key Stage 2 results in our model, male participants of Other White, Indian or Bangladeshi ethnic origin go from being as likely as White British males to attend a good university at age 18 to being significantly more likely to do so; on the other hand, boys of Black African, Pakistani or Other ethnic origin go from being significantly less likely to attend a high quality HEI to being equally likely to do so. This suggests that if boys from these ethnic groups can achieve the same outcomes at Key Stage 2 as White British boys with the same observable characteristics, then they will have significantly improved their chances of attending a high quality university (conditional on attending HE at all). This is an important finding in terms of the Widening Participation agenda.

For male participants from the majority of ethnic groups, the successive inclusion of Key Stage 3, Key Stage 4 and Key Stage 5 results serves to reduce the advantage that they exhibit over White British boys in terms of the likelihood of going to a good university. For example, while Chinese males are 14.1 percentage points more likely than White British males to attend a high quality HEI after controlling for Key Stage 2 results, they are 8.3 percentage points more likely to do so after including test results from Key Stage 3, Key Stage 4 and Key Stage 5.

There are two key exceptions to this pattern: firstly, the disadvantage faced by male participants of Black Caribbean ethnic origin falls by approximately half following the inclusion of Key Stage 3 results (from 7.8 percentage points to 3.7 percentage points) and is reduced to insignificance once we control for Key Stage 4 results as well. Secondly, the inclusion of prior educational attainment serves to increase the advantage of males of Other Black ethnic origin over White British males (in terms of the likelihood of attending a good university), from an insignificant 0.4 percentage points (including Key Stage 2 results) to a large and significant 8.3 percentage points (once we control for Key Stage 3, Key Stage 4 and Key Stage 5 results). This is equivalent to the advantage experienced by male participants of Chinese ethnic origin, and suggests that boys of Other Black ethnic origin may improve their academic performance relative to White British boys over the course of secondary and post-compulsory schooling.

Once we have taken into account prior educational attainment from age 11 to age 18, however, only male participants of Other Black, Bangladeshi and Chinese ethnic origin are significantly more likely to attend a high quality HEI than males of White British ethnic origin (at conventional levels), and no ethnic minority males are significantly less likely to attend a good university than White British males. As was the case for HE participation, therefore, a Widening Participation agenda may be concerned about improving the school and HE outcomes of White British boys.

5.2.2 Females

Column 1 of Table 5.2.2 presents estimates (for females) of the impact of material deprivation, neighbourhood parental education and ethnicity on the likelihood of attending a high quality university, controlling for school quality, month of birth, whether English is the student's first language and whether they have special educational needs.[56] In Columns 2 through 5, we build up our model by sequentially adding academic attainment from Key Stage 2 (age 11) to Key Stage 5 (age 18).

Table 5.2.2 Gradients in quality of HE institution attended by females, controlling for individual-level characteristics and prior attainment

	Individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
4th deprivation quintile	0.013	0.009	0.002	-0.003	-0.003
3rd deprivation quintile	0.028***	0.021**	0.009	-0.001	-0.002
2nd deprivation quintile	0.056***	0.045***	0.033***	0.019**	0.017**
Least deprived quintile	0.068***	0.053***	0.036***	0.021**	0.017**
2nd OA education quintile	0.015*	0.012	0.010	0.005	0.006
3rd OA education quintile	0.035***	0.026***	0.020***	0.012	0.008
4th OA education quintile	0.061***	0.048***	0.040***	0.028***	0.019***
Most educated quintile	0.110***	0.093***	0.079***	0.063***	0.043***
Other White	0.024*	0.036***	0.038***	0.028**	0.012
Black African	-0.006	0.023	0.035**	0.036**	0.025
Black Caribbean	-0.085***	-0.032*	-0.017	-0.011	-0.006
Other Black	-0.063**	-0.019	-0.007	-0.005	0.002
Indian	0.001	0.040***	0.033***	0.025**	0.038***
Pakistani	-0.029*	0.028*	0.039***	0.027*	0.042***
Bangladeshi	-0.014	0.037*	0.035	0.018	0.026
Chinese	0.147***	0.160***	0.127***	0.105***	0.103***
Other Asian	0.056**	0.077***	0.064**	0.049**	0.059***
Mixed ethnicity	0.051***	0.048***	0.038**	0.035**	0.035**
Other ethnicity	0.041**	0.061***	0.060***	0.054***	0.053***
Constant	0.245***	0.047***	0.025	0.006	-0.020
Observations	61,216	61,216	61,216	61,216	61,216
R-squared	0.038	0.118	0.169	0.214	0.318
Number of clusters	2,822	2,822	2,822	2,822	2,822
F-test of additional controls (p-value)		0.000	0.000	0.000	0.000

Notes to Table 5.2.2:
1) The results presented in Column 1 replicate those found in Column 2 of Table 5.1.4.
2) All models are within-school (i.e. we include school fixed effects on the basis of secondary school attended at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

The inclusion of prior educational attainment monotonically reduces the impact of material deprivation and neighbourhood parental education on the likelihood of attending a good university (conditional on participation at age 18) for females. For example, female participants amongst the 20% of pupils from the most well-educated

[56] This replicates Column 2 of Table 5.1.4.

neighbourhoods are 11.0 percentage points more likely to attend a good university than female participants amongst the 20% of pupils from the least well-educated neighbourhoods before the inclusion of prior attainment, but only 4.3 percentage points more likely to do so after we include test results from Key Stage 2 to Key Stage 5. This suggests that the impact of neighbourhood parental education on the probability of attending a high quality HEI is greater for females than it is for males (for whom the difference was only 2.2 percentage points).

In contrast to the findings for male participants, we do not observe a total elimination of the effect of material deprivation on the likelihood of attending a good university following the inclusion of Key Stage 4 (or even Key Stage 5) results for female participants. While controlling for academic outcomes reduces the advantage associated with being amongst the 20% of pupils experiencing the least material deprivation (compared to amongst the 20% of pupils experiencing the most material deprivation) from 6.8 to 5.3 percentage points (Key Stage 2), 3.6 percentage points (Key Stage 3), 2.1 percentage points (Key Stage 4) and 1.7 percentage points (Key Stage 5) respectively, this final figure remains significant (although of smaller magnitude than that for HE participation per se – see Section 4.2.2).

As was the case for males, the inclusion of Key Stage 2 results significantly reduces the penalties faced (relative to White British females) by females of Black Caribbean, Indian or Pakistani ethnic origin in terms of the probability of attending a good university at age 18. For example, after controlling for academic outcomes at Key Stage 2, Black Caribbean females are only 3.2 percentage points less likely to attend a high quality HEI than White British females, while they were 8.5 percentage points less likely prior to the inclusion of educational controls. Girls of Other Black ethnic origin also experience a similar change in estimate (whilst inclusion of academic results made no difference to the estimate for Other Black boys).

The inclusion of Key Stage 3, Key Stage 4 and Key Stage 5 results thereafter makes very little difference to the estimates of the impact of ethnicity on the likelihood of attending a good university for females. Using our final model specification, females of Indian, Pakistani, Chinese, Other Asian, Mixed or Other ethnic origin are significantly more likely to attend a high quality HEI than female participants of White British ethnic origin, suggesting that not only does ethnicity have a greater impact for females than it does for males, but that it also affects slightly different groups.[57]

5.3 Conclusion

This section has shown that the Widening Participation agenda should not only be concerned about participation in Higher Education per se, but also about the quality of institutions attended by participants from different backgrounds. While the impact of material deprivation on the likelihood of attending a high quality university for boys disappears once we include Key Stage 4 outcomes, it remains significant but small for girls (even after including Key Stage 5 results). Similarly, whilst the effects of neighbourhood parental education are much reduced once we control for school quality, individual characteristics and prior educational attainment, our final model

[57] Significant differences were evident for boys of Other Black, Bangladeshi and Chinese ethnic origin.

still shows that pupils from highly educated neighbourhoods are significantly more likely to attend a good university than pupils from more poorly educated neighbourhoods.

In contrast to the findings for HE participation (discussed in Section 4), the raw results for many ethnic minority groups suggest that they are significantly *less* likely to attend a high quality university at age 18 than White British students. However, our final specification suggests that this disadvantage arises largely from differences in other characteristics – particularly prior educational attainment – because once we control for such factors, the estimated effects become either positive and significant, or insignificant – mirroring the findings for HE participation (see Section 4.3 for details). Once we control for prior attainment, Other Black, Bangladeshi and Chinese males are more likely to attend a high quality HE institution than White British students; while all other ethnic groups are approximately as likely to attend a high quality university as White British males. Similarly, females of Indian, Pakistani, Chinese, Other Asian and other mixed ethnic origin are significantly more likely to attend a “high quality” university than White British females, whilst other ethnic groups have a similar probability of attending.

6 Conclusion

Students from materially deprived backgrounds are much less likely to participate in higher education compared to wealthier pupils. However, our findings suggest that this socio-economic gap in HE participation does not emerge at the point of entry into higher education. In other words, the socio-economic gap in HE participation does not arise because poorer students face the same choices at 18, but choose not to go to university. Instead it comes about because poorer pupils do not achieve as highly in secondary school as their more advantaged counterparts. In fact, the socio-economic gap that remains on entry into HE, after allowing for prior attainment, is very small indeed. For example, after allowing for prior achievement to Key Stage 5, the 20% most materially deprived males (females) are just 1.6 (2.6) percentage points less likely to participate in HE than their more advantaged counterparts (this compares with raw differences of 22.2 (27.1) percentage points). The implication of this finding is that focusing policy interventions on encouraging disadvantaged pupils at KS5 to apply to university is unlikely to have a serious impact on reducing the raw socio-economic gap in HE participation. That is not to say that universities should not carry out outreach work to disadvantaged students who continue into post-compulsory education, but simply that it will not tackle the more major problem underlying the socio-economic gap in HE participation, namely the underachievement of disadvantaged pupils in secondary school.

Our analysis of the transitions made by students between Key Stage 2 and Key Stage 4 is in some respects quite reassuring, in that those deprived students who do catch up and perform well at Key Stage 4 have a similar probability of attending university as their more advantaged peers. Our work suggests that improving educational performance at Key Stage 4 is particularly important in terms of [encouraging young people to stay on in post-compulsory education, and subsequently] increasing poorer children's chances of participating in HE. This means that secondary school interventions designed to improve the performance of disadvantaged children are more likely to increase their participation in HE than interventions during post-compulsory education. Of course, what is also evident from our analysis is that improving the educational achievement of disadvantaged students is (unsurprisingly) likely to be quite challenging, given that there was far less upward mobility in their educational achievement throughout secondary school (compared to their richer counterparts).

At least part of the explanation for the relatively low achievement of disadvantaged children in secondary school is likely to be rooted in school quality. Although our analysis cannot establish a causal link between the quality of secondary schooling accessed by a pupil and his or her academic achievement, it is apparent from our work that different types of students are accessing different quality schools and that this is likely to be part of the story behind the large socio-economic gaps in HE participation that we observe. In particular, our analysis suggests that school quality is likely to affect poorer pupils' achievement and indeed the achievement of some ethnic minority groups. This in turn suggests that improving access to good schools may be one way in which the underachievement of disadvantaged pupils can be tackled

So far, we have argued that we should be focusing more on improving the educational performance of disadvantaged children in secondary school as a way of enabling them to access higher education. Yet we also need to be cautious about this policy conclusion. Students look forward when making decisions about what qualifications to attempt at age 16 and 18, and indeed when deciding how much effort to put into school work. If disadvantaged pupils feel that HE is "not for people like them", then it may be that their achievement in school simply reflects anticipated barriers to participation in HE, rather than the other way around. This suggests that outreach activities will still be required to raise students' aspirations about HE, but that they might perhaps be better targeted on younger children in secondary school.

We also explored ethnic gaps in HE participation. By and large ethnic minority students are significantly more likely to participate in HE than their White British peers. Our findings suggested that some of the apparent advantage of ethnic minority students, in terms of their higher HE participation rates, is reduced once we take into account their prior educational attainment. This means that some ethnic minority groups have higher rates of HE participation largely because they have higher achievement in secondary school. Nonetheless, it remains true that not only do many ethnic minority students have higher HE participation rates, after allowing for prior achievement, but they also have more upward mobility in terms of their educational achievement throughout secondary school, compared to White British children.

Another aspect of the widening participation agenda that we have explored in this report surrounds the type of HE experienced by the student. We find that there are large socio-economic and ethnic gaps in the likelihood of attending a high quality (as measured by research intensiveness) HE institution. Whilst it may well be that research quality is not a good indicator of the overall quality of an HEI, the additional value of degrees from such institutions means that access to such universities is as much of a widening participation issue as access to the sector as a whole. Again, however, we find that the impact of material deprivation on the likelihood of attending a good university disappears for male participants (and becomes very small for female participants) once we take account of prior attainment. Again, this highlights the importance of prior attainment: if we want to widen participation of different types of student in high quality universities, then we need to focus on improving their educational achievement in secondary school. That said, even controlling for prior attainment from Key Stage 2 to Key Stage 5, we still find that pupils from highly educated neighbourhoods are significantly more likely to attend a good university than pupils from more poorly educated neighbourhoods. This may suggest that parental education gives some students an additional advantage in terms of accessing higher quality institutions.

We also analysed the probability of attending a high quality HEI by ethnic group. The raw results for many minority groups suggested that they were significantly less likely to attend a good university at age 18 than White British students. However, once we control for prior attainment, all ethnic minority groups have a similar or higher probability of attending a high quality university compared to their White British counterparts. This confirms some success in the long standing attempts to widen participation in HE to minority groups. However, we should not forget that some minority groups, due to their lower academic achievement, remain much less likely to attend a high quality HEI than White students: an issue of clear policy concern.

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Appendix A

Figure A.1 Raw neighbourhood parental education gap in male HE participation rates at age 18

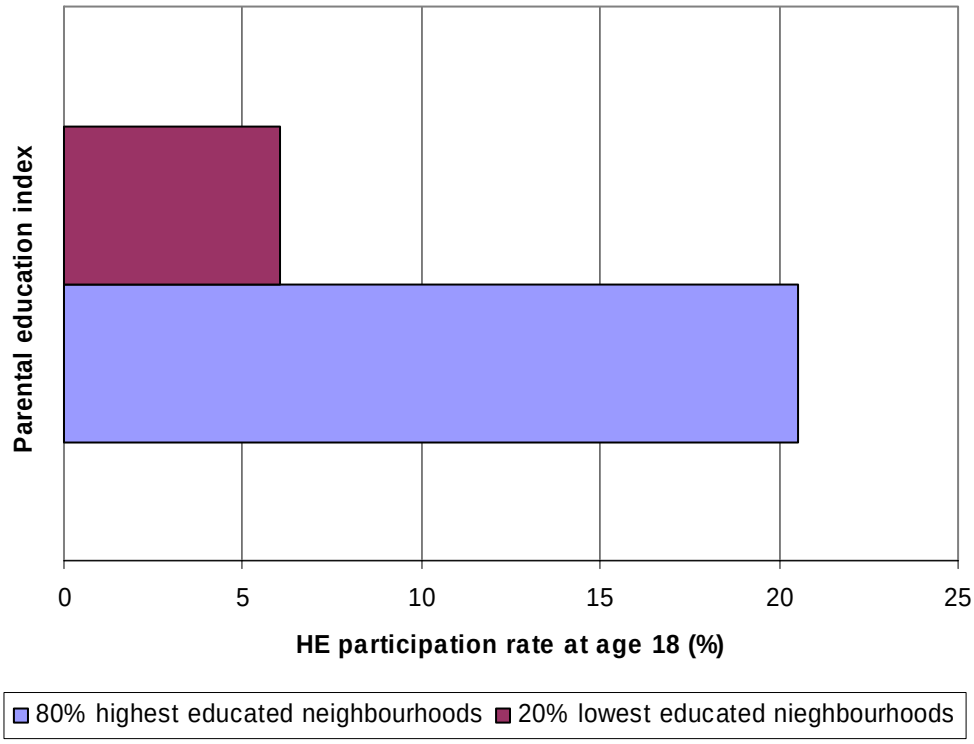

Figure 3.2 Raw neighbourhood parental education gap in female HE participation rates at age 18

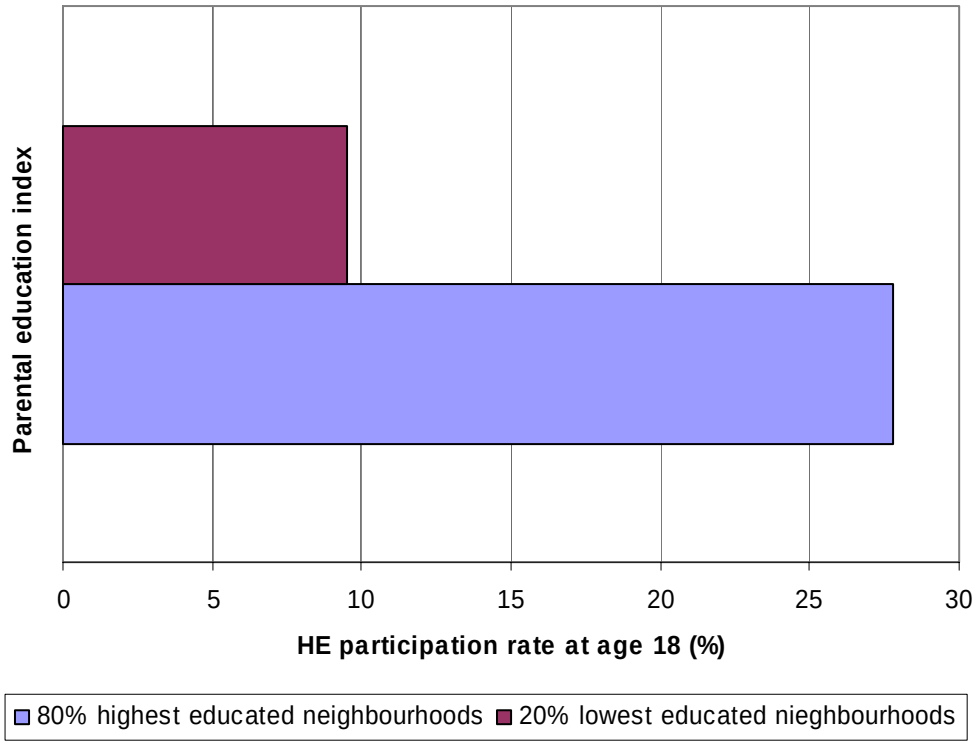

Table A.1 Proportion of individuals with particular characteristics who go to university at age 18 and who attend a high quality institution

Characteristic	Proportion participating in HE	Proportion attending a high quality institution
Reached expected level at Key Stage 2	0.261	0.096
Did not reach expected level at Key Stage 2	0.054	0.007
Reached expected level at Key Stage 3	0.273	0.098
Did not reach expected level at Key Stage 3	0.03	0.003
Achieved 5 A*-C GCSE grades	0.395	0.144
Did not achieve 5 A*-C GCSE grades	0.021	0.002
Achieved 3 A A-Level grades	0.803	0.719
Did not achieve 3 A A-level grades	0.193	0.056
Reached Level 3 threshold by 18 via any route	0.461	0.167
Did not reach Level 3 threshold by 18 via any route	0.018	0.002
Eligible for Free School Meals	0.08	0.017
Not eligible for Free School Meals	0.229	0.082
Speaks English as an additional language	0.281	0.086
Speaks English as a first language	0.201	0.072
Male	0.176	0.064
Female	0.241	0.082
White British	0.198	0.07
Other White	0.222	0.087
Black African	0.225	0.064
Black Caribbean	0.148	0.029
Other Black	0.136	0.037
Indian	0.449	0.142
Pakistani	0.215	0.053
Bangladeshi	0.221	0.065
Chinese	0.488	0.249
Other Asian	0.549	0.263
Mixed ethnicity	0.457	0.201
Other ethnicity	0.194	0.067
Least deprived quintile	0.339	0.142
2nd deprivation quintile	0.264	0.098
3rd deprivation quintile	0.206	0.066
4th deprivation quintile	0.14	0.038
Most deprived quintile	0.093	0.022
Least educated quintile	0.078	0.017
2nd OA education quintile	0.148	0.039
3rd OA education quintile	0.211	0.064
4th OA education quintile	0.27	0.097
Most educated quintile	0.335	0.149
Attends a community school	0.183	0.058
Attends a foundation school	0.255	0.1
Attends a voluntary aided school	0.277	0.109
Attends a voluntary controlled school	0.257	0.105

Appendix B

Table B.1 Gradients in HE participation for males, by eligibility for Free School Meals (at age 16)

	Raw results	Plus school quality	Plus neighbourhood parental education and ethnicity	Plus individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
Not eligible for FSM	0.130***	0.079***	0.062***	0.048***	0.032***	0.020***	0.006***	0.002*
2nd OA education quintile			0.039***	0.033***	0.024***	0.016***	0.008***	0.005***
3rd OA education quintile			0.077***	0.067***	0.048***	0.033***	0.017***	0.008***
4th OA education quintile			0.114***	0.102***	0.074***	0.052***	0.027***	0.010***
Most educated quintile			0.164***	0.150***	0.110***	0.078***	0.040***	0.013***
Other White			0.023***	0.013*	0.025***	0.023***	0.015***	0.010**
Black African			0.062***	0.043***	0.071***	0.078***	0.063***	0.050***
Black Caribbean			-0.011*	-0.003	0.023***	0.037***	0.040***	0.034***
Other Black			-0.024***	-0.022***	0.001	0.011	0.016**	0.015***
Indian			0.209***	0.179***	0.194***	0.178***	0.140***	0.101***
Pakistani			0.082***	0.057***	0.079***	0.080***	0.061***	0.041***
Bangladeshi			0.117***	0.085***	0.096***	0.087***	0.061***	0.051***
Chinese			0.244***	0.215***	0.208***	0.169***	0.130***	0.095***
Other Asian			0.265***	0.235***	0.237***	0.199***	0.132***	0.076***
Mixed ethnicity			0.196***	0.184***	0.162***	0.139***	0.092***	0.036***
Other ethnicity			0.023***	0.009	0.028***	0.030***	0.024***	0.024***
Constant	0.065***	0.109***	0.032***	0.084***	-0.019***	-0.038***	-0.026***	0.114***
Observations	262,516	262,516	262,516	262,516	262,516	262,516	262,516	262,516
R-squared	0.014	0.014	0.06	0.085	0.178	0.249	0.337	0.462
Number of clusters		3,452	3,452	3,452	3,452	3,452	3,452	3,452
F-test of additional controls (P value)			0.000	0.000	0.000	0.000	0.000	0.000

Notes to Table B.1:

1) To control for school quality, we include school fixed effects (based on secondary school attended at age 16).
2) Individual level controls include month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (assessed at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Table B.2 Gradients in HE participation for females, by eligibility for Free School Meals (at age 16)

	Raw results	Plus school quality	Plus neighbourhood parental education and ethnicity	Plus individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
Not eligible for FSM	0.169***	0.116***	0.094***	0.080***	0.055***	0.037***	0.018***	0.009***
2nd OA education quintile			0.052***	0.047***	0.030***	0.020***	0.010***	0.005***
3rd OA education quintile			0.106***	0.098***	0.069***	0.050***	0.029***	0.015***
4th OA education quintile			0.154***	0.143***	0.102***	0.074***	0.043***	0.020***
Most educated quintile			0.200***	0.187***	0.135***	0.096***	0.053***	0.016***
Other White			0.018*	0.006	0.022**	0.024***	0.007	0.005
Black African			0.117***	0.086***	0.115***	0.121***	0.096***	0.065***
Black Caribbean			0.026***	0.031***	0.061***	0.074***	0.068***	0.050***
Other Black			0.007	0.006	0.028***	0.039***	0.037***	0.030***
Indian			0.261***	0.215***	0.227***	0.205***	0.165***	0.131***
Pakistani			0.099***	0.056***	0.085***	0.086***	0.060***	0.041***
Bangladeshi			0.145***	0.096***	0.115***	0.104***	0.065***	0.053***
Chinese			0.255***	0.216***	0.216***	0.163***	0.117***	0.084***
Other Asian			0.275***	0.235***	0.242***	0.200***	0.137***	0.089***
Mixed ethnicity			0.211***	0.196***	0.173***	0.149***	0.112***	0.056***
Other ethnicity			0.040***	0.019**	0.037***	0.036***	0.023***	0.025***
Constant	0.096***	0.142***	0.043***	0.082***	-0.040***	-0.055***	-0.033***	0.110***
Observations	254,512	254,512	254,512	254,512	254,512	254,512	254,512	254,512
R-squared	0.019	0.019	0.072	0.09	0.183	0.248	0.325	0.441
Number of clusters		3,381	3,381	3,381	3,381	3,381	3,381	3,381
F-test of additional controls (P value)		0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes to Table B.2:

1) To control for school quality, we include school fixed effects (based on secondary school attended at age 16).
2) Individual level controls include month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (assessed at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Appendix C

Table C.1 Gradients in HE participation for males, controlling for individual-level characteristics and prior attainment (but not school quality)

	Baseline model	Plus individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
4th deprivation quintile	0.034***	0.025***	0.016***	0.005***	0.001	0.001
3rd deprivation quintile	0.083***	0.066***	0.044***	0.020***	0.008***	0.002
2nd deprivation quintile	0.124***	0.102***	0.069***	0.036***	0.014***	0.001
Least deprived quintile	0.170***	0.146***	0.101***	0.057***	0.027***	0.007***
2nd OA education quintile	0.022***	0.019***	0.011***	0.007***	0.003*	0.003**
3rd OA education quintile	0.048***	0.043***	0.026***	0.018***	0.009***	0.004**
4th OA education quintile	0.081***	0.075***	0.046***	0.032***	0.015***	0.002
Most educated quintile	0.134***	0.128***	0.081***	0.055***	0.025***	-0.001
Other White	0.016**	0.017**	0.023***	0.020***	0.008	0.003
Black African	0.033***	0.033***	0.065***	0.076***	0.059***	0.049***
Black Caribbean	-0.031***	-0.021***	0.011**	0.031***	0.035***	0.035***
Other Black	-0.044***	-0.036***	-0.006	0.009	0.013**	0.014***
Indian	0.226***	0.220***	0.226***	0.197***	0.154***	0.110***
Pakistani	0.074***	0.075***	0.091***	0.087***	0.062***	0.040***
Bangladeshi	0.076***	0.073***	0.081***	0.079***	0.045***	0.044***
Chinese	0.272***	0.263***	0.239***	0.187***	0.138***	0.099***
Other Asian	0.331***	0.316***	0.289***	0.226***	0.148***	0.087***
Mixed ethnicity	0.231***	0.222***	0.184***	0.153***	0.098***	0.041***
Other ethnicity	0.008	0.008	0.028***	0.032***	0.025***	0.025***
Constant	0.026***	0.080***	-0.027***	-0.035***	-0.024***	0.123***
Observations	262,516	262,516	262,516	262,516	262,516	262,516
R-squared	0.073	0.096	0.184	0.251	0.338	0.462
F-test of additional controls (P value)		0.000	0.000	0.000	0.000	0.000

Notes to Table C.1:

1) All models are across-school (i.e. do not include school fixed effects).
2) In addition to deprivation quintile, neighbourhood parental education quintile and ethnicity, Column 2 also includes controls for month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (measured at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Table C.2 Gradients in HE participation for females, controlling for individual-level characteristics and prior attainment (but not school quality)

	Baseline model	Plus individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
4th deprivation quintile	0.050***	0.039***	0.025***	0.009***	0.002	0
3rd deprivation quintile	0.112***	0.095***	0.063***	0.031***	0.012***	0.002
2nd deprivation quintile	0.159***	0.139***	0.093***	0.051***	0.020***	0.003
Least deprived quintile	0.211***	0.188***	0.128***	0.073***	0.037***	0.009***
2nd OA education quintile	0.028***	0.026***	0.012***	0.007***	0.003	0.001
3rd OA education quintile	0.068***	0.064***	0.040***	0.029***	0.017***	0.008***
4th OA education quintile	0.107***	0.103***	0.065***	0.046***	0.027***	0.009***
Most educated quintile	0.156***	0.151***	0.096***	0.065***	0.034***	-0.001
Other White	0.014	0.014*	0.023***	0.023***	0.005	-0.001
Black African	0.086***	0.079***	0.111***	0.120***	0.095***	0.067***
Black Caribbean	0.012	0.019**	0.055***	0.072***	0.070***	0.058***
Other Black	-0.01	-0.007	0.022**	0.037***	0.036***	0.031***
Indian	0.281***	0.265***	0.269***	0.234***	0.192***	0.148***
Pakistani	0.096***	0.087***	0.108***	0.100***	0.066***	0.043***
Bangladeshi	0.104***	0.092***	0.106***	0.100***	0.053***	0.043***
Chinese	0.275***	0.260***	0.245***	0.181***	0.130***	0.090***
Other Asian	0.319***	0.300***	0.289***	0.227***	0.157***	0.100***
Mixed ethnicity	0.246***	0.238***	0.196***	0.159***	0.118***	0.061***
Other ethnicity	0.026***	0.024***	0.043***	0.041***	0.026***	0.028***
Constant	0.048***	0.087***	-0.039***	-0.043***	-0.023***	0.124***
Observations	254,512	254,512	254,512	254,512	254,512	254,512
R-squared	0.085	0.103	0.189	0.25	0.326	0.441
F-test of additional controls (P value)		0.000	0.000	0.000	0.000	0.000

Notes to Table C.2:

1) All models are across-school (i.e. do not include school fixed effects).
2) In addition to deprivation quintile, neighbourhood parental education quintile and ethnicity, Column 2 also includes controls for month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (measured at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Appendix D

Table D.1 Transition matrix showing changes in attainment over time for males who are eligible for Free School Meals

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	6,351	2,514	658	97	23	9,643
	65.86	**26.07**	**6.82**	**1.01**	**0.24**	**100**
	0.19	*2.03*	*19.30*	*47.42*	*60.87*	*2.59*
2	2,370	2,413	1,188	273	58	6,302
	37.61	**38.29**	**18.85**	**4.33**	**0.92**	**100**
	0.21	*1.33*	*16.58*	*37.36*	*58.62*	*5.87*
3	1,009	1,579	1,439	522	125	4,674
	21.59	**33.78**	**30.79**	**11.17**	**2.67**	**100**
	0.59	*1.20*	*11.61*	*37.36*	*53.60*	*9.71*
4	421	790	1,046	686	279	3,222
	13.07	**24.52**	**32.46**	**21.29**	**8.66**	**100**
	1.43	*1.52*	*10.23*	*34.40*	*59.86*	*16.39*
Highest scores	118	215	511	537	466	1,847
	6.39	**11.64**	**27.67**	**29.07**	**25.23**	**100**
	0.00	*1.40*	*11.35*	*28.31*	*56.44*	*25.77*
Total	10,269	7,511	4,842	2,115	951	25,688
	39.98	**29.24**	**18.85**	**8.23**	**3.7**	**100**
	0.28	*1.56*	*13.55*	*34.56*	*57.31*	*8.09*

Notes to Table D.1:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

Table D.2 Transition matrix showing changes in attainment over time for males who are not eligible for Free School Meals

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	18,198	13,146	3,599	506	107	35,556
	51.18	**36.97**	**10.12**	**1.42**	**0.3**	**100**
	0.36	*1.64*	*15.45*	*37.94*	*45.79*	*3.03*
2	7,454	15,471	11,364	3,049	525	37,863
	19.69	**40.86**	**30.01**	**8.05**	**1.39**	**100**
	0.54	*1.62*	*14.31*	*39.59*	*61.52*	*9.10*
3	3,348	10,351	15,461	7,877	2,070	39,107
	8.56	**26.47**	**39.54**	**20.14**	**5.29**	**100**
	0.24	*1.88*	*13.85*	*37.67*	*61.11*	*16.82*
4	1,320	4,738	12,993	13,098	7,261	39,410
	3.35	**12.02**	**32.97**	**33.24**	**18.42**	**100**
	0.68	*1.41*	*13.11*	*35.85*	*61.89*	*27.83*
Highest scores	444	1,314	5,287	11,100	21,202	39,347
	1.13	**3.34**	**13.44**	**28.21**	**53.88**	**100**
	1.35	*2.36*	*11.56*	*35.32*	*65.67*	*47.00*
Total	30,764	45,020	48,704	35,630	31,165	191,283
	16.08	**23.54**	**25.46**	**18.63**	**16.29**	**100**
	0.42	*1.69*	*13.63*	*36.43*	*64.35*	*21.20*

See Notes to Table D.1.

Table D.3 Transition matrix showing changes in attainment over time for females who are eligible for Free School Meals

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	5,362	3,100	1,002	196	28	9,688
	55.35	**32**	**10.34**	**2.02**	**0.29**	**100**
	0.32	***1.65***	***18.56***	***39.29***	***71.43***	***3.62***
2	1,787	2,610	1,861	572	113	6,943
	25.74	**37.59**	**26.8**	**8.24**	**1.63**	**100**
	0.56	***1.34***	***14.08***	***36.89***	***55.75***	***8.37***
3	782	1,282	1,738	926	287	5,015
	15.59	**25.56**	**34.66**	**18.46**	**5.72**	**100**
	0.64	***1.79***	***11.74***	***34.02***	***58.54***	***14.26***
4	324	535	1,086	1,004	503	3,452
	9.39	**15.5**	**31.46**	**29.08**	**14.57**	**100**
	0.62	***1.31***	***11.14***	***31.08***	***55.47***	***20.89***
Highest scores	113	141	383	606	763	2,006
	5.63	**7.03**	**19.09**	**30.21**	**38.04**	**100**
	0.00	***2.84***	***10.70***	***29.04***	***55.70***	***32.20***
Total	8,368	7,668	6,070	3,304	1,694	27,104
	30.87	**28.29**	**22.4**	**12.19**	**6.25**	**100**
	0.41	***1.56***	***13.41***	***33.02***	***56.38***	***11.12***

See Notes to Table D.1.

Table D.4 Transition matrix showing changes in attainment over time for females who are not eligible for Free School Meals

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	11,910	13,206	5,175	963	151	31,405
	37.92	**42.05**	**16.48**	**3.07**	**0.48**	**100**
	0.47	***2.08***	***16.79***	***41.12***	***64.90***	***5.39***
2	4,383	12,487	13,747	5,498	991	37,106
	11.81	**33.65**	**37.05**	**14.82**	**2.67**	**100**
	0.59	***1.90***	***15.01***	***41.25***	***62.87***	***14.06***
3	1,880	6,694	14,817	11,864	4,563	39,818
	4.72	**16.81**	**37.21**	**29.8**	**11.46**	**100**
	0.64	***1.87***	***14.22***	***38.76***	***61.43***	***24.23***
4	883	2,766	9,941	15,086	13,011	41,687
	2.12	**6.64**	**23.85**	**36.19**	**31.21**	**100**
	1.36	***1.70***	***14.19***	***37.76***	***62.12***	***36.58***
Highest scores	318	695	3,204	9,226	27,930	41,373
	0.77	**1.68**	**7.74**	**22.3**	**67.51**	**100**
	3.14	***2.59***	***12.95***	***35.44***	***65.49***	***53.18***
Total	19,374	35,848	46,884	42,637	46,646	191,389
	10.12	**18.73**	**24.5**	**22.28**	**24.37**	**100**
	0.60	***1.96***	***14.64***	***38.06***	***64.10***	***28.12***

See Notes to Table D.1.

Appendix E

Table E.1 Transition matrix showing changes in attainment over time for males amongst the 20% of pupils living in the least well-educated neighbourhoods

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	8,714	3,569	667	70	13	13,033
	66.86	**27.38**	**5.12**	**0.54**	**0.1**	**100**
	0.13	*0.98*	*9.75*	*34.29*	*15.38*	*1.05*
2	3,236	4,217	2,024	342	46	9,865
	32.8	**42.75**	**20.52**	**3.47**	**0.47**	**100**
	0.28	*0.88*	*9.34*	*27.19*	*52.17*	*3.57*
3	1,381	2,729	2,652	849	139	7,750
	17.82	**35.21**	**34.22**	**10.95**	**1.79**	**100**
	0.51	*1.03*	*7.96*	*28.15*	*48.20*	*7.12*
4	546	1,326	2,270	1,347	438	5,927
	9.21	**22.37**	**38.3**	**22.73**	**7.39**	**100**
	0.55	*0.90*	*8.50*	*28.66*	*50.68*	*13.77*
Highest scores	147	364	1,006	1,241	1,099	3,857
	3.81	**9.44**	**26.08**	**32.18**	**28.49**	**100**
	0.68	*1.37*	*7.95*	*26.51*	*57.32*	*27.09*
Total	14,024	12,205	8,619	3,849	1,735	40,432
	34.69	**30.19**	**21.32**	**9.52**	**4.29**	**100**
	0.22	*0.96*	*8.56*	*27.83*	*54.47*	*7.18*

Notes to Table E.1:
1) Numbers in bold represent the proportion of individuals in a given quintile at Key Stage 2 who appear in each quintile at Key Stage 4.
2) Numbers in gray italics represent the proportion of individuals in each group who participate in HE at age 18.

Table E.2 Transition matrix showing changes in attainment over time for males amongst the 80% of pupils living in the best-educated neighbourhoods

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	15,835	12,091	3,590	533	117	32,166
	49.23	**37.59**	**11.16**	**1.66**	**0.36**	**100**
	0.42	*1.91*	*17.21*	*40.15*	*52.14*	*3.70*
2	6,588	13,667	10,528	2,980	537	34,300
	19.21	**39.85**	**30.69**	**8.69**	**1.57**	**100**
	0.55	*1.80*	*15.52*	*40.81*	*62.01*	*10.10*
3	2,976	9,201	14,248	7,550	2,056	36,031
	8.26	**25.54**	**39.54**	**20.95**	**5.71**	**100**
	0.24	*2.02*	*14.72*	*38.72*	*61.53*	*17.98*
4	1,195	4,202	11,769	12,437	7,102	36,705
	3.26	**11.45**	**32.06**	**33.88**	**19.35**	**100**
	1.00	*1.59*	*13.75*	*36.54*	*62.50*	*29.10*
Highest scores	415	1,165	4,792	10,396	20,569	37,337
	1.11	**3.12**	**12.83**	**27.84**	**55.09**	**100**
	1.20	*2.49*	*12.29*	*36.00*	*65.91*	*48.00*
Total	27,009	40,326	44,927	33,896	30,381	176,539
	15.3	**22.84**	**25.45**	**19.2**	**17.21**	**100**
	0.47	*1.88*	*14.59*	*37.29*	*64.70*	*22.51*

See Notes to Table E.1.

Table E.3 Transition matrix showing changes in attainment over time for females amongst the 20% of pupils living in the least well-educated neighbourhoods

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	6,860	4,455	1,163	139	18	12,635
	54.29	**35.26**	**9.2**	**1.1**	**0.14**	**100**
	0.19	*0.81*	*10.75*	*28.06*	*66.67*	*1.78*
2	2,468	4,282	3,120	749	124	10,743
	22.97	**39.86**	**29.04**	**6.97**	**1.15**	**100**
	0.36	*1.17*	*9.49*	*30.84*	*57.26*	*6.12*
3	1,038	2,209	3,340	1,698	348	8,633
	12.02	**25.59**	**38.69**	**19.67**	**4.03**	**100**
	0.48	*0.63*	*9.04*	*30.68*	*49.71*	*11.76*
4	385	908	2,166	2,023	963	6,445
	5.97	**14.09**	**33.61**	**31.39**	**14.94**	**100**
	1.04	*1.43*	*10.02*	*28.57*	*51.82*	*20.34*
Highest scores	151	242	692	1,295	1,705	4,085
	3.7	**5.92**	**16.94**	**31.7**	**41.74**	**100**
	0.66	*1.65*	*8.53*	*27.26*	*59.12*	*34.88*
Total	10,902	12,096	10,481	5,904	3,158	42,541
	25.63	**28.43**	**24.64**	**13.88**	**7.42**	**100**
	0.29	*0.97*	*9.53*	*29.17*	*55.83*	*10.89*

See Notes to Table E.1.

Table E.4 Transition matrix showing changes in attainment over time for females amongst the 80% of pupils living in the best-educated neighbourhoods

	Key Stage 4					
Key Stage 2	Lowest scores	2	3	4	Highest scores	Total
Lowest scores	10,412	11,851	5,014	1,020	161	28,458
	36.59	**41.64**	**17.62**	**3.58**	**0.57**	**100**
	0.58	*2.45*	*18.55*	*42.55*	*65.84*	*6.40*
2	3,702	10,815	12,488	5,321	980	33,306
	11.12	**32.47**	**37.49**	**15.98**	**2.94**	**100**
	0.73	*2.05*	*16.26*	*42.25*	*62.76*	*15.44*
3	1,624	5,767	13,215	11,092	4,502	36,200
	4.49	**15.93**	**36.51**	**30.64**	**12.44**	**100**
	0.74	*2.32*	*15.20*	*39.61*	*62.15*	*25.82*
4	822	2,393	8,861	14,067	12,551	38,694
	2.12	**6.18**	**22.9**	**36.35**	**32.44**	**100**
	1.22	*1.71*	*14.84*	*38.60*	*62.65*	*37.88*
Highest scores	280	594	2,895	8,537	26,988	39,294
	0.71	**1.51**	**7.37**	**21.73**	**68.68**	**100**
	3.21	*3.03*	*13.71*	*36.23*	*65.61*	*54.02*
Total	16,840	31,420	42,473	40,037	45,182	175,952
	9.57	**17.86**	**24.14**	**22.75**	**25.68**	**100**
	0.70	*2.24*	*15.73*	*38.96*	*64.38*	*29.66*

See Notes to Table E.1.

Appendix F

Table F.1 Gradients in quality of HE institution attended by males, by eligibility for Free School Meals (at age 16)

	Raw results	Plus school quality	Plus neighbourhood parental education and ethnicity	Plus individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
Not eligible for FSM	0.148***	0.085***	0.065***	0.059***	0.040***	0.027***	0.018**	0.016*
2nd OA education quintile			0.025**	0.025**	0.019*	0.008	-0.002	-0.006
3rd OA education quintile			0.051***	0.051***	0.039***	0.025***	0.008	-0.004
4th OA education quintile			0.081***	0.081***	0.063***	0.046***	0.024**	0.009
Most educated quintile			0.119***	0.119***	0.098***	0.076***	0.045***	0.026***
Other White			0.017	0.019	0.034**	0.029**	0.025*	0.021*
Black African			-0.075***	-0.074***	-0.026	-0.004	0.002	0.007
Black Caribbean			-0.130***	-0.130***	-0.082***	-0.040*	-0.019	0.003
Other Black			-0.007	-0.002	0.041	0.061*	0.075**	0.084***
Indian			-0.026**	-0.02	0.031**	0.032**	0.02	0.018
Pakistani			-0.069***	-0.061***	-0.001	0.014	0.01	0.018
Bangladeshi			0.031	0.038	0.074**	0.063*	0.048	0.062**
Chinese			0.124***	0.131***	0.137***	0.112***	0.097***	0.081***
Other Asian			0.076**	0.080**	0.092***	0.072**	0.049*	0.042*
Mixed ethnicity			0.03	0.032	0.03	0.021	0.016	0.023
Other ethnicity			-0.046**	-0.041**	-0.014	-0.011	-0.012	-0.003
Constant	0.224***	0.285***	0.233***	0.250***	0.050***	0.001	0.057**	0.011
Observations	46,275	46,275	46,275	46,275	46,275	46,275	46,275	46,275
R-squared	0.005	0.005	0.028	0.03	0.127	0.193	0.276	0.394
Number of clusters		2,763	2,763	2,763	2,763	2,763	2,763	2,763
F-test of additional controls (P value)		0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes to Table F.1:

1) To control for school quality, we include school fixed effects (based on secondary school attended at age 16).
2) Individual level controls include month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (assessed at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

Table F.2 Gradients in quality of HE institution attended by females, by eligibility for Free School Meals (at age 16)

	Raw results	Plus school quality	Plus neighbourhood parental education and ethnicity	Plus individual level controls	Plus Key Stage 2 results	Plus Key Stage 3 results	Plus Key Stage 4 results	Plus Key Stage 5 results
Not eligible for FSM	0.143***	0.081***	0.063***	0.060***	0.047***	0.031***	0.024***	0.014**
2nd OA education quintile			0.025***	0.025***	0.020***	0.015**	0.008	0.008
3rd OA education quintile			0.052***	0.052***	0.039***	0.031***	0.018***	0.014**
4th OA education quintile			0.084***	0.084***	0.067***	0.054***	0.037***	0.027***
Most educated quintile			0.138***	0.138***	0.114***	0.096***	0.074***	0.053***
Other White			0.022	0.024*	0.035***	0.038***	0.028**	0.012
Black African			-0.016	-0.011	0.019	0.032*	0.035*	0.024
Black Caribbean			-0.090***	-0.089***	-0.036**	-0.02	-0.012	-0.007
Other Black			-0.067***	-0.066***	-0.022	-0.009	-0.005	0.001
Indian			-0.011	-0.006	0.035**	0.030**	0.023*	0.035***
Pakistani			-0.039***	-0.032*	0.026	0.037**	0.027*	0.040***
Bangladeshi			-0.015	-0.008	0.042*	0.038*	0.022	0.028
Chinese			0.134***	0.142***	0.157***	0.124***	0.103***	0.101***
Other Asian			0.045*	0.050*	0.073***	0.060**	0.046*	0.057**
Mixed ethnicity			0.048***	0.049***	0.046***	0.037**	0.034**	0.034**
Other ethnicity			0.035**	0.040**	0.060***	0.059***	0.054***	0.052***
Constant	0.204***	0.263***	0.202***	0.212***	0.021	0.006	-0.011	-0.03
Observations	61,216	61,216	61,216	61,216	61,216	61,216	61,216	61,216
R-squared	0.005	0.005	0.035	0.036	0.117	0.168	0.214	0.318
Number of clusters		2,822	2,822	2,822	2,822	2,822	2,822	2,822
F-test of additional controls (P value)		0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes to Table F.2:

1) To control for school quality, we include school fixed effects (based on secondary school attended at age 16).
2) Individual level controls include month of birth, whether English is the pupil's first language and whether they have either statemented (more severe) or non-statemented (less severe) special educational needs (assessed at age 16).
3) *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.