



The link between secondary school characteristics and university participation and outcomes

CAYT Research Report

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Executive summary

Previous research has shown that prior attainment – particularly at Key Stage 4 and Key Stage 5 – plays a key role in helping to explain why some young people are more likely to go to university than others (and why some perform better than others once they are there). This suggests that what happens earlier in an individual’s life is likely to be a crucial determinant of their subsequent educational choices and progress. What is less clear from the existing evidence, however, is what role schools might play in helping to explain why some groups of young people are more likely to access and achieve at university than others.

This report uses linked individual-level administrative data from schools and universities to document the relationships between a variety of secondary school characteristics of interest and higher education (HE) participation rates and university outcomes. The school characteristics we consider are: school type and selectivity; whether the school has an attached sixth form; the proportion of pupils in the school who are eligible for free school meals; and school value added. (Results by school performance are included in Appendix 2.) The outcomes we consider are: participation at any HE institution in the UK at age 18 or 19; participation at a high-status institution; dropout within two years of starting university; degree completion within five years of starting university; and degree class.

Perhaps more importantly, we also explore what drives the relationships that we observe. We have access to a limited set of background characteristics and a rich set of measures of attainment at Key Stages 2 (age 11), 4 (age 16) and 5 (age 18). We are therefore able to investigate what explains the differences in HE participation and outcomes that we observe: is it the fact that different types of pupils attend different types of schools; that some schools are able to get their pupils better grades in more-highly-regarded subjects and qualifications at Key Stage 4; that some schools are more successful at encouraging their pupils to stay on for further education (and to perform better while they are there); or, in the case of degree outcomes, that some schools encourage their pupils to go to certain types of university or study certain subjects?

Or is it something else? Is it, for example, the case that more pupils from particular types of schools go to (high-status) universities and/or do particularly well while they are there, even after accounting for their family background and prior attainment? This could be indicative of the fact that pupils from particular schools are more likely to apply to certain types of universities or for some reason are more suited to studying independently once they are there.

If pupils with a given set of characteristics and grades are, on average, less likely to go to (a high-status) university if they come from schools with particular characteristics or intakes, then this might indicate a potentially fruitful group upon whom universities (or other organisations) could target outreach efforts. Similarly, if pupils from schools with particular characteristics or intakes on average outperform those from elsewhere once

they are at university, even after accounting for their qualifications, subjects and grades on entry, then this might provide an indication of: (a) the types of schools from which pupils have been particularly successful in terms of HE participation and outcomes, and that might therefore be worthy of further investigation to understand their success; and/or (b) the types of characteristics that universities may want to consider taking into account when making offers to prospective students.

HE participation

We find evidence of substantial differences in HE participation rates overall and at high-status institutions according to the school characteristics we consider. The gaps are largest by school selectivity – with, for example, pupils attending selective state schools more than 40 percentage points more likely to go to university and more than 30 percentage points more likely to go to a high-status institution than pupils attending non-selective state schools. The differences in terms of school performance, the proportion of pupils eligible for free school meals, school value added and whether the school has an attached sixth form become progressively smaller.

The fact that different types of pupils attend different types of schools plays an important role in understanding these differences in participation: once we compare pupils with similar background characteristics and Key Stage 2 scores, the raw gaps in HE participation according to secondary school attended are reduced by at least 40% in all cases.

We can explain most of the remaining gaps in HE participation according to secondary school characteristics by accounting for the qualifications, subjects and grades that pupils achieve at Key Stage 4. Once we compare pupils with the same background characteristics, Key Stage 2 scores and Key Stage 4 attainment, the differences in HE participation fall to less than 4 percentage points in terms of participation overall and to less than 1 percentage point in terms of participation at a high-status institution. The addition of a rich set of controls for attainment at Key Stage 5 adds very little to this picture. This suggests that:

- To the extent that schools have an effect on their pupils' HE decisions, it is likely to come primarily via their effect on Key Stage 4 attainment. That is not to say that the change in the magnitude of the differences in HE participation before and after controlling for Key Stage 4 attainment represents the causal effect of a particular school characteristic on Key Stage 4 attainment, because there could be other unobserved differences between schools (or pupils within those schools) that are driving these results; for example, pupils from certain types of schools may have tried harder on the tests. Nonetheless, it suggests that any causal effects of school characteristics on HE participation are most likely to come via this route.

- Any effect that secondary schools may have in terms of encouraging their pupils to stay in education beyond compulsory school-leaving age (or to do well once they are there) is likely to come via increasing attainment at Key Stage 4.
- Any direct effect (i.e. any effect over and above that arising from increasing pupils' attainment) that secondary schools may have on their pupils' choices over whether and where to go to university is likely to be very small. This suggests that doing things such as encouraging pupils to apply to university or helping them with their application does not appear to play a large role in explaining why pupils from some schools are more likely to go to university than others; the key way in which schools seem to influence their pupils' HE participation decisions appears to come via prior attainment, especially at Key Stage 4.

Taken together, these results suggest that the focus of 'widening participation' efforts on the basis of secondary school characteristics should be to ensure that pupils from all schools make the right choices over the subjects and qualifications they take at Key Stage 4, and that they maximise their chances of getting good grades at this level. Good grades in highly-regarded subjects and qualifications at Key Stage 4 are not only associated with a higher probability of staying in education beyond the age of 16 and doing well at Key Stage 5, but we find that they also continue to be significantly associated with HE participation decisions and university outcomes even after accounting for subsequent measures of attainment. Interventions targeted at students beyond the end of compulsory education are unlikely to be able to eliminate the differences in HE participation that we observe between pupils from different types of schools.

University outcomes

We find evidence of sizeable differences in university outcomes between pupils from different schools, even amongst the selected group of university participants. The percentage point differences are largest in terms of degree class and, in contrast to the results for HE participation, according to the proportion of pupils in the school eligible for free school meals (FSMs). For example, students who attended one of the 20% of secondary schools with the highest proportions of FSM-eligible pupils are, on average, 5.4 percentage points more likely to drop out, 11.0 percentage points less likely to complete their degree and 21.8 percentage points less likely to graduate with a first or a 2:1 than pupils who attended one of the 20% of secondary schools with the lowest proportions of FSM-eligible pupils.

As was the case for the gaps in HE participation, the fact that different types of pupils attend different schools explains a substantial proportion of the raw differences that we see.

In stark contrast to the results for HE participation, however, once we add a rich set of controls accounting for the qualifications, subjects and grades attained at Key Stage 4, in

most cases our estimates of the differences in university outcomes across school characteristics change sign. Once we compare individuals with similar levels of attainment, those from independent and selective state schools, those from state schools with a low proportion of FSM-eligible pupils and those from high-value-added state schools are now significantly *more* likely to drop out, significantly *less* likely to complete their degree and significantly *less* likely to graduate with a first or a 2:1 than their counterparts in non-selective state schools, state schools with a high proportion of FSM-eligible pupils and low-value-added state schools respectively.

Again, the picture is relatively unchanged when we account for Key Stage 5 attainment (although measures of this, as well as many of those at Key Stage 4, are significantly associated with the likelihood of dropout, degree completion and degree class). The picture also changes relatively little when we additionally account for the type of university attended and subject studied (or when we restrict attention to pupils attending high-status universities only).

The remaining differences are largest between state and private school students, although the differences between selective and non-selective state school students, and students from high- and low-value-added state schools, are not too far behind. For example, when comparing pupils with the same background characteristics and prior attainment, studying at the same universities in the same subjects, those from selective independent schools are 2.6 percentage points more likely to drop out, 6.4 percentage points less likely to complete their degree and 10.3 percentage points less likely to graduate with a first or a 2:1 than pupils from non-selective community schools.

While we cannot use these results to conclude that these school characteristics are having a significant *causal* effect on university outcomes, one conclusion that could be drawn from our results is that, amongst students with a given set of characteristics and measures of prior attainment, those from non-selective or low-value-added state schools have higher 'potential' than those from selective or high-value-added state schools. This may, in turn, suggest that university entry requirements could be lowered for pupils from non-selective or low-value-added state schools in order to equalise the potential of all students being admitted to university.

Some universities have already started giving state school students lower entry offers than private school students for exactly this reason (using 'contextualised' admissions policies). In spite of this, however, there are still very large differences in degree performance between these two groups, suggesting that more could be done. Our results also suggest that students from selective state schools should be excluded from receiving these lower offers; and that universities may wish to take into account a measure of school value added or school performance as well when making their admissions offers.

1. Introduction

Motivation

Education is an important driver of intergenerational mobility: that is, it is one of the key routes through which the socio-economic circumstances in which individuals are raised affect their own socio-economic circumstances in adulthood. This arises because there are substantial returns to higher educational qualifications, but very large differences in the likelihood of acquiring those qualifications according to the socio-economic circumstances in which individuals were raised.

For example, there are substantial differences in the proportion of individuals from different backgrounds who acquire a university degree: Blanden and Macmillan (2014) show that, amongst a sample of individuals graduating from university in the late 1990s, 46% of those from the fifth of families with the highest incomes have completed a degree by age 23, compared with just 9% of those from the fifth of families with the lowest incomes. These gaps could be driven by the fact that young people from disadvantaged backgrounds are less likely to go to university in the first place, but could be exacerbated if these people are also more likely to drop out once they are there.

Previous research has suggested that socio-economic gradients exist in both university entry and dropout. For example, Chowdry et al. (2013) show that males (females) from the bottom fifth of an index of socio-economic status are 40.1 (44.2) percentage points less likely to go to university than males (females) from the top fifth of the index. Similarly, Vignoles and Powdthavee (2009) look at 18-year-old university entrants and show that a student from a professional background is 1.3 percentage points less likely to drop out after their first year than a student from a managerial background, even after accounting for a variety of other individual and area-level characteristics.

We also know that the returns to holding a degree vary by the type of institution attended (e.g. Chevalier and Conlon, 2003; Hussain et al., 2009) and degree class obtained (e.g. Bratti et al., 2008; Feng and Graetz, 2013), and there are large differences in these outcomes according to family background as well. For example, Chowdry et al. (2013) show that, amongst those who go to university, males (females) from the bottom fifth of their socio-economic index are 31.2 (31.9) percentage points less likely to attend a high-status institution than males (females) from the top fifth of their index. Similarly, Smith and Naylor (2001a) and McNabb et al. (2002) both find strong evidence that students whose parents are from a higher occupational class are more likely to be awarded a higher degree class.

Previous research (e.g. Smith and Naylor, 2001a; Gayle et al., 2002; McNabb et al., 2002; Galindo-Rueda et al., 2004; Chowdry et al., 2013) has shown that prior attainment – particularly at Key Stage 4 and Key Stage 5 – plays a key role in helping to explain why some young people are more likely to go to university than others (and why some

perform better than others once they are there). This suggests that what happens earlier in an individual's life – particularly during secondary school – is likely to be a crucial determinant of their subsequent educational choices and progress. What is less clear from the existing evidence, however, is what role schools might play in helping to explain these gaps.

There are at least two routes through which schools might affect them:

1. One of a school's key aims (on which it is assessed by the government) is to maximise the attainment of its pupils, by directing them towards subjects and qualifications that are highly valued by universities and/or the labour market and by helping them to obtain the best possible grades in those qualifications. We can think of this as an *indirect* way through which schools might affect the post-compulsory education choices and attainments of their pupils.
2. The introduction of Key Stage 4 destination measures into school league tables in England and the recent publication of destinations information beyond Key Stage 5¹ mean that schools are increasingly being held to account not only for the educational attainment of their pupils while they are in school, but also for their subsequent choices and outcomes. While prior attainment is a (perhaps the) key determinant of higher education (HE) participation and attainment, there are many other factors that could influence these outcomes, over which schools have at least some degree of control. For example, the provision of effective advice and guidance may encourage pupils to choose good GCSE and A-level subjects and qualifications and to apply to the top universities, while helping them with their university applications might increase the probability that pupils will be accepted at such institutions.

Similarly, it is possible that schools might be able to improve the non-cognitive skills of their pupils, which may increase their chances of applying to university and/or boost their performance once they are there. For example, Anders and Micklewright (2013) provide suggestive evidence that secondary schools may have a role to play in raising young people's HE expectations; they may also encourage pupils to think critically and work independently. We can think of these as *direct* routes (i.e. routes other than via attainment) through which schools might affect the post-compulsory education choices and attainments of their pupils.

Whilst ensuring that young people from all schools achieve to the best of their ability is, of course, vital to increasing university participation and maximising performance once there, the influences in (2) above may be of particular interest to policymakers aiming to narrow differences in HE participation and outcomes, for two reasons:

¹ See, for example, <https://www.gov.uk/government/publications/destinations-of-key-stage-4-and-key-stage-5-pupils-academic-year-2009-to-2010>.

1. If pupils with a given set of grades are, on average, less likely to go on to (a high-status) university if they come from schools with particular characteristics or intakes, then this might indicate a potentially fruitful group upon whom universities (or other organisations) could target outreach efforts.
2. If pupils from schools with particular characteristics or intakes on average outperform those from elsewhere once they are at university, even after accounting for their personal characteristics, qualifications, subjects and grades on entry, then this might provide an indication of the types of characteristics that universities may want to consider taking into account when making offers to prospective students.

It is unfortunately not possible for us to observe the quality of advice and guidance on offer, or the non-cognitive skills of pupils when entering and leaving a particular school; however, if we were to find a significant relationship between a particular school or a particular school characteristic and subsequent university participation or outcomes, even after controlling for individual characteristics and prior attainment, then this might indicate that schools were having a direct effect on their pupils' subsequent education choices and outcomes.

Understanding the role that individual schools play in helping their pupils to progress to and do well at university is potentially very useful for the school in question or when seeking to identify particular institutions in which to undertake further research to understand the drivers of these effects. However, it is less useful for universities – which tend to recruit nationally or internationally – interested in identifying groups of pupils or schools who might benefit from additional outreach efforts or contextual admissions offers (see below).

We therefore focus on identifying the relationships between university participation and outcomes and four specific secondary school characteristics:

- school type and selectivity;
- whether the school has an attached sixth form;
- the proportion of pupils in the school who are eligible for free school meals;
- the average value added by the school between Key Stage 2 and Key Stage 4.

We also report differences according to the proportion of pupils in the school who obtain at least five GCSEs at grades A*–C in Appendix 2.

Our contribution

We are not the first researchers to document and explore the links between school characteristics and HE participation and outcomes; however, there are a number of ways in which our work builds on the existing evidence.

First, we will focus on more recent cohorts of pupils. There are a number of reasons why the influence of schools on HE participation and outcomes may have changed over time: for example, there has been a much greater emphasis in recent years on the importance of ‘widening participation’ in higher education: that is, increasing the HE participation rates – particularly at high-status institutions – of young people from disadvantaged backgrounds. There has also been increasing discussion of the use of ‘contextual admissions’ policies: that is, reducing the entry requirements for students from disadvantaged backgrounds with ‘high potential’. If these policies were (successfully) targeted on the school characteristics previously found to indicate lower-than-expected participation in HE or higher-than-expected attainment once there, then the relationships between school characteristics and HE participation and outcomes that were documented in earlier cohorts could, in principle, have narrowed.²

Second, while most previous research on this topic (e.g. Smith and Naylor, 2001a, 2001b; McNabb et al., 2002; HEFCE, 2003, 2005, 2013, 2014; BIS, 2009, 2013; Sutton Trust, 2011) – and the school-level information on the university participation rates of former pupils recently published by the Department for Education – focuses on the school attended at age 18, given the apparently pivotal role played by attainment at Key Stage 4 in determining whether and where pupils go to university (e.g. Crawford, 2014), this report focuses on the schools attended by pupils at age 16.³ This enables us to explore the potentially key role that schools may play in encouraging their pupils to stay in education beyond age 16, which we know to be the first step towards university entry (and subsequent attainment).

Third, because we have access to rich individual-level linked administrative data – which allow us to follow the population of pupils taking their GCSEs in England between 2001–02 and 2007–08 through to participation at any UK university – we are able to explore in more detail than has hitherto been possible what is driving the raw differences in HE participation and outcomes that we observe. In particular, we consider the extent to which these differences are associated with:

- the selection of different types of pupils into schools (on the basis of individual and family background characteristics and Key Stage 2 scores);

² HEFCE (2014) also focuses on a more recent cohort – those starting university in 2007–08 – but focuses primarily on the influence of school type and investigates the factors driving degree performance only.

³ The potential importance of secondary schools in shaping HE decisions has also been highlighted by others, e.g. Sir Martin Harris, Director of Fair Access, in a report on widening access to selective institutions written in 2010: <http://www.offa.org.uk/wp-content/uploads/2010/05/Sir-Martin-Harris-Fair-Access-report-web-version.pdf>. HEFCE (2014) also investigates the role of secondary school attended at age 16, although it focuses on the effect of changes in school type attended between age 16 and age 18 on degree class only.

- the extent to which pupils from certain types of schools obtain good grades in ‘facilitating’ subjects in highly regarded qualifications at Key Stage 4;⁴
- whether schools encourage their pupils to stay on for Key Stage 5 (and perform well);
- (for university outcomes) whether schools encourage their pupils to go to particular types of universities or study particular subjects.

If the addition of controls for attainment at Key Stage 4 and Key Stage 5 reduces the relationship between HE participation and outcomes and our school characteristics of interest, this may indicate that schools are having an ‘indirect’ effect on these outcomes, while any differences that remain after including such controls may indicate that schools are having a ‘direct’ effect on these outcomes. Of course, in both cases, it is possible that there may be fixed unobservable characteristics – such as the motivation of pupils and their parents – that are likely to affect the selection of pupils into particular schools, their performance while they are there and their subsequent university decisions and attainment. For this reason, we do not regard our results as *causal estimates* of the impact of particular school characteristics on university participation and outcomes, but rather as indications of relationships that might be useful in motivating the allocation of scarce university resources towards pupils with the greatest potential.

It is also worth noting that we do not account for other (observable) school characteristics in our analysis. Our interest is in understanding whether pupils attending schools with particular characteristics are less likely to attend university (or do better once they are there) than similarly-qualified pupils from other schools, in order to identify characteristics that universities or policymakers may wish to target for outreach or contextualised admissions purposes. In this context, it seems more appropriate to capture the whole effect of a particular school characteristic on HE participation and outcomes, rather than the partial effect conditional on other school characteristics.

There are also a number of more specific ways in which we add to the previous research on each of the school characteristics we consider. In what follows, we summarise the existing evidence on each characteristic and highlight the ways in which our work adds to this body of knowledge.

School type and selectivity

Differences in HE participation and outcomes by school type – especially the distinction between pupils who attend state schools and those who attend private schools – have received the most attention to date. For example, in terms of participation overall and at high-status institutions, BIS (2009, 2013) and Sutton Trust (2011) show that a

⁴ Facilitating subjects are those that enable pupils to access a wide range of courses at A level and university. They typically include English, maths, science, languages and humanities.

substantially higher proportion of pupils from grammar schools (selective state schools) and independent schools went to university (including to high-status institutions, variously defined) than of pupils from other types of state schools. Interestingly, however, while grammar schools were more successful than independent schools at getting their pupils into any type of university, independent schools outperformed grammar schools in terms of participation at selective institutions. BIS (2009), using school-level data, also shows that these patterns continue to hold once account is taken of the average A-level performance of students attending different schools, although less work has been done to explore these relationships – and the factors that drive them – at the individual level, which we will address.⁵

In terms of dropout, HEFCE (2013) finds that, amongst full-time first-degree entrants, state school students are twice as likely to drop out between years 1 and 2 as independent school students (7.4% vs. 3.7% in 2010–11), but that this difference can be explained by the other characteristics of these students (specifically, age at entry, entry qualifications and subject studied). Smith and Naylor (2001b) and Johnes and McNabb (2004) go further, finding that, after accounting for a range of other individual and family background characteristics, plus institution and subject controls, students from independent schools are actually significantly *more* likely to drop out of university (less likely to complete their degree) than those from state schools.

The finding that students from independent schools tend to perform worse at university, on average, than equivalently-qualified state school students has been confirmed in other research focusing on degree class. For example, Smith and Naylor (2001a), McNabb et al. (2002) and HEFCE (2003, 2005, 2014) find that, when comparing individuals from state and private schools with the same A-level grades (and, in the case of Smith and Naylor (2001a) and McNabb et al. (2002), a set of other characteristics), those from private schools are less likely to graduate with a first or a 2:1, on average, than equivalent state school pupils with the same prior attainment.

Less attention has been paid in this literature to potential differences within the state and private sector, however, such as whether the school is selective. Research focusing on students at the University of Bristol (Hoare and Johnston, 2011) and the University of Oxford (Ogg et al., 2009) finds that, at these highly selective institutions where students are likely to have relatively homogeneous A-level grades, those from selective state schools tend to outperform those from independent schools. Findings regarding the differential performance of students from selective and non-selective state schools are rather less clear, however: the results of Hoare and Johnston (2011) would seem to suggest that those from selective state schools outperform those from non-selective state schools, while Ogg et al. (2009) report no significant differences. HEFCE (2014) also

⁵ One recent exception is Anders (2012), who obtains similar results using the secondary school attended at age 14 – although this was not the primary focus of his research.

investigates this issue, but is unable to separate selective and non-selective independent schools due to small sample sizes (it only considers one university entry cohort, while we consider several); it also includes school type and selectivity separately when using multivariate regression analysis, while we focus on the interaction between the two and do not include other school characteristics (such as school performance) in our model at the same time.

In addition, we explore differences between selective and non-selective independent schools, selective and non-selective community and other maintained schools (including voluntary controlled, voluntary aided and foundation schools), and academies. This will enable us to shed more light on the issue of whether school type matters beyond the simple state-independent dichotomy; the distinction between different state schools with different degrees of autonomy may be of particular interest given the government's recent extension of the academies programme.⁶

Sixth form

Studies focusing on differences in university participation according to the type of school attended at age 18 tend to use state schools with attached sixth forms as their base (e.g. BIS, 2009; Sutton Trust, 2011). Because of our focus on school attended at age 16, however, we examine the differences in HE participation rates and subsequent university outcomes between pupils attending secondary schools that do and do not cater for pupils beyond the end of compulsory schooling (regardless of whether they are part of the state or independent sector).

Previous research has suggested that attending a school with an attached sixth form is positively correlated with both the likelihood of staying on at 16 (e.g. Foskett et al., 2004) and the quality of post-16 provision experienced (e.g. Meschi et al., 2010). Given that it is very rare for students to enter university without having stayed in education at age 16 (at least not when considering university entry at age 18 or 19) – and that HE participation rates tend to be higher amongst students from schools with sixth forms than those from further education colleges (e.g. BIS, 2009; Sutton Trust, 2011) – we might expect there to be some relationship between attending a secondary school with an attached sixth form and the probability of going to university.

Anders (2012) finds evidence of such a relationship amongst a sample of pupils in England when using secondary school attended at age 14 – although not when focusing on participation at a Russell Group institution. We add to the sparse literature in this area by documenting and exploring what drives the differences in HE participation rates and

⁶ Because of the age of the cohorts considered in this report, academies are 'old-style' – previously underperforming schools that were converted – rather than 'new-style' academies (introduced in 2010).

degree outcomes between pupils who, at age 16, attended a secondary school with or without an attached sixth form.

Average value added

Some work has been done to investigate the link between school performance and HE participation and degree outcomes. For example, BIS (2009) and Sutton Trust (2011) both show that, overall and within school type, pupils attending higher-performing schools (defined using average A-level and equivalent scores per pupil) are substantially more likely to be accepted to study at university than those attending lower-performing schools. For example, Sutton Trust (2011) shows that 52.2% of pupils from the lowest-performing fifth of schools are accepted to study at university compared with 81.9% of pupils from the highest-performing fifth of schools. These differences are even larger when looking at acceptance to study at a group of 30 highly-selective universities: just 4.9% of pupils from the lowest-performing schools are accepted to study at these institutions, compared with 51.9% of those from the highest-performing schools.

HEFCE (2003, 2005, 2014) investigates the link between school performance and degree class and shows that pupils from lower-performing schools tend to outperform those from higher-performing schools with the same A-level grades. These differences are smaller than those for school type and become statistically insignificant when controlled for linearly in a multivariate regression alongside other school characteristics. Hoare and Johnston (2011) also find evidence of a negative (but insignificant) relationship between school performance prior to university entry and degree class.

School performance is highly correlated with the characteristics of students who attend that school, however. Measures of school value added correct for this to some extent: they take the attainment of pupils on entry to the school as a starting point and assess by how much their performance increases relative to expectation (estimated using the performance of the median school). It is therefore perfectly possible for a school to add a lot of value but still not do very well in terms of overall performance (e.g. if it has a very low-attaining intake who subsequently perform at around the average) or vice versa; for example, in our data the correlation between school value added from Key Stage 2 to Key Stage 4 and school performance is only 0.1.

One could imagine that schools that add a lot of value in terms of Key Stage test scores might also be more likely to encourage their pupils to apply to university (including to high-status institutions) and to provide them with the skills necessary to perform better once they are there. To our knowledge, however, there has been no work investigating the link between school value added and HE participation decisions or degree outcomes; our work seeks to fill this gap.

Percentage eligible for free school meals

While one can think of a variety of reasons why the characteristics of the secondary school attended might affect the qualifications achieved while there and/or the likelihood of subsequently progressing to further or higher education, one feature that has achieved relatively little attention to date is the composition of students attending a school. One could, in principle, think of this as a peer-group effect: to what extent does your own propensity to attend (a high-status) university depend upon the characteristics of your schoolmates?

One commonly-used measure of socio-economic status – which is available for all pupils in state schools in England via administrative data – is eligibility for free school meals (FSMs).⁷ Previous research has suggested that those attending schools with a higher proportion of pupils eligible for free school meals tend to perform worse in their exams at the end of Key Stage 4 (GCSEs and equivalents), on average, than those attending schools with a lower proportion of pupils eligible for free school meals (e.g. Noden and West, 2009). Noden and West (2009) find that this relationship is stronger for pupils who are not eligible for free school meals and that the average performance of FSM-eligible pupils is actually slightly higher at schools with the highest proportions of pupils eligible for free school meals than at schools with slightly lower (but not the lowest) proportions of pupils eligible for free school meals.

Noden and West (2009) show that this relationship is reduced, but not eliminated, after accounting for the other ways in which pupils from these schools differ from one another (such as ethnicity). Meschi et al. (2010) find a similar result when examining the link between an individual's likelihood of staying on for post-compulsory education and the proportion of pupils in their school who were eligible for free school meals: pupils attending schools with higher proportions of FSM-eligible pupils are less likely to stay on for post-compulsory education and more likely to attend a further education college as opposed to any other type of provision if they do so. As discussed above in the context of schools with attached sixth forms, both findings provide plausible explanations for why there might be a link between an individual's likelihood of going to university and the proportion of pupils in their secondary school who were eligible for free school meals. Our work will add to the existing evidence in this area by exploring these relationships.

Research questions

The research questions this report will address are thus as follows:

⁷ Pupils are *entitled* to free school meals if their parents are claiming out-of-work benefits, or they are on child tax credit with a gross annual family income of no more than £16,190 (see <https://www.gov.uk/apply-free-school-meals>). They are *eligible* for free school meals if they are both entitled and registered as such with their local authority.

- Are pupils who attend certain types of secondary schools more likely to go to (a high-status) university and do well once they are there?
- To what extent can these differences be explained by:
 - the fact that different types of pupils attend different types of schools?
 - the fact that pupils from some types of schools are more likely to acquire good grades in highly-regarded qualifications and subjects at the end of compulsory schooling?
 - the fact that pupils from some types of schools are more likely to stay on for post-compulsory education and do well once they are there?
 - (in the case of university outcomes) the fact that pupils from some schools are more likely to go to institutions or study subjects that have better or worse outcomes than others?
- To what extent are there differences that we cannot explain using the characteristics at our disposal? Such remaining unexplained differences might be indicative of a 'direct' effect of secondary school attended on HE participation and outcomes (although we are careful not to ascribed causality to the relationships that we see).

This report now proceeds as follows: Chapter 2 discusses the data and methods that we use; Chapter 3 documents the differences in HE participation overall and at high-status institutions by school characteristics and explores what drives these differences; Chapter 4 repeats the same analysis for differences in dropout, degree completion and degree class amongst university participants; Chapter 5 concludes.

2. Data and methods

Data

We use linked individual-level administrative data from schools, colleges and universities: specifically, from the National Pupil Database (NPD), the Individual Learner Records (ILR) and National Information System for Vocational Qualifications (NISVQ) databases, and the Higher Education Statistics Agency (HESA). The NPD comprises an annual census of pupils attending state schools in England, together with the results of national achievement tests for all pupils in England who sat them (including both state and private school students). The ILR and NISVQ data together provide an annual census of those attending further education colleges and those studying for qualifications outside the compulsory education system in England, including details of the qualifications achieved. The HESA data provide an annual census of all students attending higher education institutions throughout the UK. Together, these data sets enable us to follow pupils in England through the education system, from age 11, through secondary school and further education, and on to potential higher education (HE) participation anywhere in the UK at age 18 (when first eligible) or age 19 (after a single gap year).

The data at our disposal provide us with a census of pupils taking (or eligible to take) GCSEs in England between 2001–02 and 2007–08, totalling over half a million pupils per cohort. Table 1 outlines the expected progression of our cohorts through the education system.

Table 1: Expected progression of our cohorts through the education system

Outcome	Cohort 1	Cohort 2	Cohort 3	Cohort 4	Cohort 5	Cohort 6	Cohort 7
Born	1985–86	1986–87	1987–88	1988–89	1989–90	1990–91	1991–92
Sat Key Stage 2 (KS2) (age 11)	1996–97	1997–98	1998–99	1999–2000	2000–01	2001–02	2002–03
Sat GCSEs / KS4 (age 16)	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08
Sat A levels / KS5 (age 18)	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10
HE participation (age 18)	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
HE participation (age 19)	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12

The combined data set includes public examination results (GCSEs, A levels and equivalent vocational qualifications) at ages 16 and 18 for all pupils who sat them, as well as an identifier for the school in which they did so (which we use to define our school characteristics of interest). For pupils in state schools, it also includes a variety of background characteristics – such as gender, date of birth, ethnicity, special educational needs (SEN) status, eligibility for free school meals (FSMs), whether English is an additional language (EAL) and the pupil’s home postcode – plus national achievement test scores taken at the end of primary school (at age 11). For those educated outside the state system (including those at private school), we have only limited background information, including gender and date of birth (plus fixed background characteristics). We are also able to observe other fixed characteristics (such as ethnicity) and Key Stage 2 scores for those in private secondary schools who attended a state primary school.

Outcomes

HE participation

This outcome is defined across the cohort as a whole. Higher education participation is defined as enrolling on any course in a UK higher education institution included in the HESA data at age 18 or 19.⁸ Amongst our sample, 34.7% of pupils participate in HE at age 18 or 19.

We follow our previous work on this topic (e.g. Chowdry et al., 2013) in defining ‘high-status’ institutions as all members of the Russell Group plus all UK universities with an average institution-level score from the 2001 Research Assessment Exercise (RAE) – a measure of research quality – exceeding the lowest found among the Russell Group; see Appendix 1 for details. This gives a total of 41 ‘high-status’ universities. We define an individual as attending a ‘high-status’ institution if they attend one of these institutions in the first year in which they go to university. Using this definition, 34.7% of HE participants attend a ‘high-status’ university, equating to 12.0% of the sample as a whole (including both participants and non-participants).

We recognise that such definitions of institution status are, by their very nature, contentious and somewhat arbitrary. However, obtaining a degree from a Russell Group institution and attending a university that scored highly in the RAE are both associated with higher wage returns (e.g. Chevalier and Conlon, 2003; Hussain et al., 2009). We would thus argue that our indicator of status is an important proxy for the nature of higher

⁸ We do not put any restrictions on the qualifications for which individuals are studying, nor on whether they are studying full- or part-time. The vast majority of those participating (85%) are studying full-time for a first degree, and the results discussed in this report do not materially change if we restrict attention to these individuals only.

education being accessed, which in turn will have long-run economic implications for the individuals concerned.

University outcomes

By definition, these outcomes only apply to those who go to university. There are some further sample restrictions for the course completion and degree class outcomes (see below for details).

- **Course completion:** This variable is equal to 1 if the individual in question went to university full-time to study for a non-medical first degree and was recorded as completing their course within five academic years of entry, and it is 0 if they went to university full-time to study for a non-medical first degree but were not recorded as completing their course within this period.⁹

We regard individuals as having completed their course if: (a) at least one of their HESA records over the relevant period includes a code indicating that the reason they left the institution in question is that they successfully completed their course; (b) even if this code is missing, degree class is non-missing in at least one record over this period. In both cases, we require students to have been at university for at least as long as their course was supposed to last in order to class them as a successful completer.

Using this definition, 78.2% of those who go to university at age 18 or 19 successfully complete their course within five years. This figure is similar to those produced (using a different method) by HESA: for example, it predicts that, amongst the cohort of students starting a first degree full-time in 2010–11, 80.5% will have completed their degree within 15 years.¹⁰

- **Dropout:** This variable is equal to 1 if the individual in question went to university but dropped out of HE completely within two years of initial entry, and it is 0 if they went to university but did not drop out within this period.

In line with our other work on degree outcomes (Crawford, 2014), we make use of the panel element of the HESA data in order to define dropout (rather than relying on codes reported within a particular year's HESA data). This enables us to focus on dropout from HE entirely, rather than from a particular institution. With this in mind, individuals are classified as having dropped out if they appear in one year of the HESA data and not in the next (without having completed their course using

⁹ We consider course completion up to five years after entry to allow sufficient time for individuals studying full-time on longer courses to graduate. We exclude medical students, as they do not typically receive a degree class; hence we do not want to include them in our degree class sample. It is worth noting, however, that lifting this restriction would not materially change our results in terms of either outcome.

¹⁰ Source: Table T5_1112 at http://www.hesa.ac.uk/index.php?option=com_content&task=view&id=2064&Itemid=141.

our definition). To minimise potential measurement error (arising because successful completion of a course is not always perfectly observed), we restrict attention to dropout within the first three years of appearing in the HESA data (i.e. between years 1 and 2 or 2 and 3 of an individual's time at university).

Using this definition, 11.5% of those who go to university at age 18 or 19 have dropped out by the time of the HESA census in their third year. This figure falls slightly (to 9.7%) if we focus on those who were studying full-time for first degrees. HESA only produces estimates of dropout between years 1 and 2 for full-time first-degree entrants: amongst those who started their degree in 2010–11, it estimates that 6.3% of young entrants left HE entirely between years 1 and 2;¹¹ the equivalent figure for our sample is 4.2%, suggesting that, if anything, we may be underestimating the proportion of the cohort who drop out.

The proportion who go to university at age 18 or 19 but drop out within two years is lower than the proportion who do not complete their degree within five years. The difference between the two includes individuals who drop out after Year 3 and individuals who fail their course.

- **First or 2:1:** This variable is equal to 1 if the individual in question went to university full-time to study for a non-medical first degree, successfully completed their degree within five years of entry and graduated with a first or a 2:1 as their degree class, and it is 0 if they went to university full-time to study for a non-medical degree and successfully completed it within five years of entry but did not graduate with a first or a 2:1 as their degree class. We take degree classifications from the first HESA record in which such information appears (after the individual has completed their degree). On our definition, 64.6% of those studying full-time for a first degree in a non-medical subject who complete their course within five years graduate with a first or a 2:1. This is very similar to the estimates produced by HESA, which show that amongst those who graduated with a classified degree in 2010–11 having studied full-time, 66% acquired a first or a 2:1.¹²

Table 2 summarises the cohorts for which we observe each outcome, as well as the population over which they are defined and the proportion for which the outcome is equal to 1.

¹¹ Source: Table T3a_1112 at http://www.hesa.ac.uk/index.php?option=com_content&task=view&id=2064&Itemid=141.

¹² Source: http://www.hesa.ac.uk/index.php?option=com_content&task=view&id=2355&Itemid=161.

Table 2: Summary of outcomes

	Participation at age 18 or 19	Participation at a high-status institution in first year	Drop out within two years	Course completion within five years	First or 2:1
Cohorts for which outcome is observed (dates refer to years in which GCSEs were taken)	1–7 (2001–02 to 2007–08)	1–7 (2001–02 to 2007–08)	1–5 (2001–02 to 2005–06)	1–3 (2001–02 to 2003–04)	1–3 (2001–02 to 2003–04)
Outcome = 1	34.7% (of cohort)	12.0% (of cohort) 34.7% (of participants)	11.5% (of participants)	78.2% (of participants studying for first degrees in non-medical subjects)	64.6% (of first-degree completers in non-medical subjects)
Observations	4,363,600	4,363,600	1,029,355	494,836	386,738

School characteristics

We focus on four different school characteristics, all defined on the basis of the school in which the pupil sat their Key Stage 4 qualifications.

- School type and selectivity:** This identifies selective and non-selective independent schools and three types of selective and non-selective state schools – specifically, community schools, academies (which are never selective) and other types of state school (including voluntary aided, voluntary controlled, foundation and community technology colleges) – giving a total of seven groups of interest.¹³ We do not have access to information on school selectivity beyond 2006, so we focus on cohorts in Year 11 (or taking their GCSEs) between 2001–02 and 2005–06. This means that the academies are ‘old-style’ academies – previously underperforming schools that were converted – rather than the ‘new-style’

¹³ We are also able to separately identify special schools. We include this group in our modelling, but do not report the coefficient estimates in the report. Results are available from the author on request.

academies introduced in 2010. It also means that some pupils may not have spent very long in the school while it was an academy; thus the results for this group in particular should be viewed with some caution.

Table 3: Summary statistics by school type and selectivity

	Non-selective community schools	Selective community schools	Non-selective other maintained schools	Selective other maintained schools	Non-selective independent schools	Selective independent schools	Academies
% of pupils in our sample attending ¹⁴	58.5	0.9	29.3	2.7	1.1	5.9	0.3
% with sixth form	49.0	100	68.8	100	57.2	88.8	82.7
% achieving at least 5 A*-C GCSEs	47.8	97.4	57.7	97.9	58.1	84.9	39.2
% absence	9.1	4.7	8.2	4.8	6.7	4.4	9.9
% SEN	19.8	2.6	15.9	2.8	21.5	11.4	29.5
% FSM	18.3	2.5	13.4	2.2	.	.	38.3
Mean KS2-KS4 value added	987.0	1013.6	995.3	1015.9	988.2	1030.1	988.8
% single sex	7.2	77.5	14.8	73.5	31.9	50.5	0
Average no. of pupils	1025	955	1046	921	221	555	984
Pupil-teacher ratio	16.8	16.8	16.9	16.7	10.1	9.7	15.8
Average fees per term in 2007-08	N/A	N/A	N/A	N/A	£2918	£3585	N/A
No. of school-year observations	13107	269	7162	879	1543	2705	168

¹⁴ The remaining 1.4% of pupils attend special schools.

The terms 'selective' and 'non-selective' are the definitions applied to schools in the annual school census, and refer to whether the school selects its pupils on the basis of academic ability. There will be a small number of pupils in non-selective schools who applied to attend a selective school but were unsuccessful (because there are only a limited number of places at such schools); these pupils could, in principle, be regarded as 'selected out' on the basis of ability, but this is likely to be a very small proportion of all pupils attending non-selective schools. It is also worth noting, of course, that although a sizeable number of independent schools are classified as non-selective on the basis of academic ability, they are still likely to be highly selective in terms of socio-economic background.

Table 3 provides some descriptive statistics for these different types of schools. It shows that all types of selective schools have higher average performance and higher mean value added than all types of non-selective schools; they also have, on average, a lower proportion of pupils eligible for free school meals and with special educational needs. Selective schools are also much more likely to have an attached sixth form – with all selective state schools catering for pupils aged 16–18 – and to be a single-sex school. As might be expected, independent schools tend to have lower pupil–teacher ratios than state schools, and are also smaller, on average. There are some interesting and perhaps unexpected differences: for example, the percentage of pupils achieving at least five A*–C grades in their GCSEs is lower at selective independent schools than at selective state schools; academies also have lower pupil–teacher ratios, on average, than other state schools. It is interesting to note that non-selective independent schools charge lower fees, on average, than selective independent schools.

- **Whether the school has a sixth form:** This is defined on the basis of the age range of the school: if it caters for pupils beyond the age of 16, then it is deemed to have an attached sixth form. Less than half of schools have a sixth form on this definition, but because these schools are larger, on average, than schools without a sixth form, almost two-thirds of pupils attend a secondary school with an attached sixth form.

In terms of other characteristics, Table 4 shows that schools with sixth forms tend to be higher performing, on average, than schools without: a higher proportion of pupils achieve at least five A*–C grades at GCSE (58% versus 42%) and their value added is slightly higher on average. The pupils who attend schools with attached sixth forms tend to be less disadvantaged than those who attend schools without: they are less likely to be eligible for free school meals (calculated amongst state schools only) and are more likely to be recorded as having special educational needs; they also have slightly lower absence rates.

Table 4: Summary statistics by whether the school has an attached sixth form

	With attached sixth form	Without attached sixth form	Difference
% of pupils in our sample attending	63.6	36.4	27.2**
% achieving at least 5 A*–C GCSEs	58.4	42.3	16.1**
% absence	8.2	10.0	–1.8**
% SEN	15.2	21.6	–6.4**
% FSM (state schools only)	16.5	23.7	–7.3**
Mean KS2–KS4 value added	1000.7	998.3	2.4**
% single sex	21.0	12.5	8.5**
Average no. of pupils	981	774	207**
Pupil–teacher ratio	14.8	15.9	–1.1**
% independent	22.4	10.2	12.2**
% selective	18.5	2.4	16.1**
No. of school-year observations	20729	18215	

Note: ** indicates significance at the 1% level.

- Percentage of pupils eligible for free school meals:** This is defined only for state schools. We split the state school population into five equally-sized groups (quintile groups) on the basis of the proportion of pupils eligible for FSMs in each year.¹⁵ By construction, around one-fifth of pupils attend schools in each of the five quintile groups. In the first (least deprived) quintile group, an average of 2.9% of pupils are eligible for FSMs in each school, while in the fifth (most deprived) quintile group the average is 40.1%.

Table 5 shows that schools with higher proportions of pupils eligible for free school meals also tend to have higher absence rates and higher proportions of pupils labelled as having special educational needs. Those with lower proportions of pupils eligible for free school meals, on the other hand, are more likely to have a sixth form, to cater for boys or girls only and to select their intake; they also tend to be higher performing – although there is a rather more mixed picture in terms of

¹⁵ We do this in order to avoid the possibility that trends in eligibility for free school meals would bias these definitions. For example, if the proportion of pupils eligible for free school meals was increasing over time and we did not account for this in our definition, then later cohorts of pupils would be over-represented in the quintile groups with the highest proportion of pupils eligible for free school meals, potentially conflating the effects of school-level FSM eligibility and cohort on HE participation decisions and university outcomes.

value added, with schools in the fifth quintile group (with the highest proportions of pupils eligible for FSMs) actually adding more value, on average, than schools in the middle three quintiles.

Table 5: Summary statistics by quintile according to proportion of pupils eligible for free school meals (state schools only)

	Q1: lowest % FSM	Q2	Q3	Q4	Q5: highest % FSM	Difference: Q5–Q1
% FSM	2.9	6.9	11.2	18.8	40.1	37.2**
% with sixth form	77.3	64.2	59.1	54.6	45.1	–32.2**
% achieving at least 5 A*–C GCSEs	73.5	60.9	52.3	40.7	25.2	–48.3**
% absence	7.0	8.2	8.9	9.7	11.3	4.3**
% SEN	10.1	14.8	17.7	21.7	27.8	17.7**
Mean KS2–KS4 value added	1008.1	998.7	994.3	991.1	1000.5	–7.6**
% single sex	25.3	8.0	8.6	8.8	11.0	–14.2**
Average no. of pupils	1105	1089	1054	998	899	–206**
Pupil–teacher ratio	16.8	17.1	17.0	16.7	15.9	–0.9**
% selective	23.4	1.1	0.3	0.1	0	–23.4**
No. of school-year obs.	4727	4275	4526	5412	8676	

Note: ** indicates significance at the 1% level.

- Key Stage 2 to Key Stage 4 value added:** This separates the school population into five equally-sized groups (quintile groups) on the basis of a school’s average value added between Key Stage 2 (KS2) and Key Stage 4 (KS4) in each year.¹⁶ There was no completely consistent measure of KS2 to KS4 value added for all years of interest in the data to which we had access, so we focus on a measure of contextual value added that is available for cohorts who were expected to sit their

¹⁶ We do this for the same reason as for FSM eligibility. See discussion in footnote 15 above.

GCSEs between 2003–04 and 2007–08.¹⁷ Although, in principle, we can observe this measure for independent schools – some of whose pupils will have sat Key Stage 2 in the state sector before moving to a private secondary school – because the value added measure is likely to be based on relatively small numbers of pupils, we do not include private schools in our analysis of the relationship between school value added and HE participation and degree outcomes; however, our results would not be materially different if we did so. By construction, around one-fifth of pupils attend schools in each of the five quintile groups.

Table 6: Summary statistics by quintile according to school Key Stage 2 to Key Stage 4 value added (state schools only)

	Q1: lowest KS2–KS4 value added	Q2	Q3	Q4	Q5: highest KS2–KS4 value added	Difference: Q5–Q1
Mean KS2–KS4 value added	966.1	985.6	996.4	1006.4	1032.3	66.1**
% with sixth form	51.5	56.9	59.9	58.5	52.7	1.2**
% achieving at least 5 A*–C GCSEs	36.9	49.4	56.0	60.3	51.5	14.7**
% absence	10.5	9.2	8.6	8.1	8.8	-1.8**
% SEN	22.2	18.9	17.0	16.7	18.4	-3.8**
% FSM	21.9	16.6	14.8	14.2	21.7	-0.2**
% single sex	6.0	10.1	12.8	15.4	19.4	13.4**
Average no. of pupils	969	1040	1066	1078	1016	47**
Pupil–teacher ratio	16.7	16.6	16.6	16.6	16.3	-0.5**
% selective	0.4	3.2	5.6	5.9	7.4	7.0**
No. of school-year obs.	3537	3330	3299	3335	4326	

Note: ** indicates significance at the 1% level.

¹⁷ We have also run our analysis for the other outcomes on this subset of cohorts and our results are not materially affected.

Table 6 shows that the link between school value added and other school characteristics is much less clear than was the case for the other school characteristics discussed above: in particular, it is far less common that we observe monotonic relationships. For example, there is a non-monotonic relationship between value added and school performance at Key Stage 4, as well as with pupil characteristics in terms of the proportions eligible for free school meals and recorded as having special educational needs. There is also no clear relationship between school value added and the pupil–teacher ratio. Schools with higher value added are, however, more likely to be single sex and selective.

The descriptive statistics presented in this section have shown that there is often a high degree of correlation between the main school characteristics under consideration in this report. This would be extremely problematic if our aim were to identify the *causal effect* of a particular school characteristic on HE participation and attainment; however, as our aim is merely to assess whether and to what extent universities may wish to focus their ‘widening participation’ activities or contextual admissions policies on different types of schools or pupils, we instead estimate correlations between these school characteristics and our outcomes of interest, without worrying about the channels through which these characteristics might be influencing the outcomes in question. We discuss this issue in more detail in the methodology section below.

Other control variables

Demographic and family background characteristics

We observe gender, month of birth and government office region (defined on the basis of the region in which they go to school) for all pupils. We observe ethnicity and language status for the vast majority of state school pupils (over 99%) and a small number of private school pupils (around 17%) who have attended a state school at some point over the period covered by our data.¹⁸ We also observe eligibility for free school meals and stated (more severe) and non-stated (less severe) special educational needs status for pupils in state schools at age 16.¹⁹

¹⁸ Note that the proportion of independent school students for whom we observe ethnicity and language status varies by cohort: we have access to NPD records for a greater number of years for the youngest cohort (2002 to 2008) than for the oldest cohort (2002 to 2004); hence the likelihood of observing ethnicity varies from 34% for the youngest cohort to 4% for the oldest cohort. As these are not the coefficients of primary interest in our analysis, we choose to include this information in our regressions; however, our conclusions would not materially change if we excluded controls for ethnicity entirely from our analysis.

¹⁹ While we could in principle include information about a pupil’s FSM or SEN status for private school students who have attended a state school at some point, we do not do so on the basis that this information could change over time.

To better differentiate pupils at the top and middle of the distribution of socio-economic position, we combine, using principal components analysis, the pupil's eligibility for free school meals (measured at age 16) with a variety of neighbourhood-based measures of socio-economic circumstances (linked in on the basis of home postcode at age 16) and split pupils into five equally-sized groups (quintile groups) on the basis of this index.²⁰ Chowdry et al. (2013) demonstrate the validity of this index as a measure of socio-economic position by comparing it with richer individual measures of socio-economic position from the Longitudinal Study of Young People in England.

Because we only observe FSM eligibility and home postcode for state school students, we must make some assumptions about the socio-economic position of private school students in order to include them in our analysis (which we do when the covariate of interest is school type/selectivity or whether the school has an attached sixth form). Given the high average fees paid to attend private schools (e.g. see Table 3 above), it does not seem unreasonable to assume that private school pupils come from families of higher socio-economic position than most state school pupils. We therefore allocate them to the top quintile group (indicating pupils of the highest socio-economic position); they make up 35% of this quintile group in total.²¹

Prior attainment

We have access to scores from national achievement tests taken by state school pupils at age 11 (Key Stage 2), plus rich measures of attainment for all pupils who sat the relevant qualifications at Key Stages 4 and 5 (GCSEs and A levels and equivalents).

In terms of test scores at Key Stage 2, we use the marks from tests in English, maths and science to calculate continuous Key Stage test levels in each subject; we then split pupils into five equally-sized groups (quintile groups) on the basis of their achievement in each subject and include the top four quintile groups in our model. Because Key Stage 2 tests do not have to be taken in private schools, we observe this information only for the sizeable proportion (nearly 60%) of private secondary school pupils who attended a state primary school.²²

²⁰ Specifically, we use information about each pupil's neighbourhood contained in their 2004 Index of Multiple Deprivation (IMD) score (see <http://www.communities.gov.uk/communities/research/indicesdeprivation/deprivation10/> for more details), the classification of their neighbourhood according to ACORN (see <http://acorn.caci.co.uk/>) and three very local area-based measures from the 2001 Census – the proportion of individuals in each area: (a) who work in higher or lower managerial/professional occupations; (b) whose highest educational qualification is NQF Level 3 or above; and (c) who own (either outright or through a mortgage) their home.

²¹ It is worth noting, however, that the omission of controls for socio-economic position does not materially affect our conclusions regarding the relationship between school characteristics and HE participation and degree outcomes.

²² It is worth noting that we observe Key Stage 2 test scores for a substantially higher proportion of private school pupils than we observe background characteristics is because we can only observe background

We use a rich set of measures to account for differences in subjects, qualifications and grades at Key Stage 4 and Key Stage 5.

At Key Stage 4, we include controls for:

- highest grade in English;
- highest grade in maths;
- number of GCSEs at grade A* in subjects that can be counted as part of the English Baccalaureate (other than English and maths, i.e. science, humanities and languages);
- number of GCSEs at grade A in these ebacc subjects;
- number of GCSEs at grade B in these ebacc subjects;
- number of GCSEs at grade C in these ebacc subjects;
- number of GCSEs at grades D–G in these ebacc subjects;
- number of GCSEs at grade A* in non-ebacc subjects;
- number of GCSEs at grade A in non-ebacc subjects;
- number of GCSEs at grade B in non-ebacc subjects;
- number of GCSEs at grade C in non-ebacc subjects;
- number of GCSEs at grades D–G in non-ebacc subjects;
- number of GNVQs at grade A;
- number of GNVQs at grade B;
- number of GNVQs at grade C;
- number of GNVQs at grades D–G;
- (from the ILR/NISVQ data):
 - whether the pupil achieved a Level 2 qualification by age 18;
 - whether they achieved Level 2 via a non-academic (further education or vocational) route;
 - quintile groups created on the basis of total points from Level 2 academic qualifications.

characteristics from 2001–02 onwards, while we can potentially observe Key Stage 2 test scores for all pupils who sat them.

At Key Stage 5, we include controls for:

- number of A levels at grade A in ‘facilitating’ subjects (including English, maths, science, humanities and languages);²³
- number of A levels at grade B in facilitating subjects;
- number of A levels at grade C in facilitating subjects;
- number of A levels at grade D in facilitating subjects;
- number of A levels at grade E in facilitating subjects;
- quintile groups created on the basis of total points achieved at Key Stage 5;
- (from the ILR/NISVQ data):
 - whether the pupil achieved a Level 3 qualification by age 18;
 - whether they achieved Level 3 via a non-academic (further education or vocational) route;
 - quintile groups created on the basis of total points from Level 3 academic qualifications.

Pupils for whom some or all of this information is missing are still included in our analysis through the use of dummy (binary) variables that indicate missing values.

University and course characteristics

When considering university outcomes (dropout, degree completion and degree class), we additionally account for the type of institution that the young person attends and the subject that they study.²⁴ To do so, we use a set of dummy variables indicating whether or not the young person was studying each of 20 subjects (medicine and dentistry; subjects allied to medicine; biological sciences; veterinary sciences and agriculture; physical sciences; mathematical sciences; computer sciences; engineering; technologies; architecture, building and planning; social studies; law; business and administrative studies; mass communications and documentation; linguistics and classics; European languages and literature; non-European languages and literature; historical and philosophical studies; creative arts and design; education) and another set indicating which of five self-defined institutional groupings they attend (Russell Group, 1994 Group, University Alliance, Million+, Guild HE, or any other institution; see Appendix 1 for details).

²³ See pages 24–25 of <http://russellgroup.org/InformedChoices-latest.pdf>.

²⁴ When looking at dropout, we also account for whether they were studying for a first degree and whether they were studying part-time. These characteristics do not vary when we look at degree completion or degree class as we restrict attention to those studying full-time for first degrees only.

Methods

We are interested in modelling the relationship between school characteristics and HE participation decisions and outcomes, and exploring the extent to which differences in individual characteristics can help to explain the relationships that we observe.

Because all the outcomes we consider are binary (taking value 0 or 1), we use probit regression models to undertake our analysis and present the marginal effects estimated at the average of each characteristic as our results. We start by running a specification that includes only the school characteristic of interest and a set of binary variables indicating the academic cohort in which the young person sat their GCSEs (to account for the fact that there may be trends in the outcomes of interest or the relationship between the school characteristics of interest and these outcomes). This provides a baseline estimate of the relationship between the school characteristic of interest and the outcome of interest (specification 1).

To investigate the potential drivers of this relationship, we adopt a sequential modelling approach, successively adding different groups of characteristics to our baseline model. The extent to which the relationship between our school characteristic of interest and our outcome of interest changes when we include these additional characteristics in our model provides an indication of the likely importance of their role in explaining the baseline relationship that we observe.

We start in specification 2 by adding (largely fixed) individual and family background characteristics (gender, month of birth, ethnicity, language status, region, and, when we focus on state school pupils only, SEN status) as well as a set of measures designed to capture the young person's attainment on entry to secondary school (from English, maths and science tests at Key Stage 2). We do so in order to account for the fact that different types of pupils may attend different types of schools, and we do not want the relationship between our school characteristic of interest and our outcome of interest to be biased by this differential selection. Any difference between the raw estimated relationship and the estimated relationship after accounting for these 'baseline' characteristics provides an indication of the extent to which the selection of different types of pupils into different types of schools might be confounding the raw estimated relationship between our school characteristic and our outcome of interest.

Our third specification adds a detailed set of measures indicating the young person's qualifications, subjects and grades at Key Stage 4 (GCSEs and equivalents). We view the change in the estimated relationship between our school characteristic of interest and our outcome of interest between this specification and the previous one as capturing the extent to which the school (or, more generally, the combination of the school and the pupils who attend that school) can secure better Key Stage 4 attainment. Finally, in specification 4 we add a rich set of measures designed to capture the young person's qualifications, subjects and grades at Key Stage 5. Comparing this specification with the

previous one provides an indication of the extent to which pupils at some schools are more likely to stay on for post-compulsory education and do well.

Just as the final estimated relationship between our school characteristic of interest and our outcome of interest should not be regarded as a causal one, neither should the comparisons between our second and third and third and fourth specifications be interpreted as the causal effect of a particular school characteristic on pupil attainment at Key Stage 4 or Key Stage 5. In each case, the estimated relationships could be capturing the influence of other unobserved pupil or school characteristics that are correlated with both the particular school characteristic of interest and pupils' university participation decisions and/or outcomes; examples of the types of factors that might be relevant here include high-quality teaching or leadership within the school, or underlying pupil ability or motivation. Instead, the relationships should be viewed as indicative of schools (or pupils from particular types of schools) that might warrant further attention in terms of 'widening participation' strategies or the potential use of contextualised admissions policies.

When considering university outcomes (dropout, degree completion and degree class), we include an additional specification in which we control for the type of institution attended and the subject studied. We do so in order to understand the extent to which the channelling of students from particular schools into particular institutions or subjects can help to explain the relationship between our school characteristic of interest and our outcome of interest. This might be particularly relevant if some institutional or subject groupings have systematically better or worse outcomes, on average, than others, as has been suggested in some other studies.²⁵

We run our analysis at the individual level, but account for the fact that the outcomes of pupils at particular institutions will be correlated (because they have been taught by the same teachers, had the same peer groups, and so on) and hence cluster our standard errors. For our analysis of the determinants of participation overall and at high-status universities, our view is that the relevant level at which to cluster is the secondary school attended (not least because this is also the level of our main characteristic of interest). For our analysis of the determinants of dropout, degree completion and degree class, however, our view is that the university is the relevant level at which to cluster. Because of the size of our sample, this makes relatively little difference to the significance or otherwise of our estimates.

²⁵ See, for example, Johnes and Taylor (1989), Smith and Naylor (2001b), McNabb et al. (2002), HEFCE (2013) and <http://www.russellgroup.ac.uk/russell-group-latest-news/154-2013/5483-russell-group-comment-on-hesa-performance-indicators/>. We additionally ran a linear probability model including institution and subject fixed effects instead of this probit model specification, which made very little difference to our overall conclusions.

3. Results: HE participation

This chapter presents our main results in terms of differences in higher education (HE) participation overall and at high-status institutions on the basis of secondary school characteristics. Each section focuses on a different school characteristic: school type and selectivity; whether the school has an attached sixth form; the proportion of pupils in the school who are eligible for free school meals; and school value added. (Results by school performance are included in Appendix 2.) In each case, we document the raw differences in participation in terms of the school characteristic of interest, and explore the extent to which these differences can be explained by the selection of pupils into schools and the ability of different types of schools to achieve good qualifications for their pupils.

Summary of findings

- There are large differences in HE participation rates overall and at high-status institutions according to the school characteristics we consider. The gaps are largest by school selectivity: pupils attending selective state schools are more than 40 percentage points more likely to go to university and more than 30 percentage points more likely to go to a high-status institution than pupils attending non-selective state schools – with school performance, the proportion of pupils eligible for free school meals, school value added and whether the school has an attached sixth form exhibiting progressively smaller differences.
- The fact that different types of pupils attend different types of schools plays an important role in understanding these differences in participation: once we compare pupils with similar background characteristics and Key Stage 2 scores, the raw gaps in HE participation according to secondary school attended are reduced by at least 40% in all cases.
- We can explain most of the remaining gaps in HE participation according to secondary school characteristics by accounting for the qualifications, subjects and grades that pupils achieve at Key Stage 4. Once we compare pupils with the same background characteristics, Key Stage 2 scores and Key Stage 4 attainment, the differences in HE participation fall to less than 4 percentage points in terms of participation overall and to less than 1 percentage point in terms of participation at a high-status institution. The addition of a rich set of controls for attainment at Key Stage 5 adds very little to this picture. This suggests that:
 - Any direct effect that different types of secondary schools may have on their pupils' choices over whether and where to go to university is likely to be very small.
 - Any direct effect that different types of schools may have in terms of encouraging their pupils to stay in education beyond age 16 (or to do well once they are there) does not contribute greatly to the differences in HE participation by school

- Any effect that different types of schools may have on their pupils' HE decisions is likely to come via their effect on Key Stage 4 attainment. That is not to say that the change in the magnitude of the differences in HE participation before and after controlling for Key Stage 4 attainment represents the causal effect of a particular school characteristic on Key Stage 4 attainment, because there could be other unobserved differences between schools (or pupils within those schools) that drive these results. Nonetheless, it suggests that any causal effects of school characteristics on HE participation that may exist are most likely to come via this route.
- Though the addition of controls for Key Stage 5 attainment does not materially affect the relationship between HE participation and our school characteristics of interest, that does not mean that Key Stage 5 attainment does not affect HE participation; on the contrary, almost all of the controls we include in our model are significantly associated with the likelihood of going to (a high-status) university. For example, pupils who score in the top 20% (compared with the bottom 20%) at Key Stage 5 are around 30 percentage points more likely to go to university, and 6–7 percentage points more likely to attend a high-status institution, even conditional on all the other measures of attainment included in our model.
- It is also worth noting that various measures of attainment at Key Stage 4 continue to have a significant effect on HE participation overall and at high-status institutions, even after accounting for a rich set of measures of attainment at Key Stage 5. For example, conditional on all other measures in our model, every additional A* grade in an ebacc subject is associated with around a 2 percentage point increase in the likelihood of going to university and a 0.5–1 percentage point increase in the likelihood of attending a high-status institution. Taken together, these results suggest that the focus of 'widening participation' efforts on the basis of secondary school characteristics should be to ensure that pupils from all schools make the right choices over the subjects and qualifications they take at Key Stage 4, and that they maximise their chances of getting good grades at this level. Interventions targeted at students beyond the end of compulsory education are unlikely to be able to eliminate the differences in HE participation that we observe between pupils from different types of schools.

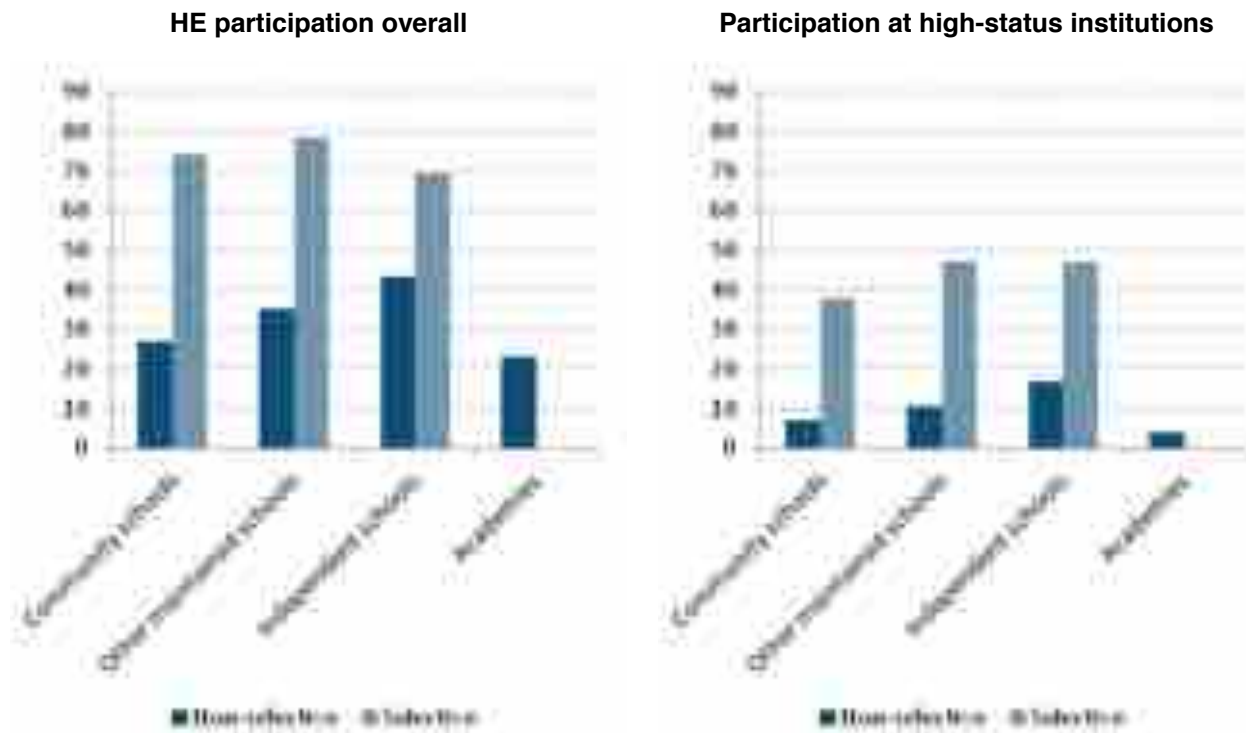
School type and selectivity

Figure 1 presents HE participation rates overall (left-hand panel) and at high-status institutions (right-hand panel) by school type and selectivity.

As might be expected, a far higher proportion of pupils who attend selective schools go on to university at age 18 or 19 than of pupils who attend non-selective schools; the same is also true for participation at high-status universities. For example, around three-

quarters of pupils at selective schools go to university at age 18 or 19, compared with around one-third of pupils at non-selective institutions; similarly, around 45% of pupils at selective schools go on to high-status institutions (nearly two-thirds of those who go to university), while just 8% of those at non-selective schools go on to such universities (less than one-third of those who go at all). This highlights the importance of considering not just differences in participation, but also differences in participation at the types of institutions that tend to secure higher earnings returns, on average, for their graduates.

Figure 1: HE participation at age 18 or 19 by school type and selectivity



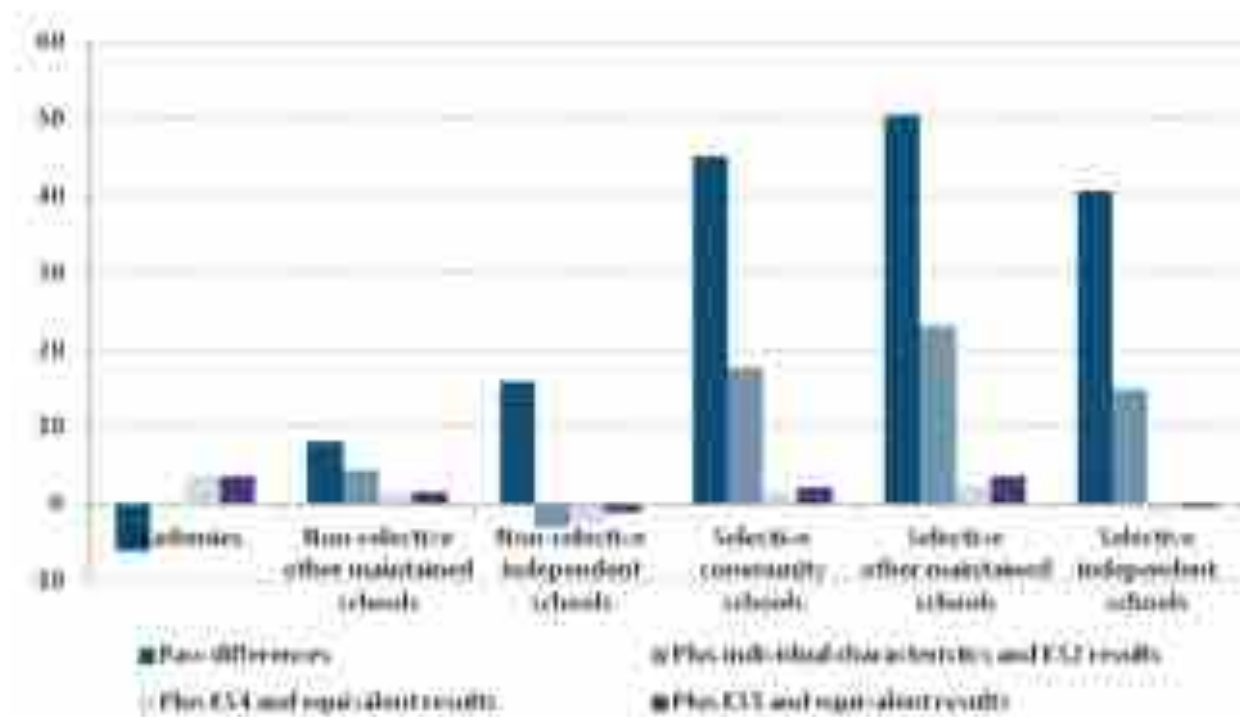
Within this broad picture of differences between selective and non-selective schools, however, there are some interesting differences by school type. For example, while non-selective independent schools send a higher proportion of their pupils to university than non-selective state schools, the reverse is true for selective schools, at least in terms of participation at any university. In terms of participation at high-status institutions, selective independent schools do relatively better, with two-thirds of the pupils they send to university attending a high-status institution, compared with 50–60% of participants from selective state schools. This chimes with the findings of Sutton Trust (2011), which showed that grammar schools (selective state schools) were more successful than independent schools at getting their pupils into university, but that independent schools outperformed grammar schools in terms of participation at highly selective institutions.

Figures 2 and 3 explore what drives these raw differences in participation overall and at high-status institutions respectively. Each set of bars reports the marginal effects from a probit model indicating how much more or less likely pupils from different types of schools are to go to (a high-status) university than pupils from non-selective community schools, with the different colours representing different model specifications. The first set

of bars (dark blue) shows the differences in participation between pupils attending different types of schools, controlling only for cohort.

The second set of bars (mid blue) illustrates the extent to which these raw differences in participation can be explained by the selection of different types of pupils into different types of schools. As shown in Table 3 above, there are substantial differences in the characteristics of the intake at different types of schools – characteristics that we know from previous research to be correlated with university decisions and attainment – suggesting that it will be important to account for these characteristics when analysing the relationship between school type and HE participation and degree outcomes. Specifically, the mid blue bars show the gap in participation that remains after accounting for demographic and family background characteristics (gender, ethnicity, language, month of birth, socio-economic position and region) and Key Stage 2 test scores.

Figure 2: Differences in HE participation at age 18 or 19 by school type and selectivity (relative to non-selective community schools)



In all cases, differences in these factors are able to explain well over half of the raw gap in HE participation, suggesting that a large part of the reason why pupils from certain types of schools are more likely to go to university than others is that they arrive at those schools with characteristics (such as high prior attainment or higher socio-economic status) that are also associated with higher university participation rates. For example, over 99% of pupils at selective community schools achieved at least the expected level (Level 4) in each of their Key Stage 2 tests, while only 72% of pupils at non-selective community schools did so; once we take account of this (and other differences in individual and family background characteristics), the average gap in HE participation

between pupils at selective and non-selective community schools falls from 45 percentage points to 18 percentage points.

The third set of bars (light blue) illustrates the extent to which the differences in HE participation between pupils attending different types of school can be explained by the fact that some schools (or the pupils or families within those schools) are more successful than others at getting their pupils good grades in highly-valued subjects and qualifications. Once we account for a rich set of measures of attainment at Key Stage 4, the magnitudes of the gaps in participation are substantially reduced – to less than 4 percentage points in all cases – and are no longer all significantly different from zero.

These results suggest that a large part of the reason why pupils from some schools are more likely to go to university than others is that they will leave those schools with better grades in more highly-valued qualifications and subjects than pupils from other schools; once we compare pupils from different schools with the same characteristics and qualifications, these differences are substantially reduced – and in some cases have also changed sign. For example, pupils from selective independent schools are, on average, 15 percentage points more likely to go to university than pupils from non-selective community schools, even after accounting for background characteristics and Key Stage 2 test scores. Once we additionally account for a rich set of measures of attainment at Key Stage 4 – such as the fact that 91% of pupils at selective independent schools achieve at least five A*–C grades at GCSE including English and maths while only 39% of pupils at non-selective community schools do so – those from selective independent schools are actually 1 percentage point *less* likely to go to university than those from non-selective community schools.

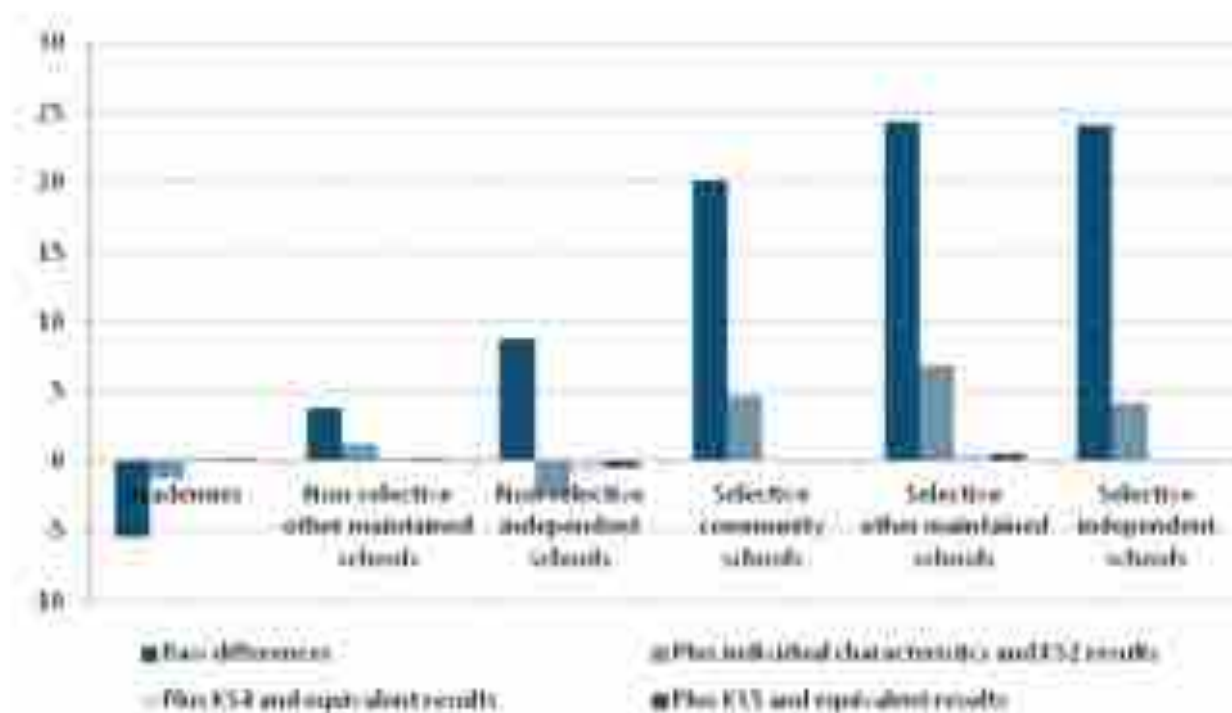
The final set of bars (purple) highlights the average remaining differences in HE participation by school type after additionally accounting for differences in Key Stage 5 results. We can interpret the difference between the gaps controlling for Key Stage 4 and Key Stage 5 results as the additional effect that schools might have in encouraging their pupils to stay in education beyond age 16 or to study particular types of qualifications or subjects. Figure 2 shows that the addition of rich measures of attainment at Key Stage 5 does not materially change the relationship between school type, selectivity and HE participation, suggesting that we are able to explain most of these choices using pupil characteristics and Key Stage 2 and Key Stage 4 test scores, which is perhaps not all that surprising.

Figure 3 presents an equivalent set of results for differences in participation at high-status institutions between pupils attending different types of schools at age 16.

The findings are very similar to those for participation overall, with the characteristics of the school's intake explaining over two-thirds of the difference in participation rates between pupils attending different types of secondary schools – and the vast majority of the remaining differences being explained by the fact that pupils at some schools leave

with better grades in subjects and qualifications that are more attractive to high-status universities.

Figure 3: Differences in participation at high-status institutions at age 18 or 19 by school type and selectivity (relative to non-selective community schools)



Overall, these results suggest that any unobserved differences between schools (or pupils attending those schools) that affect the likelihood of going to university (or attending a high-status institution) other than via a pupil’s attainment – such as the provision of university application assistance, the provision of (or engagement in) a wider range of extracurricular activities or the acquisition of more desirable non-cognitive skills – are likely to be relatively small. That is not to say that the effect of schools on HE participation is negligible; simply that the vast majority of any causal influence they may have appears to be acting via the attainment of more and/or better qualifications at Key Stage 4.

Whether school has a sixth form

This section repeats the above analysis, this time documenting average differences in participation overall and at high-status universities between pupils who, at age 16, attended a (state or private) secondary school with or without an attached sixth form.

Previous evidence (e.g. Foskett et al., 2004) has suggested that attending a school with an attached sixth form positively influences the likelihood that a young person will stay on beyond compulsory education – a first step towards being able to go on to university. Anecdotal evidence also suggests that higher-quality teachers are more likely to apply to schools in which they have the opportunity to teach A-level students, which may also

help to explain why pupils attending secondary schools with attached sixth forms may be more likely to go to university than others.

Figure 4 shows that pupils attending schools with attached sixth forms are 12 percentage points more likely to go to university at age 18 or 19 than those attending schools without (39% versus 27%). The equivalent figures for high-status participation are 15% and 7% respectively.

Figure 4: HE participation at age 18 or 19 by whether school has a sixth form

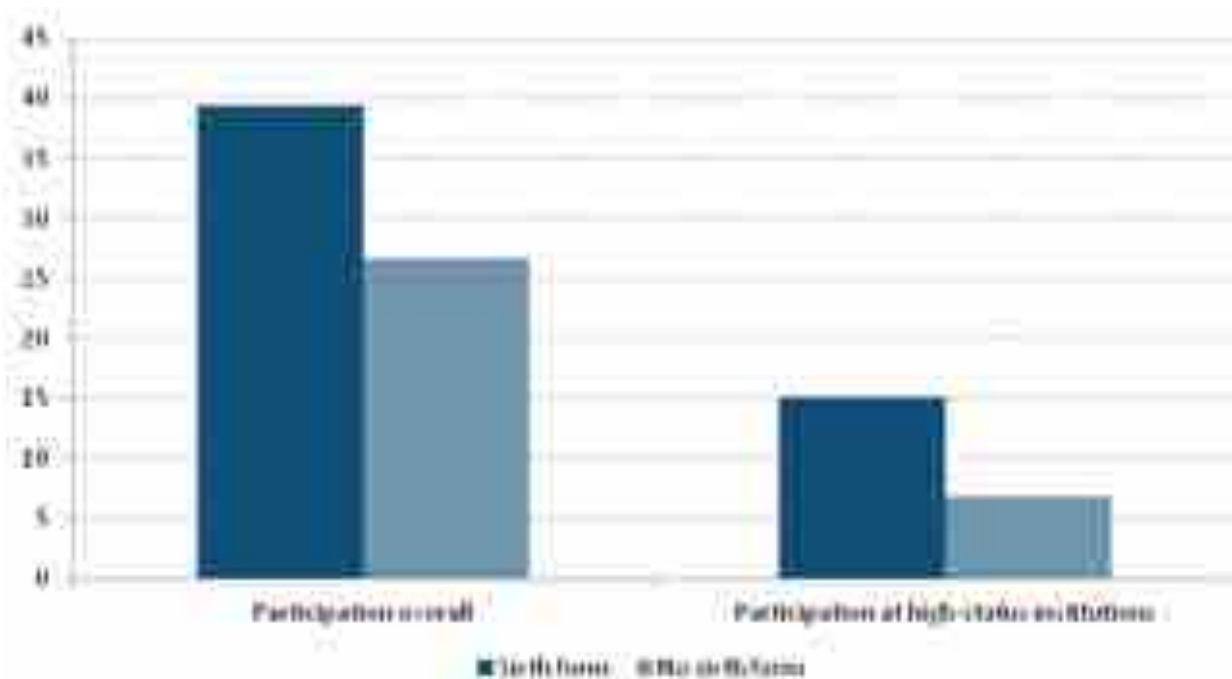


Figure 5: Differences in HE participation at age 18 or 19 by whether school has a sixth form (having a sixth form relative to no sixth form)

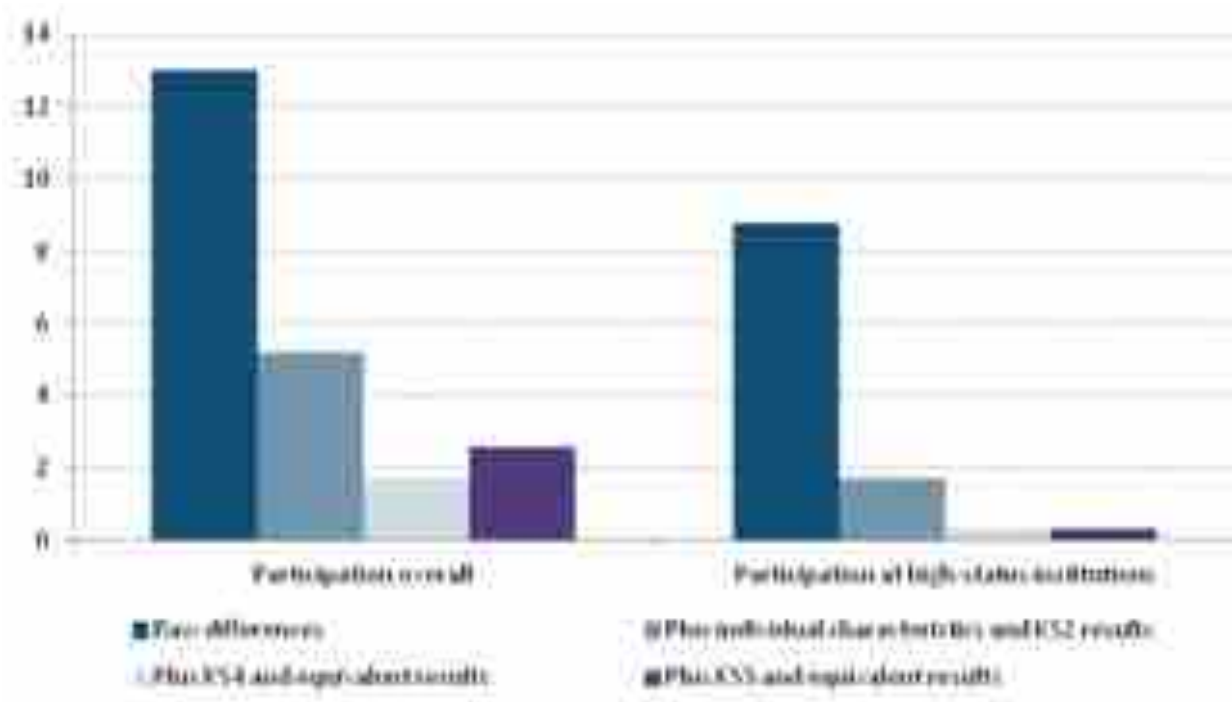


Figure 5 explores the extent to which these differences arise because different types of pupils attend schools with or without a sixth form, because schools with attached sixth forms are better at securing higher Key Stage 4 or 5 results for their pupils, or because of something else. The left-hand set of bars gives results for overall participation and the right-hand set is for participation at high-status institutions.

The dark blue bars (the first in each group) illustrate the average raw differences in HE participation between pupils who do and do not attend a school with an attached sixth form (after controlling for cohort). At 13 percentage points for participation overall and 9 percentage points for high-status participation, these gaps are much smaller than those in terms of school type and selectivity that we saw above (some of which were close to 50 percentage points).

We are also able to explain a higher proportion of the raw difference in HE participation between pupils attending schools with and without an attached sixth form by accounting for differences in pupil intake than we were able to by school type above: once we control for individual and family background characteristics and Key Stage 2 scores (the mid blue bars, the second in each group), we are able to explain 60% of the difference in participation rates overall and over 80% of the difference in participation rates at high-status institutions between pupils who attend secondary schools with or without an attached sixth form (compared with around 50% and 70% respectively for some school types earlier).

The differences remaining after accounting for background characteristics and Key Stage 2 scores are smaller in absolute magnitude as well: the gap in terms of overall participation is just over 5 percentage points, while the gap in terms of participation at high-status institutions is just under 2 percentage points. This suggests that the potential for observed or unobserved factors that differ between schools with or without an attached sixth form to be influencing young people's HE participation decisions is much smaller than was the case between selective and non-selective schools of different types.

Figure 5 also highlights that, again, one of the key routes through which schools seem to influence the HE participation rates of their pupils is via the effect they have on the subjects, qualifications and grades that their pupils study for and obtain at Key Stage 4.²⁶ Once we account for a rich set of measures of attainment in GCSE and equivalent qualifications (the light blue bars, the third in each group), the remaining differences in HE participation between pupils attending schools with or without an attached sixth form fall to 0.3 percentage points in the case of participation at a high-status institution and 1.7 percentage points in terms of participation overall. This picture is broadly unchanged when we add controls for A-level and equivalent qualifications in the final specification

²⁶ Although we note that the differences across specifications do not necessarily represent the *causal* effect of a particular school characteristic on the Key Stage 4 or 5 attainment of their pupils.

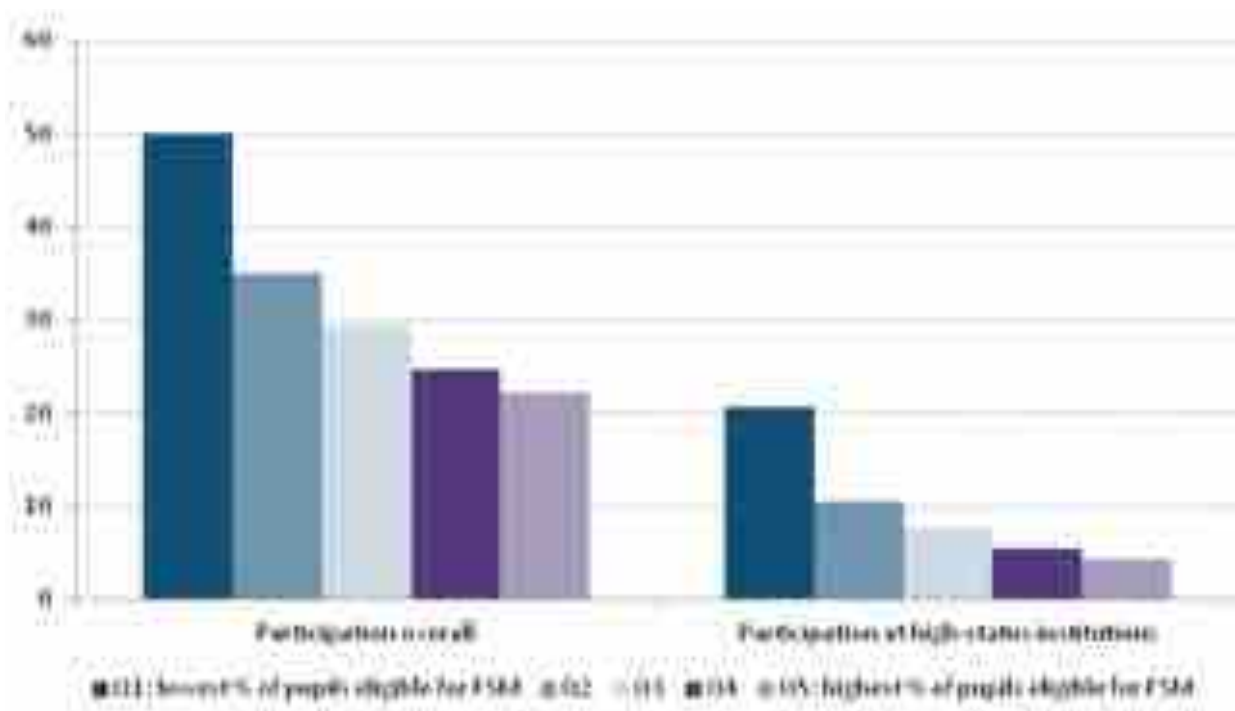
(the purple bars). As with the results by school type, this suggests that any direct effects of attending a school with an attached sixth form on HE participation (i.e. effects other than via attainment) are likely to be small.

Percentage of pupils eligible for free school meals

This section illustrates the differences in HE participation rates overall and at high-status institutions according to the proportion of pupils in the school who are eligible for free school meals (FSMs). It does so for state schools only, splitting schools into five equally-sized groups (quintile groups) according to the proportion of FSM-eligible pupils and documenting the average raw differences in participation overall and at high-status universities amongst these groups. As above, it then goes on to explore the extent to which we can explain these gaps using differences in other characteristics between pupils attending these schools.

Figure 6 illustrates the participation rates of individuals attending schools with different proportions of pupils eligible for free school meals. It shows that there is a steep gradient in terms of participation according to this particular school characteristic, with pupils attending schools with the lowest proportion of FSM-eligible pupils more than twice as likely to go to university as pupils attending schools with the highest proportion of FSM-eligible pupils (50% versus 22%). The differences are even starker when we consider participation at high-status universities, with those in the first (least deprived) quintile group almost five times more likely to attend a high-status university than those in the fifth (most deprived) quintile group (21% versus 4%).

Figure 6: HE participation at age 18 or 19 by school-level percentage of pupils eligible for free school meals



It is also interesting to note that there is a clear difference in participation rates between the first (least deprived) quintile group and all other quintile groups: the gap between pupils attending schools in the first versus second quintile groups is larger than the gap between the second and fifth (most deprived) quintile groups. For example, the gap between the first and second quintile groups is 15 percentage points in terms of HE participation overall, compared with 13 percentage points between the second and fifth quintile groups; the equivalent figures are 10 percentage points versus 6 percentage points when considering participation at high-status institutions.

This is perhaps not altogether surprising given that, as shown in Table 5, almost all pupils attending selective state schools are included in the first quintile group on this measure (i.e. they have very few FSM-eligible pupils), and we saw above that the participation rates of pupils attending selective state schools were far higher than those of pupils attending non-selective state schools. There are also substantial differences between the first and second quintile groups in terms of other characteristics that might plausibly affect HE participation rates, such as Key Stage 2 to Key Stage 4 value added. (We discuss differences in HE participation by value added below.)

Figures 7 and 8 go on to explore the extent to which differences in HE participation rates overall and at high-status institutions respectively between pupils attending schools with different proportions of pupils eligible for free school meals can be explained by differences in the other characteristics of pupils attending these schools.

Figure 7: Differences in HE participation at age 18 or 19 by school-level percentage of pupils eligible for free school meals (relative to quintile 1: lowest % of pupils eligible for FSMs)

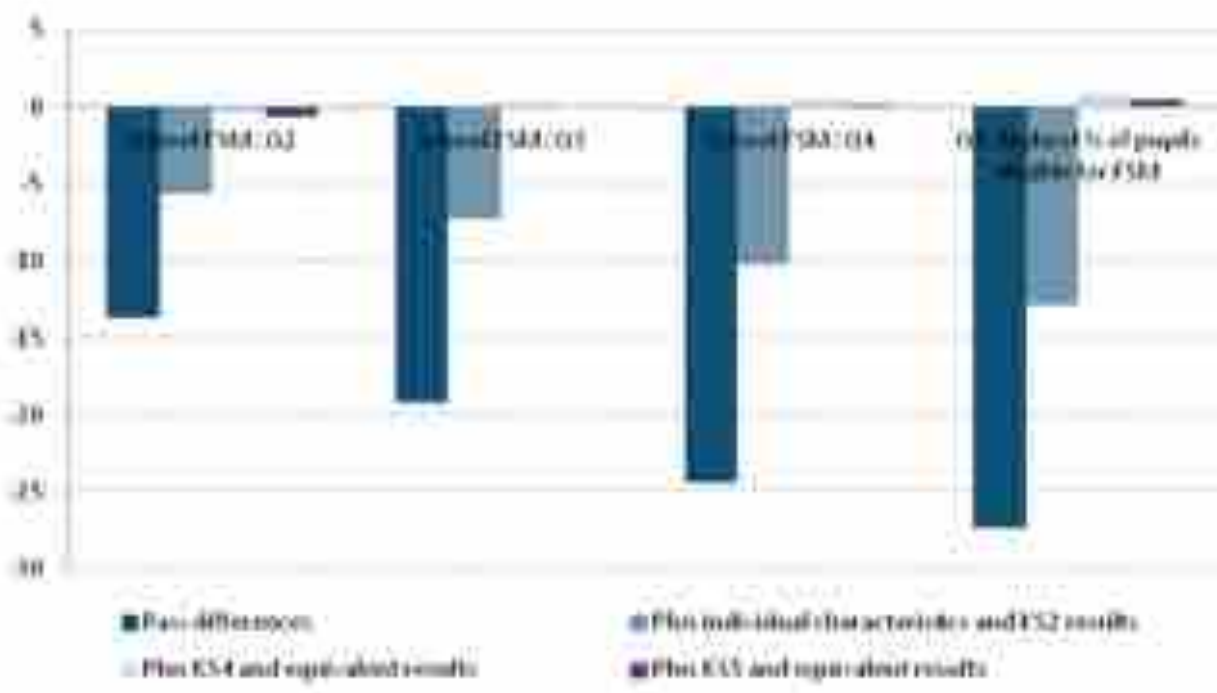
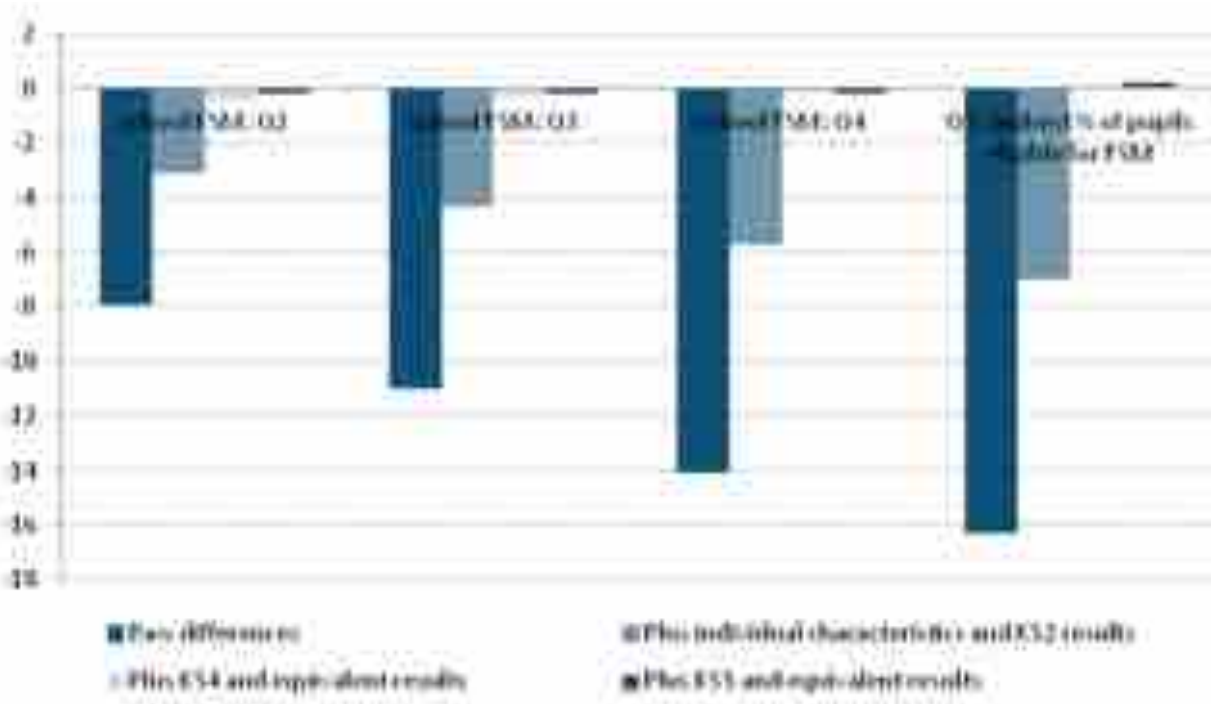


Figure 8: Differences in participation at high-status institutions at age 18 or 19 by school-level percentage of pupils eligible for free school meals (relative to quintile 1: lowest % of pupils eligible for FSMs)



The dark blue bars (the first in each group) in Figures 7 and 8 highlight the substantial raw differences in HE participation, after controlling for cohort, between pupils attending schools in the second to fifth quintile groups compared with the first quintile group (having the lowest proportion of FSM-eligible pupils). These differences are, in general, larger than those between pupils attending schools with and without a sixth form (Figure 5), but smaller than those between pupils attending selective and non-selective schools (Figures 2 and 3).

The mid blue bars (the second in each group) illustrate the differences that remain after accounting for the selection of pupils into schools (i.e. after controlling for individual characteristics and Key Stage 2 results).²⁷ The remaining gaps are much smaller than the raw differences, suggesting that a substantial part of the reason why pupils attending schools in which a high proportion of pupils are FSM-eligible are less likely to go to university than pupils attending schools in which a low proportion of pupils are FSM-eligible is that they themselves are more likely to be eligible for free school meals, are more likely to be labelled as having special educational needs, and tend to have lower Key Stage 2 scores, on average – characteristics that we know to be associated with lower HE participation rates (e.g. Chowdry et al., 2013). Once we account for differences

²⁷ In addition to gender, ethnicity, language, month of birth and socio-economic position – which we use in our models including both state and private school students – we control for a pupil's special educational needs status in this analysis (and when investigating differences in HE participation by school value added – see below).

in these characteristics, the remaining gaps fall to around 40–50% of their raw magnitude in terms of HE participation overall and to around 40% of their raw magnitude in terms of participation at a high-status institution.

The third set of bars (light blue) and the fourth set of bars (purple) in Figures 7 and 8 illustrate the gaps in HE participation overall and at high-status institutions that remain after accounting additionally for pupils' performance at Key Stage 4 and Key Stage 5 respectively. These bars illustrate the extent to which the remaining differences in HE participation across quintile groups can be explained by the fact that schools in which different proportions of pupils are eligible for free school meals are more or less able to help their pupils obtain good grades in desirable subjects and qualifications, or to encourage them to stay in education beyond age 16.

In both cases, achievement at Key Stage 4 explains the vast majority of what remains of the raw difference in HE participation between pupils attending schools with different proportions of pupils eligible for free school meals. Once we account for a rich set of measures of achievement at Key Stage 4, the differences in HE participation fall to less than 1 percentage point in all cases (5% or less of the raw gap). This suggests that a large part of the reason why pupils attending schools with a low proportion of FSM-eligible pupils are more likely to go to (a high-status) university, on average, than pupils attending schools with a high proportion of FSM-eligible pupils is that they are significantly more likely to obtain qualifications that are more highly valued by colleges and universities.

For example, while two-thirds of pupils attending schools in the first quintile group (with the lowest proportion of pupils eligible for FSM) achieve at least five A*–C grades at GCSE including English and maths, only a quarter of pupils attending schools in the fifth quintile group (with the highest proportion of pupils eligible for FSM) achieve the same benchmark. Once we take account of this differential performance, there is almost no difference in HE participation rates between these two groups; indeed, those in the 60% of schools with the highest proportion of pupils eligible for free school meals are marginally *more* likely to go to university than those in the 20% of schools with the lowest proportion of pupils eligible for FSM (although these differences are not significantly different from zero).

As was the case for the analysis examining differences in HE participation according to other school characteristics in this chapter, the addition of rich measures of performance at Key Stage 5 changes this picture relatively little: once we compare pupils with similar characteristics and qualifications, there is very little difference between the average HE participation rates of pupils attending schools with a very high or very low proportion of pupils eligible for free school meals. This suggests that any peer-group effects (or the effects of other pupil- or school-level factors that are correlated with both an individual's chances of going to (a high-status) university and the proportion of pupils in their school

who are eligible for free school meals) that operate through channels other than prior attainment are likely to be very small indeed.

Key Stage 2 to Key Stage 4 value added

This section rounds off this chapter on the differences in HE participation overall and at high status institutions across a variety of school-level characteristics by documenting differences according to the value added of the secondary school attended at age 16 and exploring the extent to which these differences can be explained using the other observable characteristics at our disposal. To do so, we use a measure of Key Stage 2 to Key Stage 4 value added, which is only consistently available from 2003–04 onwards. Because we do not observe Key Stage 2 results for all pupils in private schools, we restrict attention to state schools only. We split schools into five equally-sized groups (quintile groups) on the basis of this measure of value added and explore the average differences in HE participation rates overall and at high-status institutions by quintile group of school value added.

Figure 9: HE participation at age 18 or 19 by school-level KS2 to KS4 value added

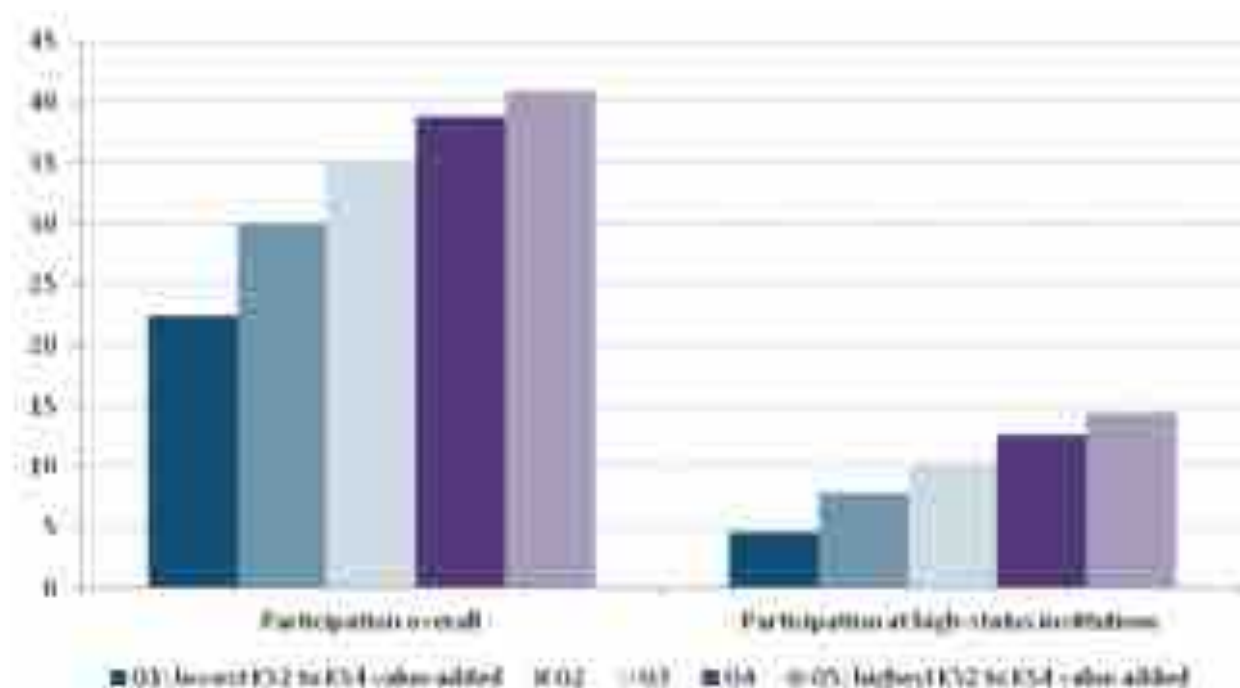


Figure 9 presents HE participation rates overall (left-hand side) and at high-status institutions (right-hand side) by quintile group of Key Stage 2 to Key Stage 4 value added. There are two things of particular note. First, compared with the differences according to the proportion of pupils in the school who are eligible for free school meals, the average difference between the top and bottom quintile groups is smaller here. In particular, it is just under 20 percentage points for participation overall and just under 10 percentage points for participation at high-status institutions when using quintile groups defined according to school value added, compared with almost 28 percentage points

and 17 percentage points respectively when considering quintile groups defined according to the proportion of pupils eligible for free school meals. Given what we know about the characteristics of schools in these quintile groups – specifically, that they are not always monotonically distributed – this is perhaps not altogether surprising.

Second, Figure 6 showed that there was a noticeable jump in participation rates between pupils attending schools in the lowest and second-lowest quintiles in terms of proportions of pupils eligible for free school meals (i.e. between the least and second-least deprived schools). Here, we see a similar jump in participation rates, but this time it occurs between the quintile groups with the lowest and second-lowest levels of value added (i.e. between the most and second-most deprived schools). By contrast, there is very little difference in participation rates between the quintile groups with the highest and second-highest rates of value added.

It is also worth noting that the differences in HE participation overall and at high-status institutions according to school value added are far less pronounced than the differences according to school performance at Key Stage 4 measured by the proportion of pupils achieving at least five A*–C grades at GCSE or equivalent (shown in Appendix 2). In particular, in common with the patterns by FSM eligibility, there is a substantial jump in participation rates between the top and second quintile groups of school performance, and the difference between the top and bottom quintile groups is of a similar magnitude to that between selective and non-selective institutions.

Figure 10: Differences in HE participation at age 18 or 19 by school-level KS2 to KS4 value added (relative to quintile 1: lowest KS2 to KS4 value added)

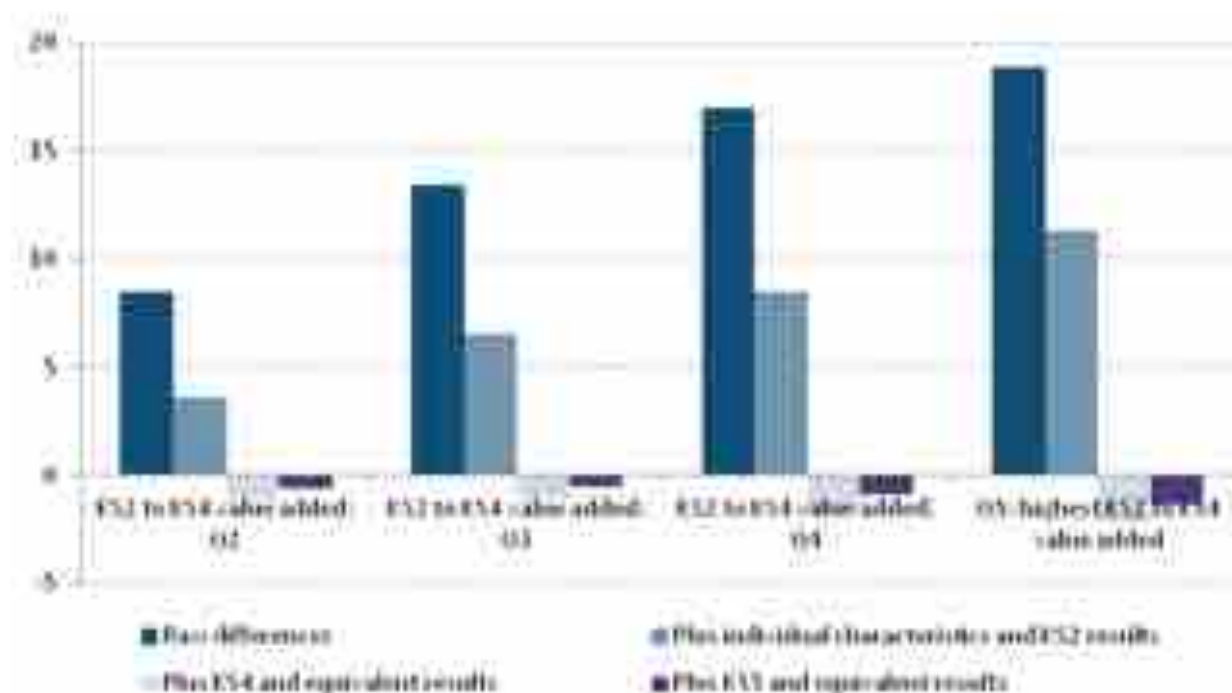
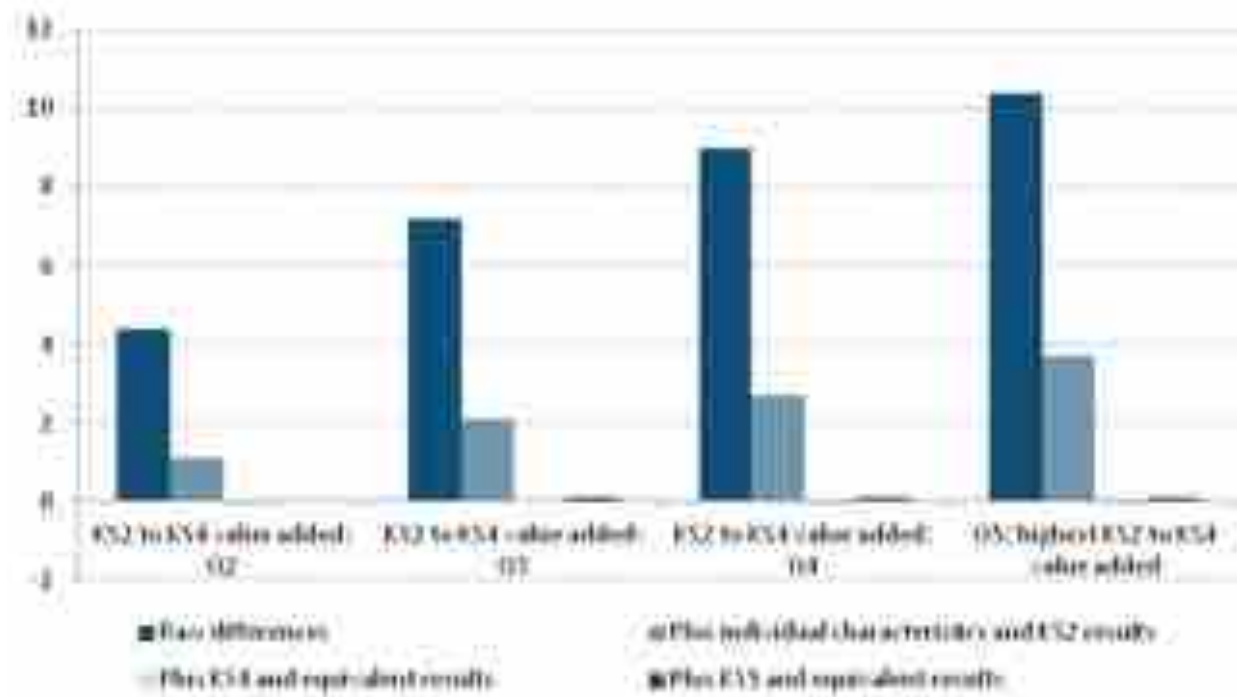


Figure 11: Differences in participation at high-status institutions at age 18 or 19 by school-level KS2 to KS4 value added (relative to quintile 1: lowest KS2 to KS4 value added)



Figures 10 and 11 go on to examine the potential explanatory factors underlying the relationship between school value added and HE participation overall and at high-status institutions respectively. The patterns are similar to each other. In common with the analysis of other school characteristics discussed in this chapter, they show that a sizeable proportion of the raw differences can be explained by the fact that different types of pupils tend to go to schools that are able to add more or less ‘value’ (in terms of test scores) to the pupils who come through their doors. For example, 86% of pupils in the bottom fifth of schools according to value added are white British, compared with 77% of pupils in the top fifth of schools; we know that white British students are significantly less likely to go to university than their ethnic minority counterparts (e.g. Chowdry et al., 2008); thus once we account for differences in ethnicity (plus other individual and family background characteristics, and Key Stage 2 test scores), the differences in participation on the basis of school value added are reduced by at least half in all cases (compare the dark and mid blue bars, the first and second in each group).

It is also clear that, in line with the findings for other school characteristics discussed in this chapter, the ability of high-value-added schools (and/or the pupils attending those schools) to generate good grades in facilitating subjects and high-value qualifications is a large part of the reason why pupils at high-value-added schools are substantially more likely to go to university (at a high-status institution) than pupils at low-value-added schools. In fact, once we account for a rich set of measures of attainment at Key Stage 4 (the light blue bars, the third in each group), pupils at high-value-added schools are, if anything, slightly less likely to go to university than pupils at low-value-added schools. This makes sense: high-value-added schools are able to generate better grades for

pupils with a similar set of characteristics on entry than low-value-added schools: this suggests that pupils leaving low-value-added schools with similar grades in similar qualifications and subjects to those leaving high-value-added schools are likely to be of higher unobserved ability (or have more attractive non-cognitive skills), making it plausible that those pupils would be more likely to go to university.

The addition of controls for performance at Key Stage 5 (the purple bars, the last in each group) makes relatively little difference to these relationships. Again, the remaining unexplained differences in HE participation between pupils attending schools with different levels of value added are very small indeed – at most 1.3 percentage points for overall participation and 0.1 percentage points for participation at a high-status institution. Moreover, in terms of high-status participation, these differences are never significantly different from zero – which, in a sample of this size, is very rare indeed. This suggests that any causal effect of high-value-added schools on pupils' HE participation decisions that may exist is likely to arise via an improvement of their attainment at Key Stage 4 or Key Stage 5, rather than via any more direct routes.

4. Results: university outcomes

This chapter presents our results in terms of differences in dropout (within two years), degree completion (within five years) and degree class between pupils attending different schools. In contrast to the previous chapter – which focused on differences across the cohort as a whole – this chapter focuses on differences *amongst participants at 18 or 19* in the case of dropout, *amongst non-medical students studying full-time for a first degree* in the case of degree completion and *amongst full-time non-medical first-degree completers within five years* in the case of degree class. The gaps presented here therefore represent differences in attainment amongst the sample of university participants that we identified in the previous chapter.

Each section focuses on a different school characteristic. In each case, we document the raw differences in university outcomes in terms of the school characteristic of interest, and explore the extent to which these differences can be explained by the selection of pupils into schools, the ability of different types of schools to achieve good qualifications for their pupils, and the selection of pupils into different subjects and universities.

Summary of findings

- There are substantial differences in university outcomes between pupils who attended different types of secondary school. The percentage point differences are largest in terms of degree class and, in contrast to the results for HE participation, according to the proportion of pupils in the school who are eligible for free school meals (FSMs). For example, students who attended secondary schools with the highest proportions of FSM-eligible pupils are, on average, 5.4 percentage points more likely to drop out, 11.0 percentage points less likely to complete their degree and 21.8 percentage points less likely to graduate with a first or a 2:1 than pupils who attended secondary schools with the lowest proportions of FSM-eligible pupils.
- As was the case for the gaps in HE participation, the fact that different types of pupils attend different schools explains a substantial proportion of the raw differences that we see.
- In stark contrast to the results for HE participation, however, once we add a rich set of controls accounting for the qualifications, subjects and grades attained at Key Stage 4, in most cases our estimates of the differences in university outcomes across school characteristics change sign. Once we compare individuals with similar levels of attainment, those from independent and selective state schools, those from state schools with a low proportion of FSM-eligible pupils and those from high-value-added state schools are now significantly *more* likely to drop out, significantly *less* likely to complete their degree and significantly *less* likely to graduate with a first or a 2:1 than their counterparts in non-selective state schools, state schools with a high proportion of FSM-eligible pupils and low-value-added state schools respectively.

- Again, the picture is relatively unchanged when we account for Key Stage 5 attainment. It also changes relatively little when we additionally account for the type of university attended and subject studied (or when we restrict attention to pupils attending high-status universities only).
- As was the case for HE participation, however, while the addition of controls for attainment at Key Stage 5 does not materially affect the relationship between university outcomes and our school characteristics of interest, many of our measures of Key Stage 5 attainment are strongly and significantly related to these outcomes. For example, pupils who score in the top 20% (compared with the bottom 20%) at Key Stage 5 are around 9 percentage points less likely to drop out of university, around 20 percentage points more likely to complete their degree and around 40 percentage points more likely to graduate with a first or a 2:1, even conditional on all the other measures of attainment included in our model.
- It is also worth noting that, as was the case for HE participation, various measures of attainment at Key Stage 4 continue to have a significant effect on how well young people do at university, even after accounting for a rich set of measures of attainment at Key Stage 5, as well as which subject they study and which institution they attend. For example, conditional on all other measures in our model, every additional A* grade in an ebacc subject is associated with around a 2 percentage point reduction in the likelihood of dropping out, around a 2 percentage point increase in the likelihood of degree completion and around a 3 percentage point increase in the likelihood of graduating with a first or a 2:1.
- The differences in university outcomes that remain after accounting for all other characteristics in our model are largest between state and private school students, although the differences between selective and non-selective state school students, and students from high- and low-value-added state schools, are not too far behind. For example, when comparing pupils with the same background characteristics and prior attainment, studying at the same universities in the same subjects, those from selective independent schools are 2.6 percentage points more likely to drop out, 6.4 percentage points less likely to complete their degree and 10.3 percentage points less likely to graduate with a first or a 2:1 than pupils from non-selective community schools.
- While we cannot use these results to conclude that these school characteristics are having a significant *causal* effect on university outcomes, we can say that any underlying unobserved differences across schools matter more for university outcomes than they do for HE participation (in ways that are not captured by prior attainment).

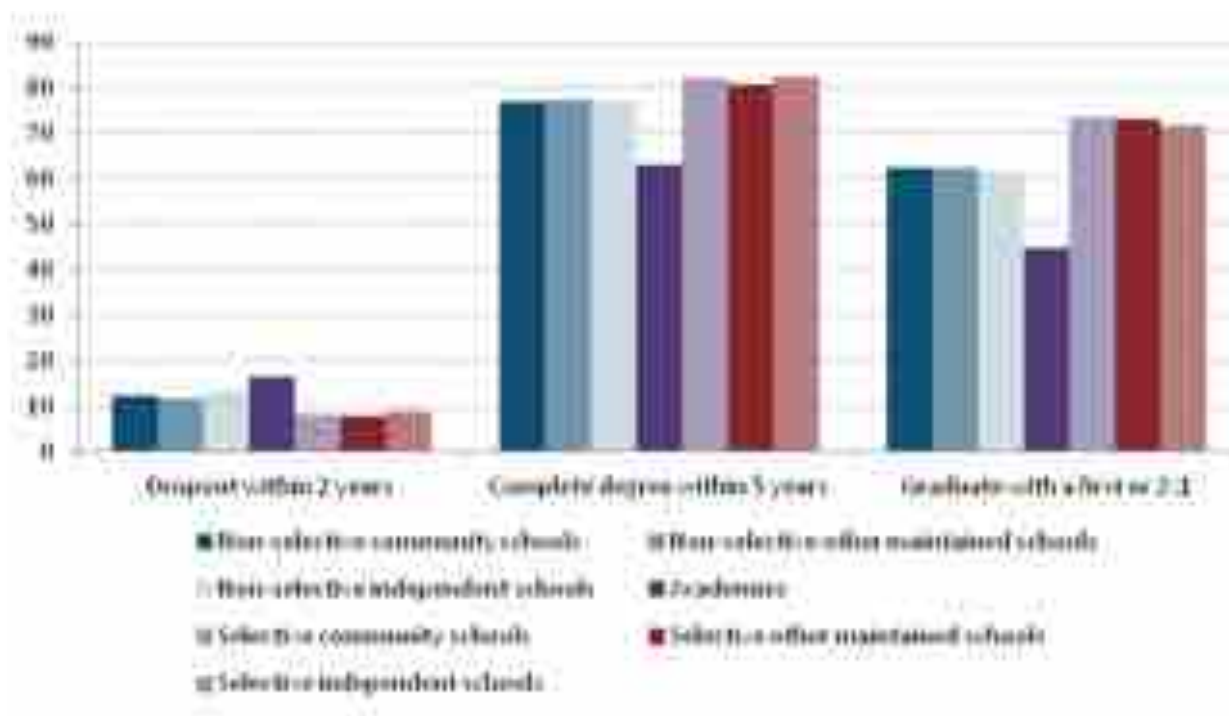
- One conclusion that could be drawn from our results is that, amongst students with a given set of characteristics and measures of prior attainment, those from non-selective or low-value-added state schools have higher 'potential' than those from selective or high-value-added state schools or independent schools. This may, in turn, suggest that university entry requirements could be lowered for pupils from non-selective or low-value-added state schools in order to equalise the potential of all students being admitted to university.
- Some universities have already started giving state school students lower entry offers than private school students for exactly this reason. In spite of this, however, there are still very large differences in degree performance between these two groups, suggesting that more could be done. Our results also suggest that students from selective state schools should be excluded from receiving these lower offers; and that universities may wish to take into account a measure of school value added as well when making their admissions offers.

School type and selectivity

Figure 12 documents the raw differences in university outcomes by school type and selectivity. It provides two important points of note. First, pupils from selective secondary schools have 'better' university outcomes (a lower probability of dropout, and higher likelihoods of degree completion and of acquiring a first or a 2:1) than pupils from non-selective secondary schools. For example, 12.4% of university entrants from non-selective community schools drop out of HE entirely before starting their third year, compared with 8.3% of those from selective community schools. By contrast, 77.2% of university entrants from non-selective community schools studying full-time for a non-medical first degree complete their course within five years, compared with 82.1% of those from selective community schools. Similarly, even amongst full-time first-degree non-medical students who complete their degree within five years, those from selective community schools are 11.3 percentage points more likely to graduate with a first or a 2:1 than those from non-selective community schools (73.7% versus 62.4%).

Second, amongst selective (or non-selective) schools, there is relatively little difference by school type. The exception is for pupils from 'old-style' academies, who perform substantially worse, on average, than pupils from all other types of schools. The performance of pupils from selective or non-selective community, other maintained and independent schools lies within 2 percentage points of one another in terms of dropout, degree completion and degree class. Pupils from 'old-style' academies, however, are, on average, 3.1 percentage points more likely to drop out, 14.1 percentage points less likely to complete their degree and 16.5 percentage points less likely to graduate with a first or a 2:1 than their nearest competitors – which, interestingly, are pupils from non-selective independent schools in the case of dropout and degree class (and pupils from non-selective community schools in the case of degree completion).

Figure 12: University outcomes by school type and selectivity



Figures 13, 14 and 15 present the differences in dropout, degree completion and degree class respectively between pupils attending particular types of schools relative to non-selective community schools. The different sets of coloured bars illustrate the extent to which these raw differences can be explained by: (a) pupil characteristics; (b) prior attainment; (c) choice of university and subject.

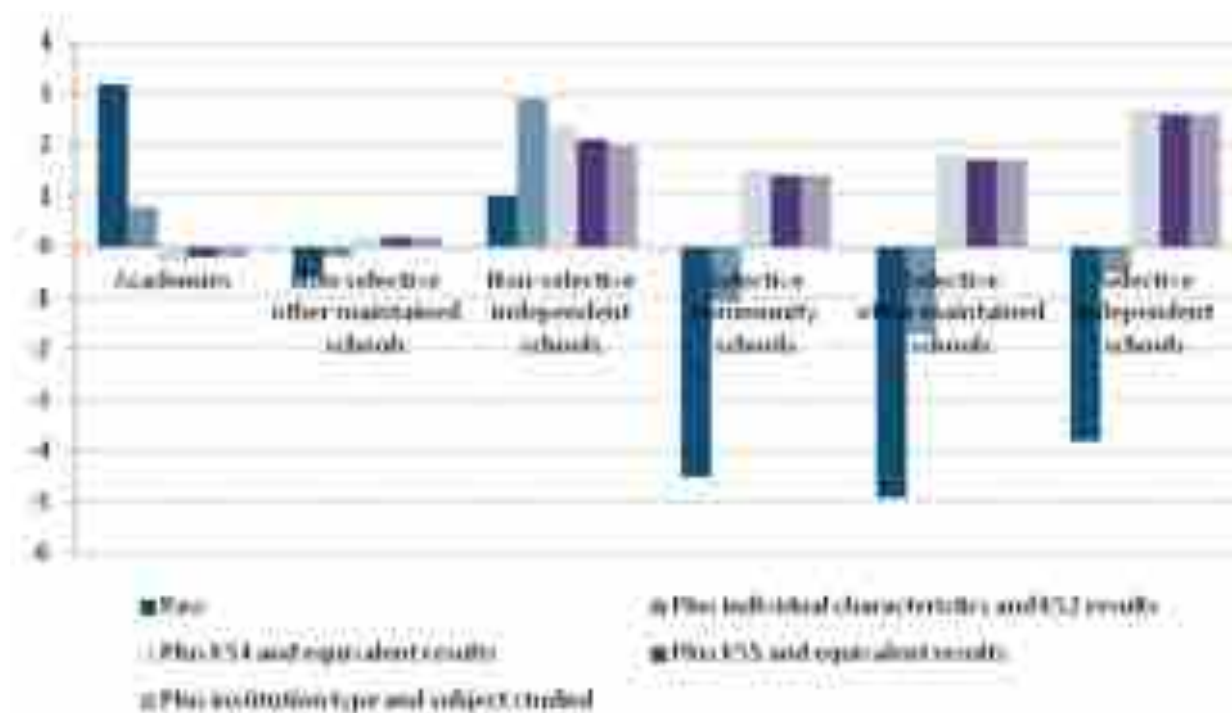
Dropout

Figure 13 shows that, in most cases, the addition of controls accounting for the selection of pupils into schools (on the basis of a limited set of individual and family background characteristics, plus Key Stage 2 test scores) reduces the magnitude of the difference in dropout relative to those attending non-selective community schools by at least 60% (compare the dark and mid blue bars, the first and second in each group).

The exception is for pupils in non-selective independent schools, for whom the addition of background controls actually *increases* (indeed, it almost trebles) the difference in dropout relative to those attending non-selective community schools. This arises because the characteristics of pupils attending non-selective independent schools are associated with lower dropout rates, on average, than the characteristics of pupils attending non-selective community schools. For example, pupils from non-selective independent schools are less likely to be white British, more likely to speak English as an additional language and (amongst those who sat the exams) more likely to have reached the expected level in all subjects at Key Stage 2 than pupils from non-selective community schools. Vignoles and Powdthavee (2009), amongst others, show that ethnic minorities and those with higher prior attainment are less likely to drop out from university. Once we

compare the outcomes of pupils from non-selective independent and community schools with the same background characteristics and Key Stage 2 attainment, therefore, the higher raw dropout rates of pupils from non-selective independent schools appear even less explicable and, consequently, the gap relative to those from non-selective community schools increases.

Figure 13: Differences in dropout by school type and selectivity (relative to non-selective community schools)



The light blue (middle) bars in Figure 13 illustrate the difference in drop-out rates relative to pupils attending non-selective community schools once we account for differences in attainment at Key Stage 4. Comparing the mid and light blue bars (before and after the inclusion of these measures) shows that, in almost all cases, the sign of the difference in dropout rates relative to non-community schools changes once we account for attainment in GCSE and equivalent qualifications – with those who were previously more likely to drop out (e.g. pupils from ‘old-style’ academies) now less likely to drop out, and those who were previously significantly less likely to drop out (e.g. pupils from selective schools) now significantly more likely to drop out.²⁸ For example, when comparing pupils with the same demographic and family background characteristics and Key Stage 2

²⁸ The one exception is for pupils from non-selective independent schools – who, as described above, already had higher-than-anticipated dropout rates on the basis of the average characteristics of pupils attending those schools – for whom the inclusion of controls for attainment at Key Stage 4 slightly reduces the gap relative to non-selective community schools. This suggests that the attainment of those who made it to university was actually slightly worse, on average, amongst pupils attending non-selective independent schools than amongst those attending non-selective community schools, such that accounting for this helps to partially explain the higher dropout rates that we see.

attainment, pupils from selective independent schools are 0.5 percentage points less likely to drop out than those from non-selective community schools. When we additionally account for a rich set of measures of attainment at Key Stage 4, this relationship is reversed – with pupils from selective independent schools now 2.7 percentage points more likely to drop out from university.

The reasons for this reversal are unclear. As discussed by Smith and Naylor (2001a) and Ogg et al. (2009) in the context of differences in degree class between state and private school students, there are at least three possibilities:

- Some schools (e.g. independent or selective schools) may be better at producing good grades at GCSE for their pupils than others, meaning that a pupil of given ability will obtain higher grades at a selective school than at a non-selective community school. This means that when we compare students with the same GCSE attainment, the pupil from the non-selective community school will have, on average, higher unobserved ability (or better non-cognitive skills) than the pupil from the selective school. If we thought that higher ability (or better non-cognitive skills) were correlated with lower dropout (which seems plausible), then this might help to explain our findings. Ogg et al. (2009) refer to this as the ‘teaching effect’ and find that it is the primary driver of differences in degree class by school type at the University of Oxford.
- While independent or selective schools might be very successful at preparing students for GCSE and A-level (and equivalent) exams, they may be less good at preparing students for independent study at university. Thus, even if the underlying unobserved ability of students from different types of schools were, on average, equal, those from independent or selective schools might be more poorly equipped for the methods of study required at university than those from non-selective community schools, thus making them more likely to drop out.
- Previous research (e.g. Naylor et al., 2002; Macmillan et al., 2013) has suggested that independent school students earn more than those from state schools. To the extent that this premium arises as a result of networks (e.g. connections via family or friends to high-paying jobs), it may not even be necessary for students from these backgrounds to graduate from university in order to secure these jobs, thus encouraging them to put in less effort – potentially to the point at which they drop out. (It is less clear to what extent this potential explanation may be relevant for students from selective state schools.)

A fourth possibility is that pupils from non-selective community schools (and ‘old-style’ academies) are, for whatever reason, better at getting into universities with lower dropout rates, and it is differences in institution-level factors (such as differences in the support provided to students in danger of dropping out) that lead to the higher dropout rates for students from all other types of school. We return to this issue below.

Regardless of the reason, it is clear that, with the exception of pupils from ‘old-style’ academies, pupils with the same background characteristics and prior attainment from all other types of schools are significantly more likely to drop out of university than pupils from non-selective community schools. This picture is relatively unchanged when we add controls for attainment at Key Stage 5 (the dark purple bars, the fourth in each group). This suggests that – as was the case for HE participation decisions – the additional role of schools in encouraging their pupils to stay in education beyond compulsory school-leaving age and acquire good A-level (or equivalent) results is relatively small (or at least highly correlated with their ability to produce good GCSE results), such that the addition of even a very rich set of controls for Key Stage 5 attainment makes relatively little difference to our results.

Perhaps more surprisingly, the same also appears to be true of the inclusion of controls for the type of institution attended and subject studied (the light purple bars, the last in each group). The fact that this makes relatively little difference to our estimates of the relationship between school type and dropout suggests that the channelling of students from different types of schools into different subjects and different universities (whose students subsequently experience different dropout rates) – the fourth possibility outlined above – is not a key explanation of the relationships we observe.²⁹

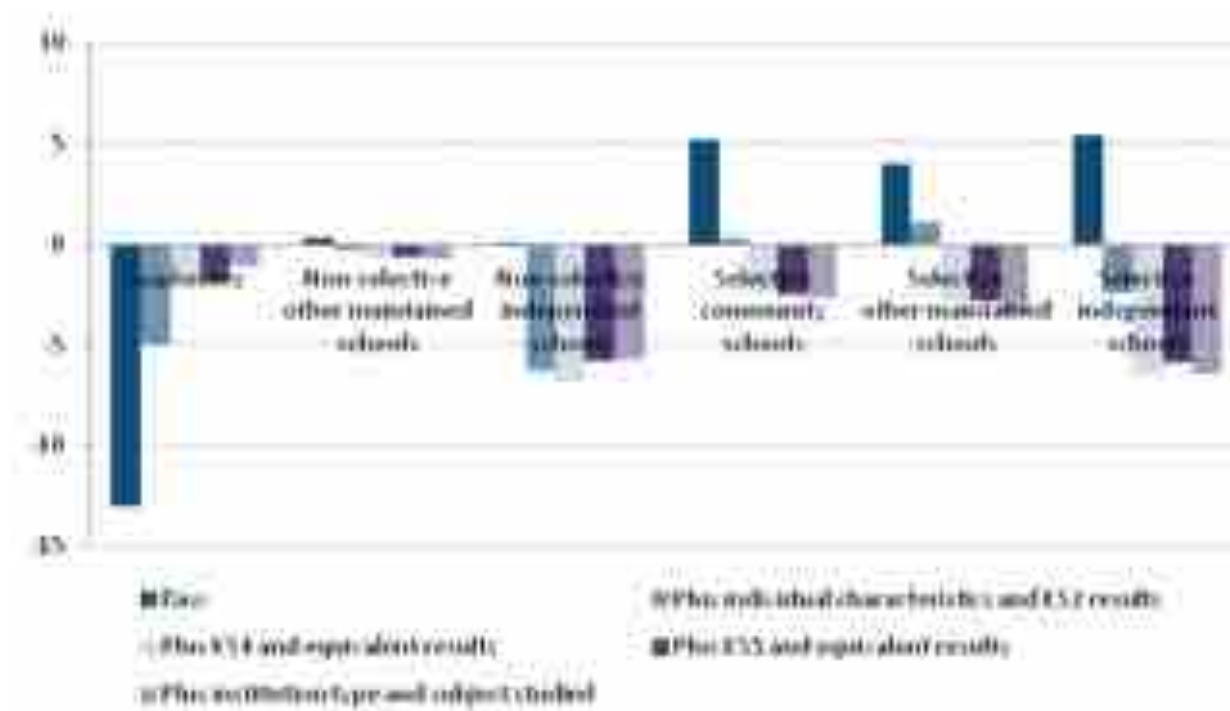
Once we have accounted for a limited set of background characteristics, a very rich set of measures of prior attainment, and the selection of individuals into different subjects and universities, it is clear that there remain large and significant differences in the likelihood of dropping out of university in the first or second year by school type. In particular, pupils who attended an independent or selective state secondary school are between 1.4 and 2.6 percentage points (around 10–20% relative to the base of 12.4 percentage points for non-selective community school students shown in Figure 12) more likely to drop out than those who attended a non-selective community school. These differences are slightly larger for independent schools (at 2.0 or 2.6 percentage points more likely to drop out for non-selective and selective independent school pupils respectively, compared with 1.4 or 1.7 percentage points more likely to drop out for those from selective community or other maintained schools). These findings highlight that, despite an increasing focus on the use of contextualised admissions policies at some universities, particularly at some high-status institutions, the links between school type and dropout do not appear to have weakened very much over time (see, for example, Smith and Naylor (2001b) and Johnes and McNabb (2004) for state–private school differences for an earlier cohort). It is worth noting that these results do not materially change if we focus on full-time first-degree entrants only, or if we focus on the differences amongst our 41 high-status institutions only (results available on request).

²⁹ These conclusions are robust to the use of a linear probability model including institution and subject fixed effects.

Course completion

Figure 14 presents a similar assessment of the relationships between school type and degree completion (amongst full-time first-degree students studying for non-medical degrees). As was the case for dropout, differences in the characteristics of pupils entering different types of schools are able to explain a substantial fraction of the differences in degree completion that we observe (compare the dark and mid blue bars, the first and second in each group). In some cases, the inclusion of these controls is sufficient to change the sign of our estimates. For example, while the raw differences suggest that pupils from selective independent schools are 5.4 percentage points more likely to complete their course within five years than pupils from non-selective community schools, once we account for the fact that the characteristics of pupils attending selective independent schools lend themselves to more positive university outcomes than those of pupils attending non-selective community schools, the gap changes sign, with pupils from selective independent schools now 2.4 percentage points *less* likely to complete their course than pupils with similar characteristics from non-selective community schools.

Figure 14: Differences in degree completion by school type and selectivity (relative to non-selective community schools)



These differences are exacerbated once we additionally control for the subjects, qualifications and grades taken by and awarded to pupils at Key Stage 4 (compare the mid and light blue bars, the second and third in each group). As shown in Table 3, all schools other than 'old-style' academies seem to turn out pupils with better Key Stage 4 results, on average, than non-selective community schools. We know that higher prior attainment is correlated with lower degree non-completion rates (e.g. Johnes, 1990; Smith and Naylor, 2001b; Vignoles and Powdthavee, 2009; HEFCE, 2013); thus once we

compare pupils with similar levels of attainment from different types of schools, the differences in course completion worsen: existing negative relationships increase – as in the case of selective independent schools – and previously positive relationships turn negative – as in the case of selective community or other maintained schools.

The addition of controls for attainment at Key Stage 5 (dark purple bars, the penultimate in each group) and for the type of institution attended and subject studied (light purple bars, the last) again makes relatively little difference to the overall patterns after accounting for Key Stage 4 attainment. If we focus just on the differences in degree completion by school type amongst our group of 41 high-status institutions (results available on request), then the estimates remain negative in most cases, but are generally reduced in magnitude, especially for pupils attending selective state schools.³⁰ Interestingly, the difference in terms of degree completion between pupils attending ‘old-style’ academies and those attending non-selective community schools becomes large and positive (although not significantly different from zero), suggesting that part of the reason for the lower degree completion rates of pupils who attend ‘old-style’ academies is that they tend to go to universities with higher dropout rates. Once we compare individuals at similarly selective universities, their dropout rates improve relative to those of pupils from other types of school.

Returning to our main results, however, once we account for a rich set of measures of prior attainment (and the type of university attended and subject studied), we find evidence of large and significant differences in course completion on the basis of school type. For example, we find that pupils attending independent schools are around 6 percentage points (7–8%) less likely to complete their course within five years than pupils attending non-selective community schools, while pupils attending selective state schools are around 3 percentage points (4–5%) less likely to do so. These results suggest that there is further dropout beyond the beginning of Year 3 that occurs according to similar patterns to those described above for dropout within two years. This results in larger differences by school type when considering course completion within five years than dropout within two years.³¹

Degree class

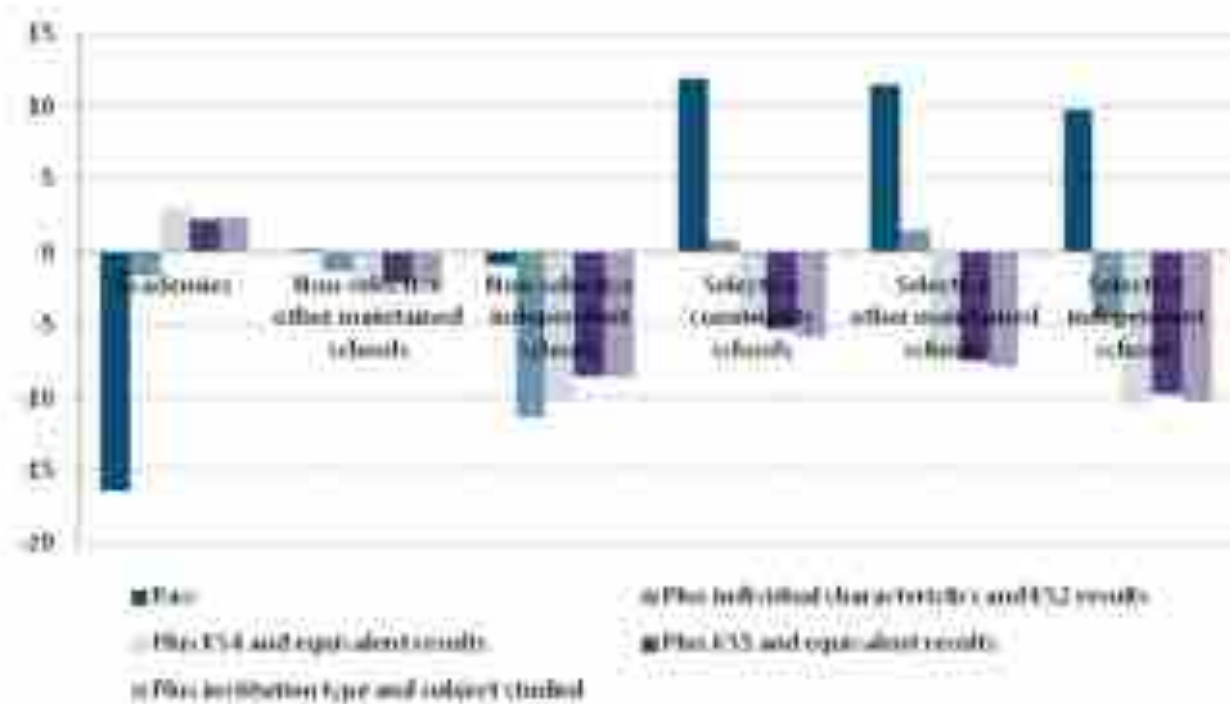
Figure 15 repeats the above analysis for degree class. As was the case for our analysis of degree completion, the sample is restricted to those who studied full-time for a non-medical first degree; here we additionally restrict attention to those who completed their degree within five years. As described in the introduction, this is an area that has already

³⁰ The exception is for pupils from non-selective independent schools, for whom the deficit relative to pupils from non-selective community schools in terms of degree completion is slightly larger at this group of high-status institutions.

³¹ It is worth noting that these differences are not driven by the different samples used to produce these results.

received a considerable amount of attention in the literature to date (e.g. Smith and Naylor, 2001a; McNabb et al., 2002; HEFCE, 2003, 2005, 2014). This section updates the existing evidence for more recent cohorts and explores how state–private school differences in degree class vary according to the selectivity of the school. We also investigate the characteristics that help to explain this relationship in a sequential fashion.

Figure 15: Differences in likelihood of graduating with a first or 2:1 by school type and selectivity (relative to non-selective community schools)



The overall patterns are broadly similar to those discussed in detail above for dropout and degree completion. That is to say:

- Amongst those who complete their degree within five years, pupils from ‘old-style’ academies are significantly less likely to graduate with a first or a 2:1 than pupils from non-selective community schools, while those from selective schools are significantly more likely to do so; interestingly, those from non-selective independent schools are slightly less likely to graduate with a first or a 2:1 than those from non-selective state schools.
- Pupils from ‘old-style’ academies tend to have ‘worse’ characteristics (i.e. characteristics associated with poorer degree outcomes), on average, than pupils from non-selective state schools, while those from independent and selective schools have slightly ‘better’ characteristics (i.e. characteristics associated with better degree outcomes), on average. Once we compare pupils from different types of schools with the same observable characteristics, the negative ‘effect’ of attending an academy or the positive ‘effect’ of attending a selective school are substantially reduced, in some cases even changing sign (as in the case of selective independent schools).

- The addition of controls for subsequent educational attainment acts in the same direction: pupils from ‘old-style’ academies tend to leave school with fewer good grades in less attractive subjects and qualifications than those from non-selective community schools, while the reverse is true for those from independent and selective schools. Once we account for the fact that some schools (or pupils within schools) produce better Key Stage 4 and 5 results conditional on Key Stage 2 attainment than others, the picture moves even further away from the initial raw differences, with pupils from ‘old-style’ academies now more likely to graduate with a first or 2:1 than otherwise-identical pupils from non-selective community schools, while those from independent and selective schools are now significantly less likely to do so.
- As for dropout and course completion, the addition of controls for the type of institution attended and subject studied makes very little difference to our estimates, which are, again, substantial: for pupils from independent schools, they amount to a disadvantage of 9–10 percentage points (around 15%) in terms of the likelihood of graduating with a first or a 2:1 relative to pupils from non-selective community schools; and for pupils from selective state schools, they amount to a disadvantage of around 6–8 percentage points (around 10%).
- If we focus on differences in degree class by school type and selectivity amongst our 41 high-status institutions only (results available on request), the overall picture remains broadly similar, although the differences in the likelihood of obtaining a first or a 2:1 that remain after accounting for background characteristics, a rich set of measures of prior attainment, and degree subject and institution are generally smaller than those between pupils from different types of schools attending the full range of HE institutions. One notable exception is that the final specification (after accounting for all characteristics at our disposal) suggests that pupils from ‘old-style’ academies are now substantially less likely to obtain a first or a 2:1, whereas they were slightly more likely to achieve this level when comparing their performance relative to pupils from a wider range of institutions. This suggests that part of the reason why pupils from ‘old-style’ academies appear more likely to get a first or a 2:1 is that they tend to go to institutions that award these grades more easily; once we focus on a group of highly selective universities, this picture is reversed. It should be noted, however, that because of the small number of individuals attending academies over the period covered by our data, these estimates are not significantly different from zero (or each other).

As discussed above, there are a number of potential explanations for the differences in degree class by school type that we observe. Thus, while we cannot use these results to conclude that school type is having a significant *causal* effect on university outcomes, we can say that any underlying unobserved differences across schools (or the pupils within those schools) matter more for university outcomes than they did for HE participation (in ways that are not captured by prior attainment). This suggests that: (a) as highlighted by other authors (and implemented by some universities already), the differences in degree

class between state and private school students with the same prior attainment could potentially be used to conclude that the underlying ability (or ‘potential’) of state school students is not fully reflected by their A-level grades and hence could be used as a basis on which to contextualise entry offers; (b) a similar conclusion could be drawn about pupils from non-selective state schools relative to selective state schools; and (c) further research could usefully be directed towards (i) trying to understand which of the potential reasons outlined above (or indeed others) are driving these results and (ii) investigating the extent to which these differences – either in terms of Key Stage 4 or 5 attainment, or HE participation and degree outcomes – represent a causal effect of school type, or simply reflect underlying unobserved differences between pupils attending different types of school.

Whether school has a sixth form

Figure 16 shows that there are only relatively small differences in university outcomes between pupils who attend a secondary school with and without an attached sixth form. For example, pupils who, at age 16, attended a school with an attached sixth form are, on average, 2.1 percentage points less likely to drop out of university within two years, 2.6 percentage points more likely to complete their course within five years and 5.7 percentage points more likely to graduate with a first or a 2:1 than those who attended a school that did not cater for pupils beyond the age of 16.

Figure 16: University outcomes by whether school has a sixth form

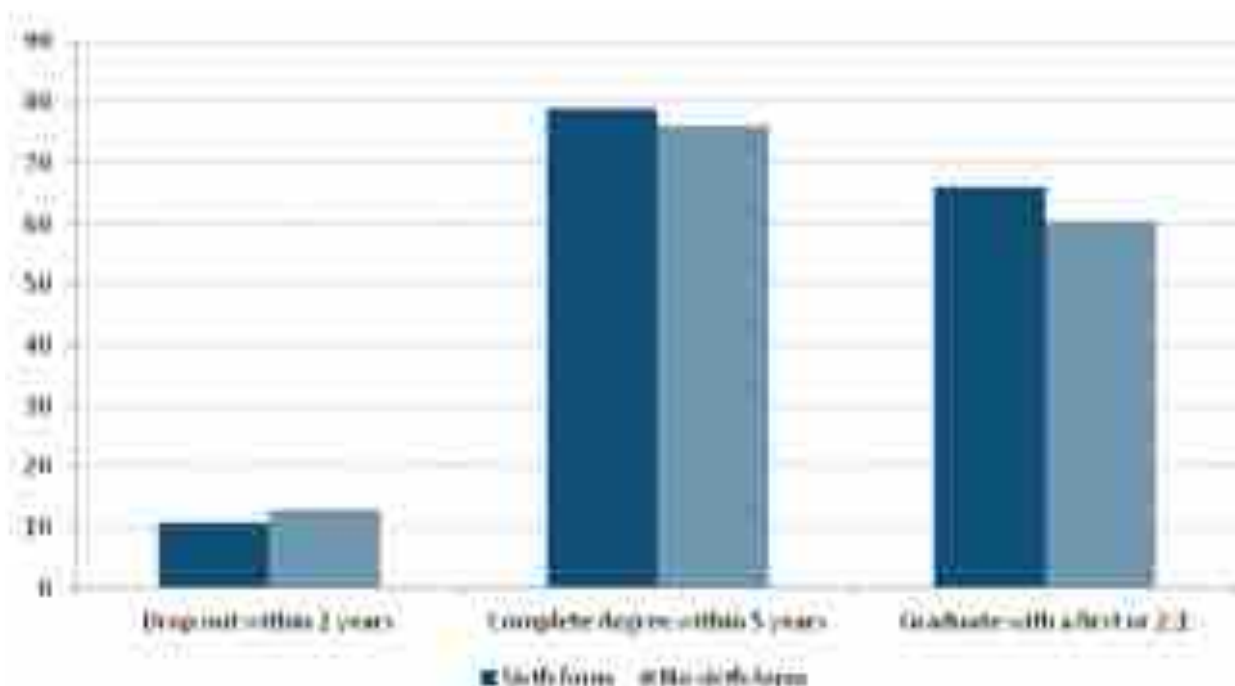
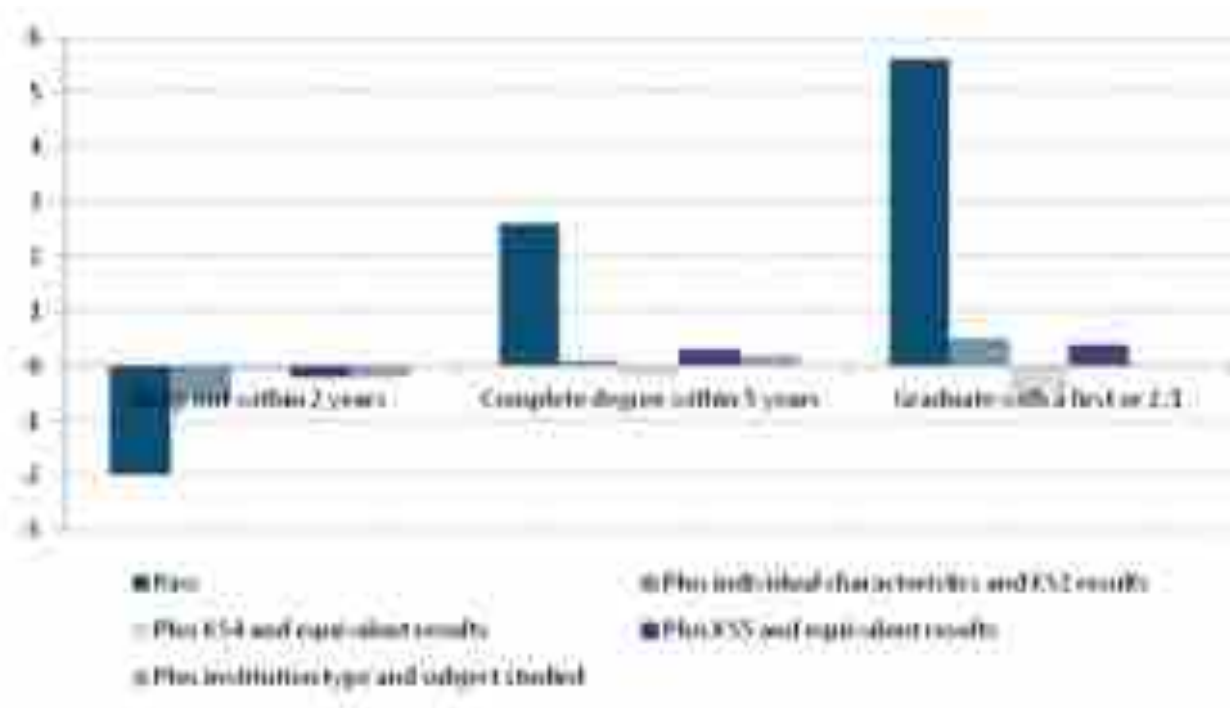


Figure 17 shows that almost all of this small difference in university outcomes between pupils attending secondary schools with and without an attached sixth form – over two-thirds in the case of dropout and over 90% in the case of degree completion and degree

class – can be explained by differences in the intake of these schools. Once we have accounted for individual and family background characteristics and Key Stage 2 attainment, the remaining differences are very small indeed (less than 1 percentage point in all cases) and only the estimate for dropout is still significantly different from zero. This suggests that the vast majority of the difference in university outcomes between pupils attending schools with and without an attached sixth form can be explained by the fact that different types of pupils attend these schools. Once we account for this, there is very little gap left to explain. As a result, the inclusion of controls for Key Stage 4 and 5 attainment, plus the type of university attended and subject studied, adds very little to the story.

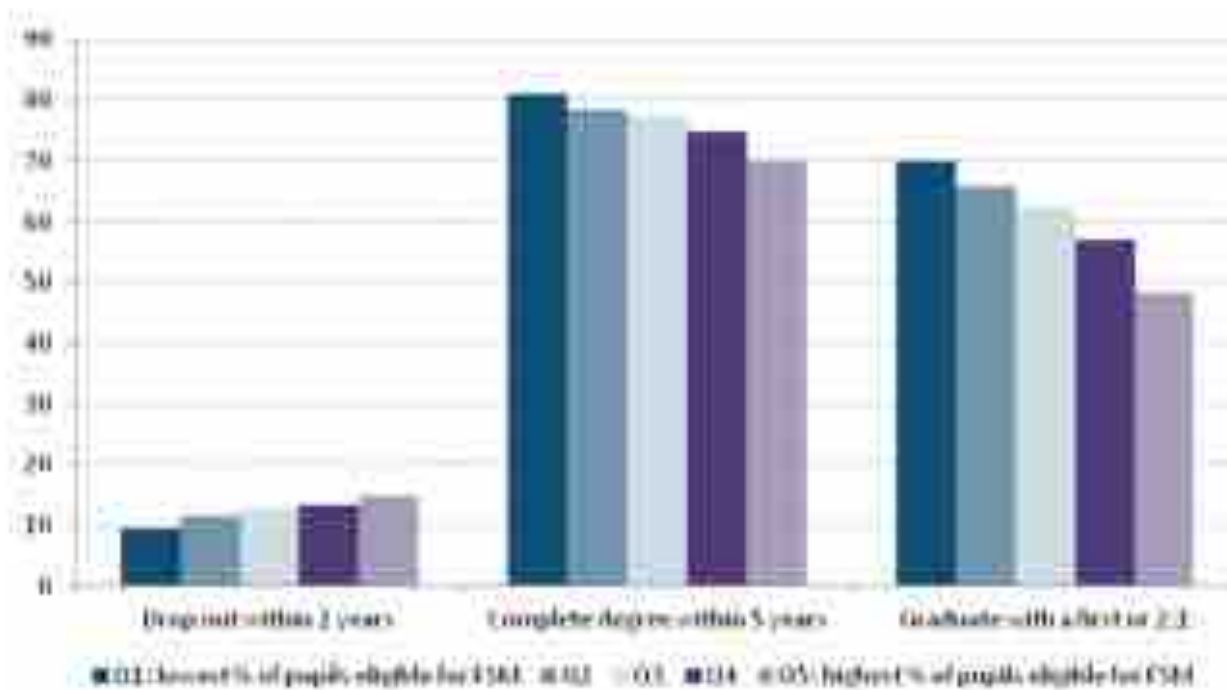
Figure 17: Differences in university outcomes by whether school has a sixth form



Percentage of pupils eligible for free school meals

This section describes the differences in dropout, degree completion and degree class between individuals attending state schools with different proportions of pupils eligible for free school meals. In contrast to the findings for HE participation – in which there were large jumps between the first and second quintile groups (those with the lowest and second-lowest proportions of pupils eligible for free school meals) – Figure 18 shows that the gradients in university outcomes are almost linear. These gradients are steepest for degree class, with a difference of 21.8 percentage points between the top and bottom quintile groups (compared with 5.4 percentage points for dropout and 11.0 percentage points for degree completion).

Figure 18: University outcomes by school-level percentage of pupils eligible for free school meals



If anything, there is evidence of a jump down in the proportion of pupils completing their degree and graduating with a first or a 2:1 between the fourth and fifth quintile groups (with the highest and second-highest proportions of FSM-eligible pupils). For example, pupils attending the 20% of schools with the highest proportions of pupils eligible for free school meals (the fifth quintile group) are 5.0 percentage points less likely to complete their degree and 8.8 percentage points less likely to get a first or a 2:1 than pupils attending the 20% of schools with the next-highest proportions of pupils eligible for free school meals (the fourth quintile group). These differences compare with gaps of 6.0 and 13.0 percentage points respectively in terms of degree completion and degree class between pupils attending schools in the fourth and first quintile groups (the latter being the 20% of schools with the lowest proportions of FSM-eligible pupils).

Figures 19, 20 and 21 explore what drives these raw relationships between the proportion of pupils in a school who are eligible for free schools, and dropout, degree completion and degree class respectively. In common with the relationships between most of the school characteristics and HE outcomes explored in this report, these figures show that differences in intake are able to explain a substantial proportion of the differences in university outcomes between pupils attending the 20% of schools with the highest and lowest proportions of pupils eligible for free school meals – over 50% in the case of dropout, over two-thirds in the case of degree completion and over 85% in the case of degree class.

For all outcomes and all quintile groups, the signs of the estimates of the differences in dropout, degree completion and degree class relative to the first quintile group (schools with the lowest proportion of pupils eligible for free school meals) are reversed once we control for attainment at Key Stage 4. This means that pupils from schools with a high

proportion of pupils eligible for free school meals become significantly less likely to drop out within two years, significantly more likely to complete their course within five years and significantly more likely to graduate with a first or a 2:1 relative to pupils from schools with a low proportion of pupils eligible for free school meals.

Figure 19: Differences in dropout by school-level percentage of pupils eligible for free school meals (relative to quintile 1: lowest % of pupils eligible for FSMs)

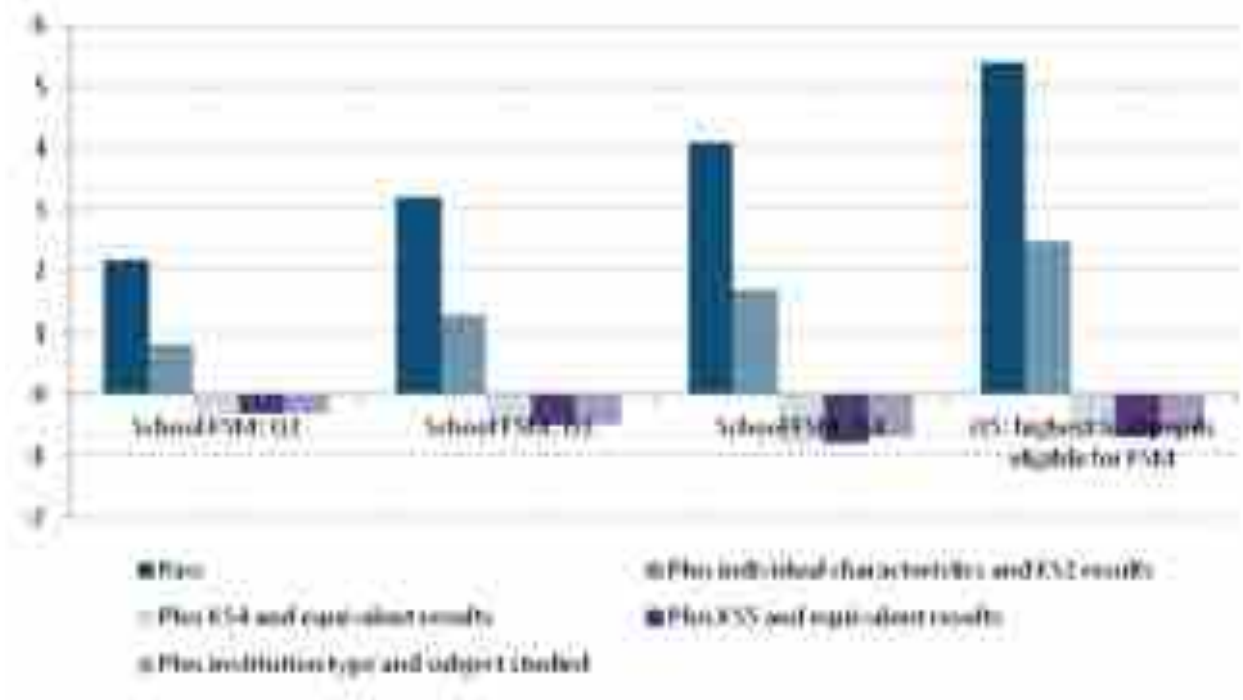


Figure 20: Differences in degree completion by school-level percentage of pupils eligible for free school meals (relative to quintile 1: lowest % of pupils eligible for FSMs)

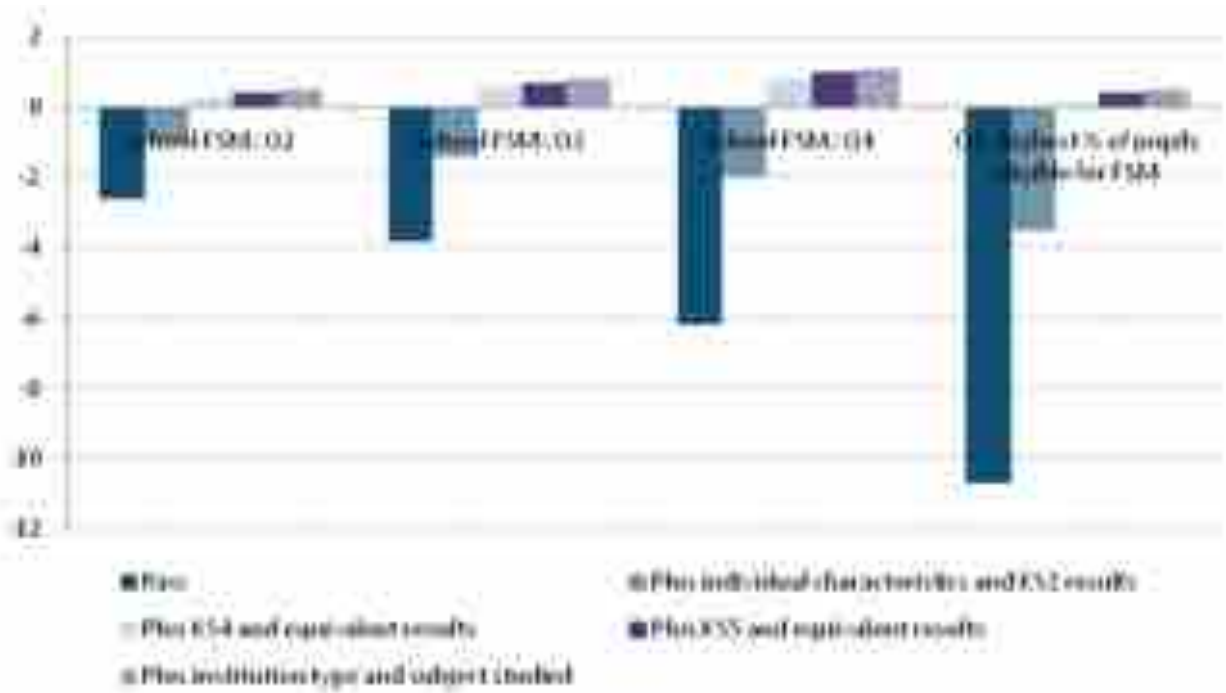
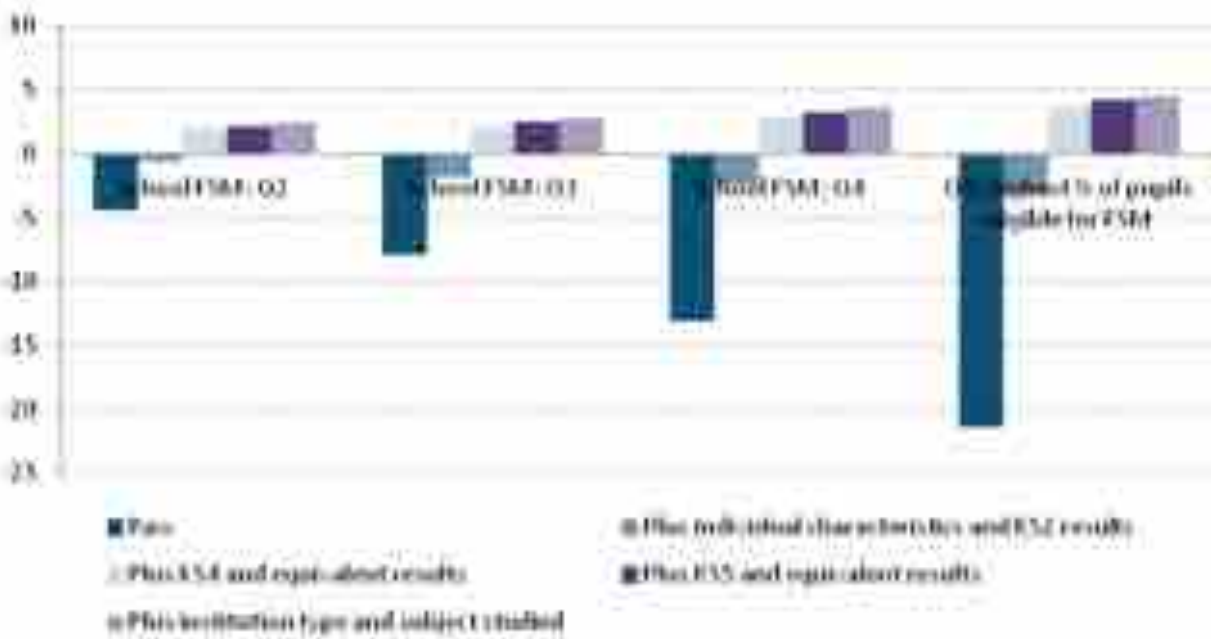


Figure 21: Differences in likelihood of graduating with a first or a 2:1 by school-level percentage of pupils eligible for free school meals (relative to quintile 1: lowest % of pupils eligible for FSMs)

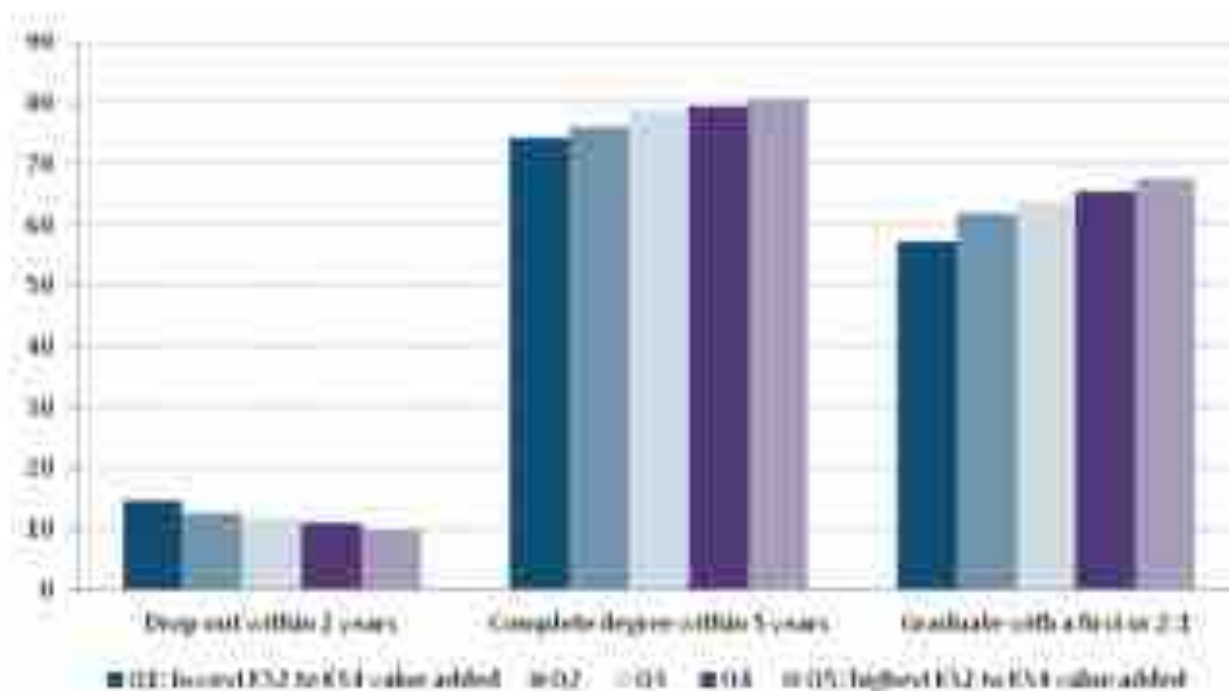


Also in common with the other analysis discussed in this report, the addition of controls for Key Stage 5 attainment, as well as the type of university attended and subject studied, adds very little to this story. This leaves us with some small but significant differences in university outcomes between pupils attending schools with different proportions of pupils eligible for free school meals that cannot be explained using the characteristics at our disposal. For example, conditional on their prior attainment, as well as the university they attend and the subject they study, pupils attending schools in the fifth quintile group (with the highest proportions of pupils eligible for free school meals) are 4.5 percentage points more likely to graduate with a first or a 2:1 than pupils attending schools from the first quintile group (with the lowest proportions of pupils eligible for free school meals). The estimates are very similar if we focus on differences in degree class amongst our 41 high-status institutions only (results available on request).

Key Stage 2 to Key Stage 4 value added

The final section in this chapter documents differences in dropout, degree completion and degree class between pupils attending secondary schools with different Key Stage 2 to Key Stage 4 value added. Figure 22 shows that the gradients in university outcomes according to the value added of the school are fairly shallow and approximately linear. In common with the findings for HE participation, there is some evidence of a jump in the proportion of students dropping out of university and the proportion of degree completers graduating with a first or a 2:1 between the first and second quintile groups (schools with the lowest and second-lowest value added) – but at magnitudes of 2.0 and 4.7 percentage points respectively, these differences are not as pronounced as the gap in terms of participation (of 7.6 percentage points).

Figure 22: University outcomes by school-level KS2 to KS4 value added



In terms of the factors that drive these results, Figures 23, 24 and 25 (showing the differences in dropout, degree completion and degree class respectively) highlight that the story is very similar to that described above in terms of differences in university outcomes according to the proportion of pupils in the school who are eligible for free school meals. Namely:

- Differences in the intake of schools with different Key Stage 2 to Key Stage 4 value added explain a substantial proportion of the raw gaps in university outcomes shown in Figure 22.
- In all cases, the gap relative to the lowest value-added quintile group changes sign once we account for the subjects, qualifications and grades achieved at Key Stage 4, suggesting that a large part of the reason why pupils from higher-value-added schools have better university outcomes than pupils from lower-value-added schools is that they achieve better qualifications in secondary school. Once we account for these differences in attainment, those from higher-value-added schools are significantly more likely to drop out (and significantly less likely to complete their degree and graduate with a first or a 2:1) than pupils from lower-value-added schools.
- The addition of controls for Key Stage 5 attainment, as well as the type of university attended and subject studied, adds very little to this picture, suggesting that the role of schools in encouraging their pupils to stay on for post-compulsory education (to do certain qualifications in certain subjects) and to apply to particular types of university to study particular subjects does not contribute much to the differences in university outcomes that we observe between different school types.

If we repeat this analysis focusing only on pupils attending our 41 high-status universities (results available upon request), the estimated differences are smaller in magnitude but still significantly different from zero in terms of degree class, but very small and not significantly different from zero in terms of degree completion. Moreover the results when measuring school performance using an absolute rather than a value-added measure (i.e. using the proportion of pupils achieving at least five A*–C grades at GCSE or equivalent) are very similar in both pattern and magnitude to those described here (see Appendix 2).

These results suggest that, even once we account for the selection of pupils into schools and universities on the basis of the characteristics at our disposal, there are large and significant differences in university outcomes between pupils attending schools with different levels of value added. For example, once we account for individual characteristics, prior attainment, and the type of university attended and subject studied, pupils who attend secondary schools with the highest Key Stage 2 to Key Stage 4 value added are, on average, 1.5 percentage points more likely to drop out, 3.0 percentage points less likely to complete their degree within five years, and 7.2 percentage points less likely to graduate with a first or a 2:1 conditional on completing their degree within five years, than pupils who attend secondary schools with the lowest Key Stage 2 to Key Stage 4 value added. These differences are similar in magnitude to the differences between selective and non-selective state schools described above. This suggests that, in addition to school type and proportion of pupils eligible for free school meals, universities may also wish to consider school value added as a characteristic on which to contextualise their admissions offers.

Figure 23: Differences in dropout by school-level KS2 to KS4 value added (relative to quintile 1: lowest KS2 to KS4 value added)

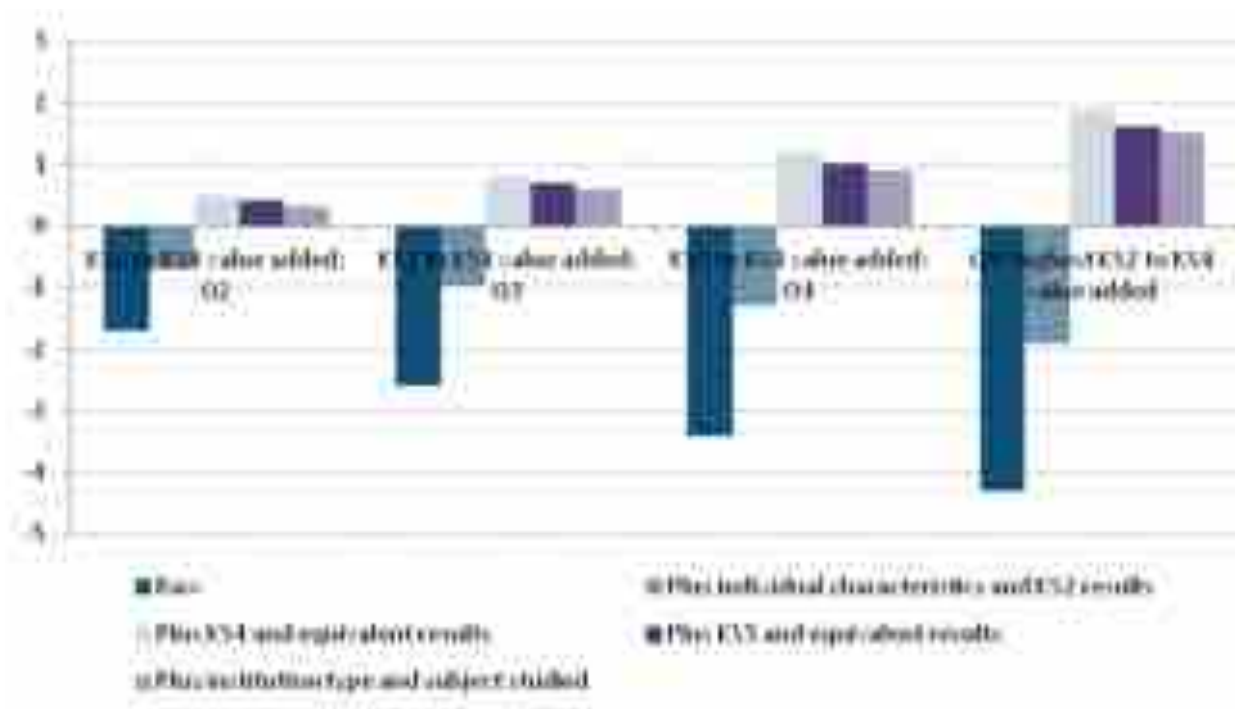


Figure 24: Differences in degree completion within five years by school-level KS2 to KS4 value added (relative to quintile 1: lowest KS2 to KS4 value added)

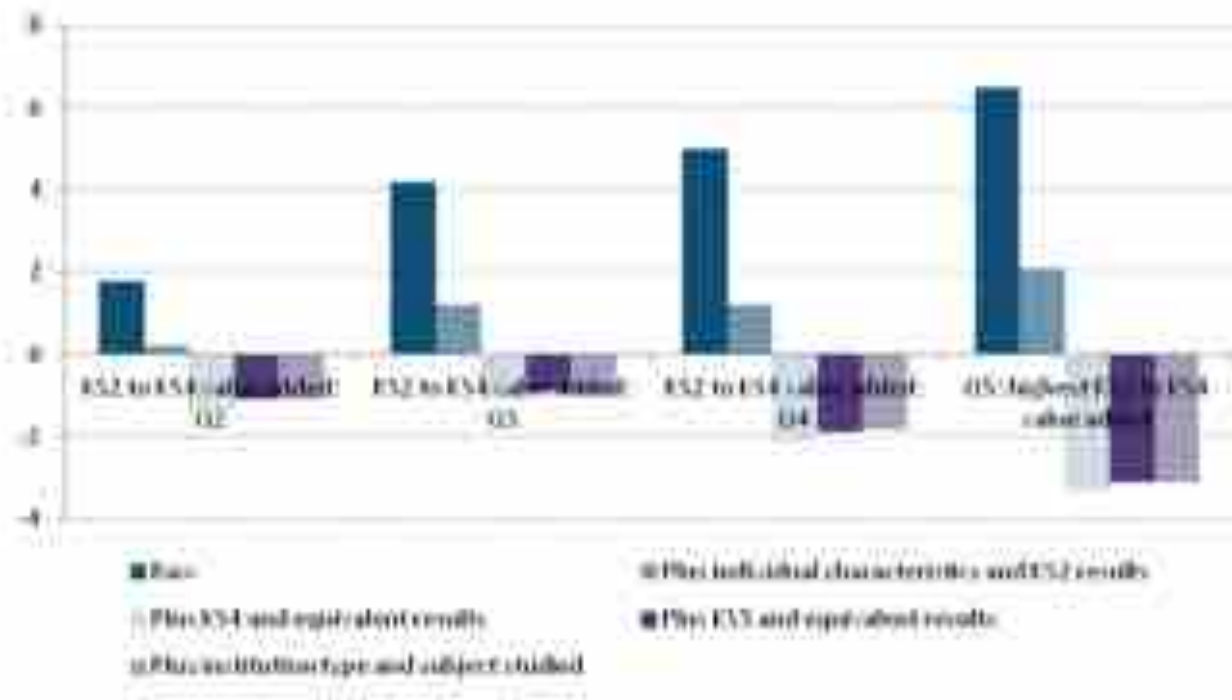
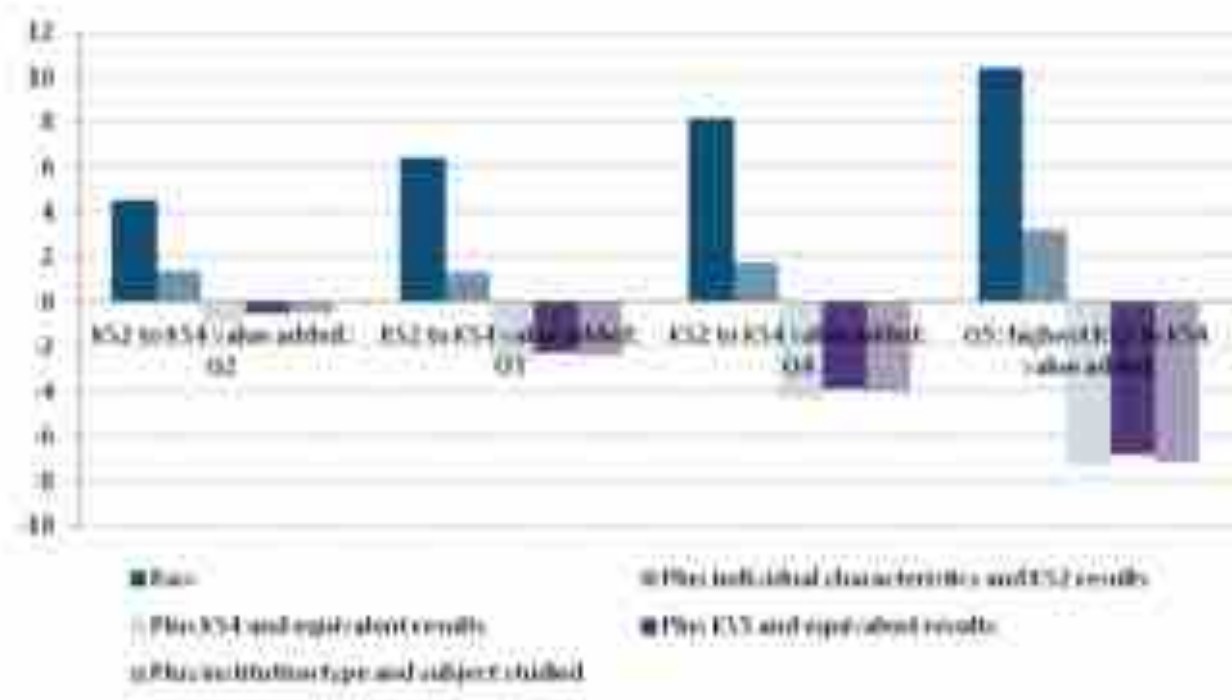


Figure 25: Differences in likelihood of graduating with a first or a 2:1 by school-level KS2 to KS4 value added (relative to quintile 1: lowest KS2 to KS4 value added)



5. Conclusions

This report has examined the extent to which higher education (HE) participation and subsequent degree outcomes vary by school. Of particular interest has been what drives these differences: is it the fact that different types of pupils attend different types of schools; that some schools are able to get their pupils better grades in more-highly-regarded subjects and qualifications at Key Stage 4; that some schools are more successful at encouraging their pupils to stay on for further education (and to perform better while they are there); or, in the case of university outcomes, that some schools encourage their pupils to go to certain types of university or study certain subjects?

Or is it something else? This possibility might be of particular concern to policymakers interested in widening participation in higher education: if pupils with a given set of characteristics and grades are, on average, less likely to go to (a high-status) university if they come from schools with particular characteristics or intakes, then this might indicate a potentially fruitful group upon whom universities (or other organisations) could target outreach efforts. Similarly, if pupils from schools with particular characteristics or intakes on average outperform those from elsewhere once they are at university, even after accounting for their qualifications, subjects and grades on entry, then this might provide an indication of the types of characteristics that universities may want to consider taking into account when making offers to prospective students.

We have shown that there are substantial differences in HE participation rates overall and at high-status institutions for the school characteristics we consider. The gaps are largest according to school selectivity – with, for example, pupils attending selective state schools more than 40 percentage points more likely to go to university and more than 30 percentage points more likely to go to a high-status institution than pupils attending non-selective state schools. School performance, the proportion of pupils eligible for free school meals, school value added and whether the school has an attached sixth form exhibit progressively smaller differences.

Even amongst the selected group of pupils who go into higher education, however, there are also large differences in university outcomes by school. The percentage point differences are largest in terms of degree class and, in contrast to the results for HE participation, according to the proportion of pupils in the school who are eligible for free school meals (FSMs). For example, students who attended secondary schools with the highest proportions of FSM-eligible pupils are, on average, 5.4 percentage points more likely to drop out, 11.0 percentage points less likely to complete their degree and 21.8 percentage points less likely to graduate with a first or a 2:1 than pupils who attended secondary schools with the lowest proportions of FSM-eligible pupils.

Our results suggest that the fact that different types of pupils attend different types of schools plays an important role in helping to explain both the differences in HE participation and the differences in university outcomes. It is once we start accounting for the differences in Key Stage 4 attainment across schools, however, that the interesting findings start to emerge.

When we compare pupils with the same background characteristics, Key Stage 2 scores, and qualifications, subjects and grades achieved at Key Stage 4, the differences in HE participation on the basis of the secondary school attended fall to less than 4 percentage points in the case of participation overall and to less than 1 percentage point in the case of participation at high-status institutions; by contrast, some of the differences in university outcomes remain large but change sign, such that pupils from independent and selective state schools, those from state schools with a low proportion of FSM-eligible pupils and those from high-value-added state schools are now significantly *more* likely to drop out, significantly *less* likely to complete their degree and significantly *less* likely to graduate with a first or a 2:1 than their counterparts in non-selective state schools, state schools with a high proportion of FSM-eligible pupils and low-value-added state schools respectively.

For both HE participation and university outcomes, the addition of a rich set of controls for attainment at Key Stage 5 adds very little to this picture; neither does accounting for the type of university attended or subject studied in the case of university outcomes.

While we cannot use these results to conclude that any of our school characteristics of interest is having a significant *causal* effect on university outcomes, we can say that any unobserved differences across schools (or the pupils within those schools) matter more for university outcomes than for HE participation (in ways that are not captured by prior attainment). In addition:

- It is clear that the focus of any ‘widening participation’ efforts should be to ensure that pupils from all schools make the right choices over the subjects and qualifications they take at Key Stage 4, and that they maximise their chances of getting good grades at this level; interventions targeted at students beyond the end of compulsory schooling are unlikely to be able to eliminate the differences in HE participation between pupils from different schools.
- Amongst pupils with a given set of characteristics and prior attainment, those from non-selective or low-value-added state schools could be regarded as having higher ‘potential’ than those from selective or high-value-added state schools or independent schools. While we cannot point to specific changes that should be made to the entry offers of particular universities, these results provide suggestive evidence that universities may wish to consider lowering their entry requirements for pupils from non-selective or low-value-added state schools (relative to pupils from selective or high-value-added state schools, or independent schools) in order to equalise the potential of students being admitted from these different types of school. Moreover, the availability of linked NPD–HESA data for several recent cohorts of students means that further exploration of such relationships for individual institutions is now eminently possible and – as recommended by Bridger et al. (2012) in a report to the Supporting Professionalism in Admissions (SPA) Programme – should be considered a cornerstone of a university’s contextual admissions practices in future.

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Appendix 1 Institutional classifications

Russell Group: Birmingham, Bristol, Cambridge, Cardiff, Edinburgh, Glasgow, Imperial College London, King's College London, Leeds, Liverpool, London School of Economics, Manchester, Newcastle, Nottingham, Oxford, Queen's University Belfast, Sheffield, Southampton, University College London and Warwick. A further four universities – Durham, Exeter, Queen Mary University of London and York – were added to the Russell Group in March 2012.

1994 Group: the Universities of Bath, Durham, East Anglia, Essex, Exeter, Lancaster, Leicester, Loughborough, Reading, St Andrews, Surrey, Sussex and York, plus Birkbeck College, Goldsmiths College, the Institute of Education, Queen Mary and Westfield College, Royal Holloway and Bedford New College, and School of Oriental and African Studies.

University Alliance: the Universities of Bradford, Glamorgan, Hertfordshire, Huddersfield, Lincoln, Northumbria (Newcastle), Plymouth, Portsmouth, Salford, Wales (Newport) and the West of England (Bristol), plus Bournemouth University, Cardiff Metropolitan University, De Montfort University, Glasgow Caledonian University, Kingston University, Liverpool John Moores University, Manchester Metropolitan University, Nottingham Trent University, the Open University, Oxford Brookes University and Sheffield Hallam University.

Million+: the Universities of Abertay Dundee, Bedfordshire, Bolton, Central Lancashire, Cumbria, Derby, East London, Gloucestershire, Greenwich, Northampton, Sunderland, West London, West of Scotland and Wolverhampton, plus Anglia Ruskin University, Bath Spa University, Birmingham City University, Buckinghamshire New University, Canterbury Christ Church University, Coventry University, Edinburgh Napier University, Leeds Metropolitan University, London Metropolitan University, Middlesex University and Staffordshire University. Kingston University is in Million+ as well as University Alliance, but has been classified as a University Alliance institution for the purposes of this exercise; it is highly unlikely that this will make any discernible difference to our results.

Guild HE: University College Birmingham, Bishop Grosseteste University College Lincoln, Arts University College at Bournemouth, University of Chichester, University for the Creative Arts, University College Falmouth, Glyndwr University, Harper Adams University College, Leeds Trinity University College, Liverpool Institute for Performing Arts, University of St Mark & St John Plymouth, Ravensbourne, Rose Bruford College, Royal Agricultural College, St Mary's University College, St Mary's University College Twickenham, University of Winchester, University of Worcester, Writtle College and York St John University.

Non-affiliated institutions: the Universities of Aberdeen, Arts (London), Brighton, Buckingham, Chester, Dundee, Highlands and Islands, Hull, Keele, Kent, London (Institutes), Stirling, Strathclyde, Ulster, Wales (central functions), Wales (Trinity St

David) and Westminster, plus Aberystwyth University, Aston University, Bangor University, Bell College, Brunel University, Central School of Speech and Drama, City University, Conservatoire for Dance and Drama, Courtauld Institute of Art, Cranfield University, Cumbria Institute of the Arts, Dartington College of Arts, Edge Hill University, Edinburgh College of Art, Glasgow School of Art, Guildhall School of Music and Drama, Heriot-Watt University, Heythrop College, Homerton College, Institute of Cancer Research, Kent Institute of Art and Design, Leeds College of Art, Leeds College of Music, Liverpool Hope University, London Business School, London School of Hygiene and Tropical Medicine, London South Bank University, Queen Margaret University (Edinburgh), Robert Gordon University, Roehampton University, Royal Academy of Music, Royal College of Art, Royal College of Music, Royal Northern College of Music, Royal Scottish Academy of Music and Drama, Royal Veterinary College, Royal Welsh College of Music and Drama, School of Pharmacy, Scottish Agricultural College, Southampton Solent University, St George's Hospital Medical School, Stranmillis University College, Surrey Institute of Art and Design, Swansea Metropolitan University, Swansea University, Trinity College (Carmarthen), Trinity Laban Conservatoire of Music, University Campus Suffolk and the Wimbledon School of Art.

Those included in our definition of high-status institutions in addition to the Russell Group: Aston, Bath, Birkbeck College, Courtauld Institute of Art, Durham, East Anglia, Essex, Exeter, Homerton College, Lancaster, Queen Mary and Westfield College, Reading, Royal Holloway and Bedford New College, Royal Veterinary College, School of Oriental and African Studies, School of Pharmacy, Surrey, Sussex, University of the Arts London, University of London and York.

Appendix 2 Results by school performance (% achieving at least 5 A*–C grades at GCSE)

Figure A2.1: HE participation at age 18 or 19 by school performance
(% achieving at least 5 A*–C grades at GCSE)

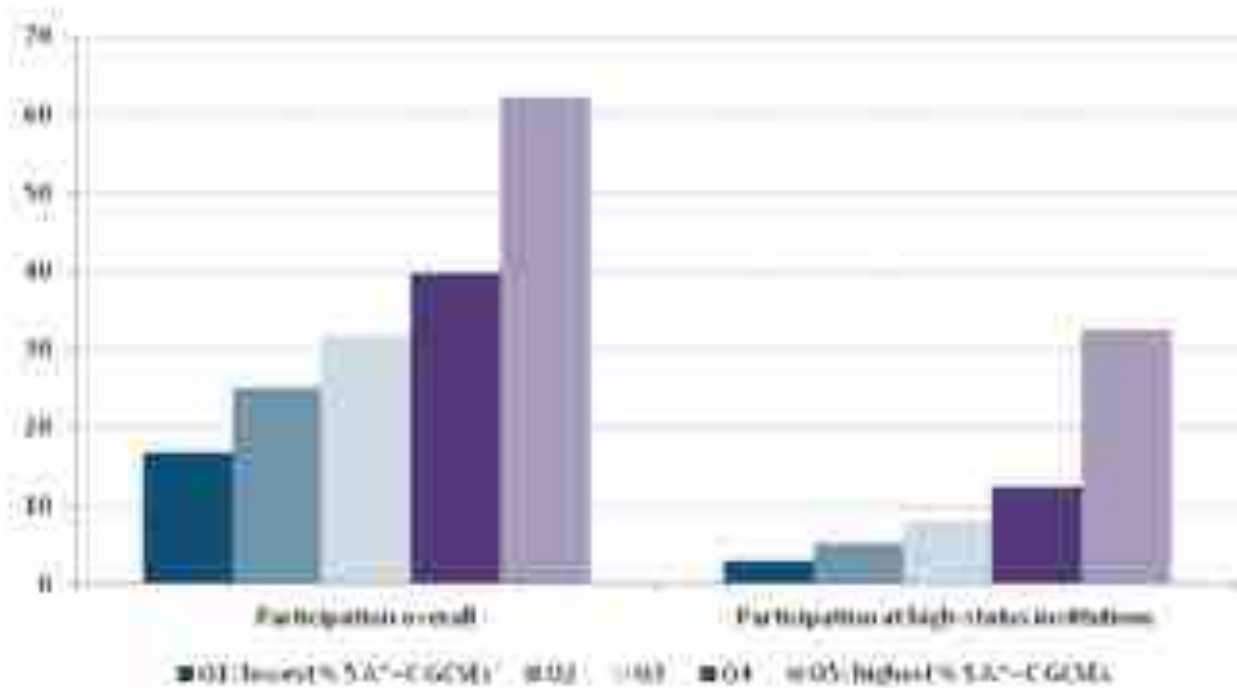


Figure A2.2: Differences in HE participation at age 18 or 19 by school performance
(relative to quintile 1: lowest % 5 A*–C GCSEs)

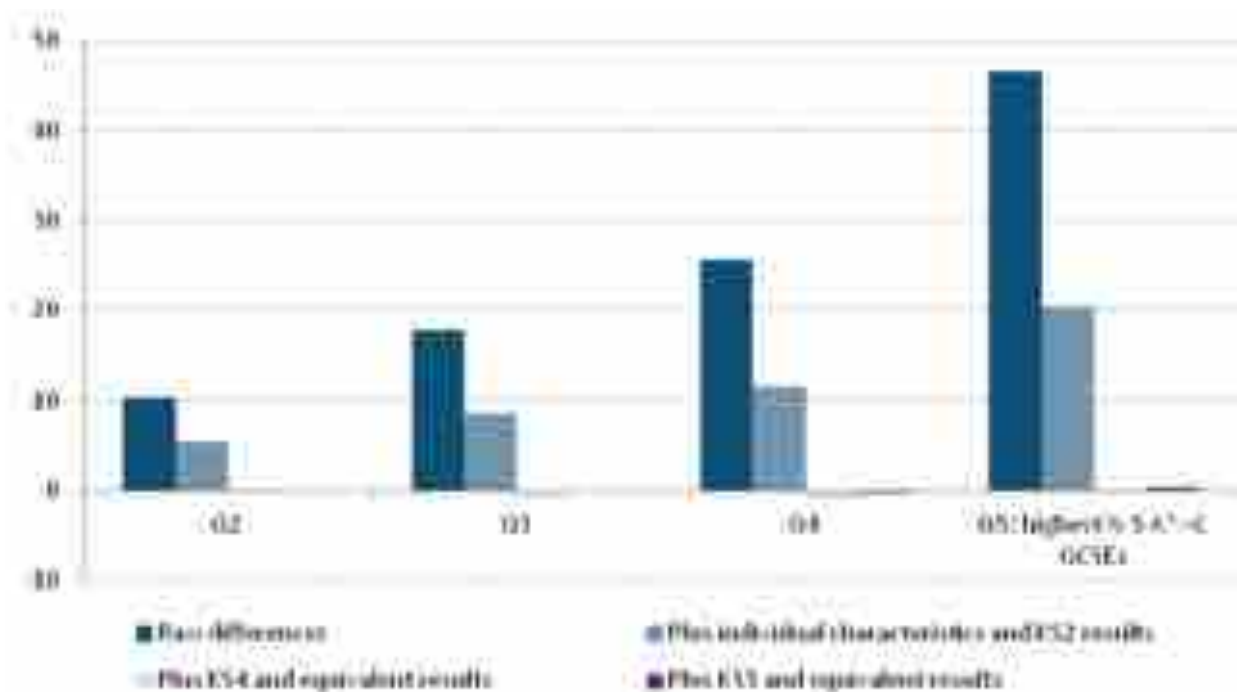


Figure A2.3: Differences in high-status HE participation at age 18 or 19 by school performance (relative to quintile 1: lowest % 5 A*-C GCSEs)

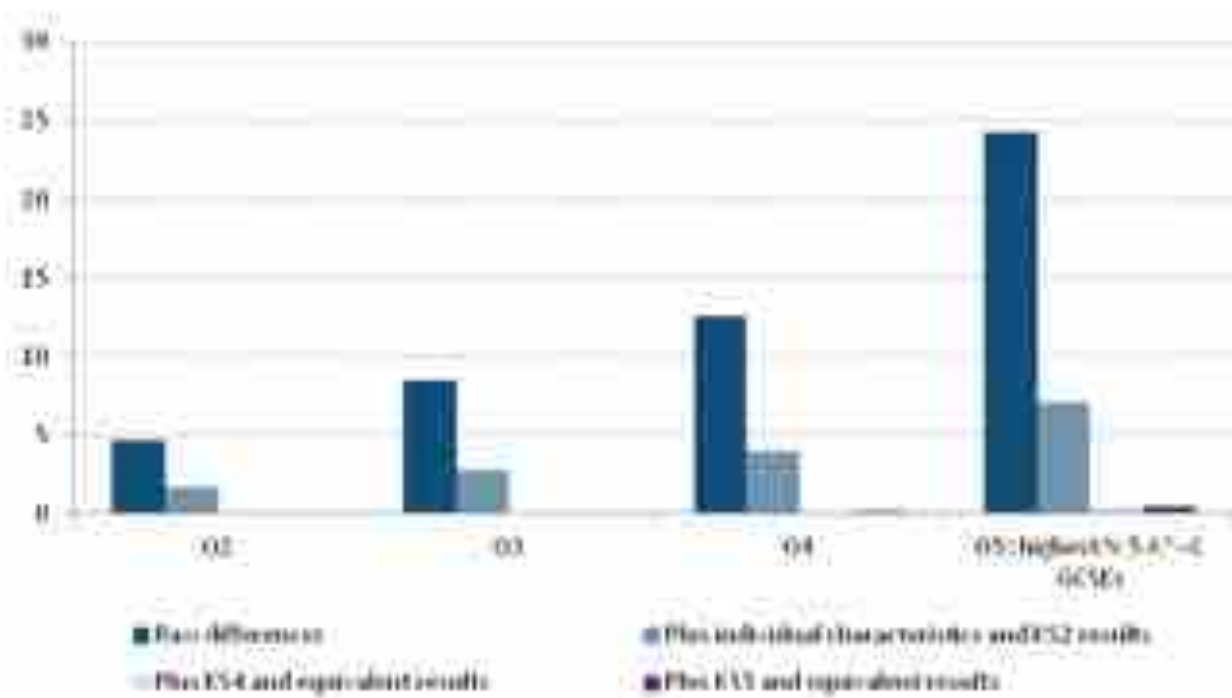


Figure A2.4: University outcomes by school performance (% achieving at least 5 A*-C grades at GCSE)

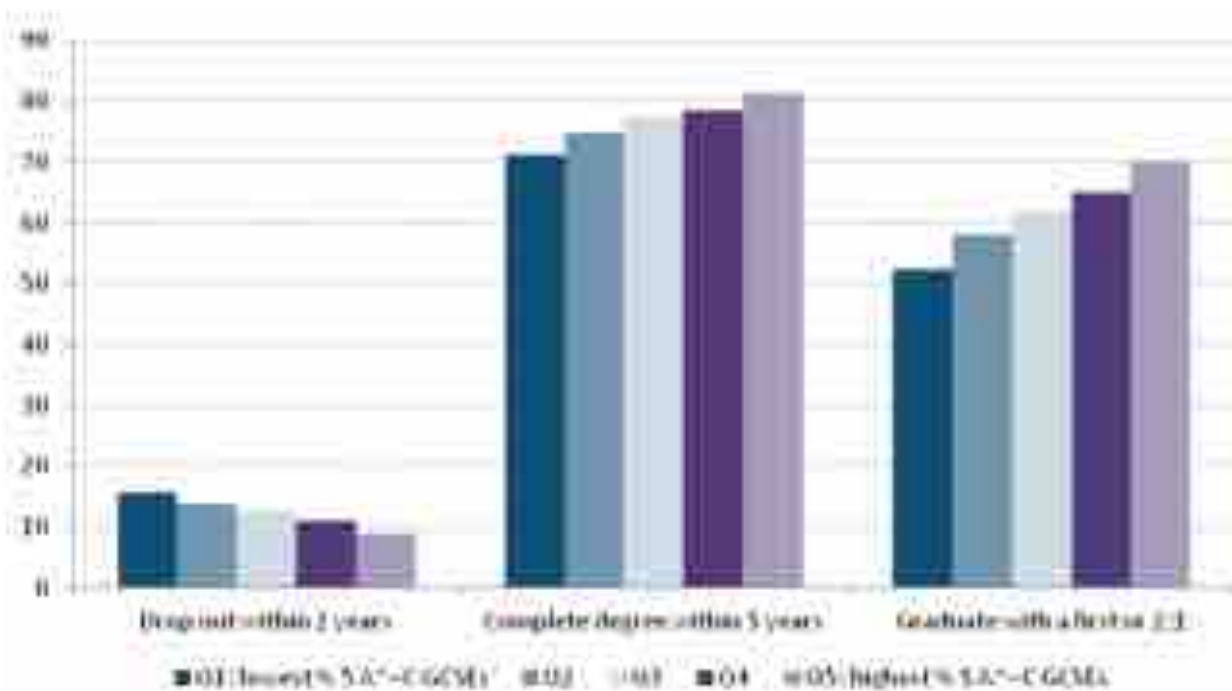


Figure A2.5: Differences in dropout by school performance
(relative to quintile 1: lowest % 5 A*-C GCSEs)

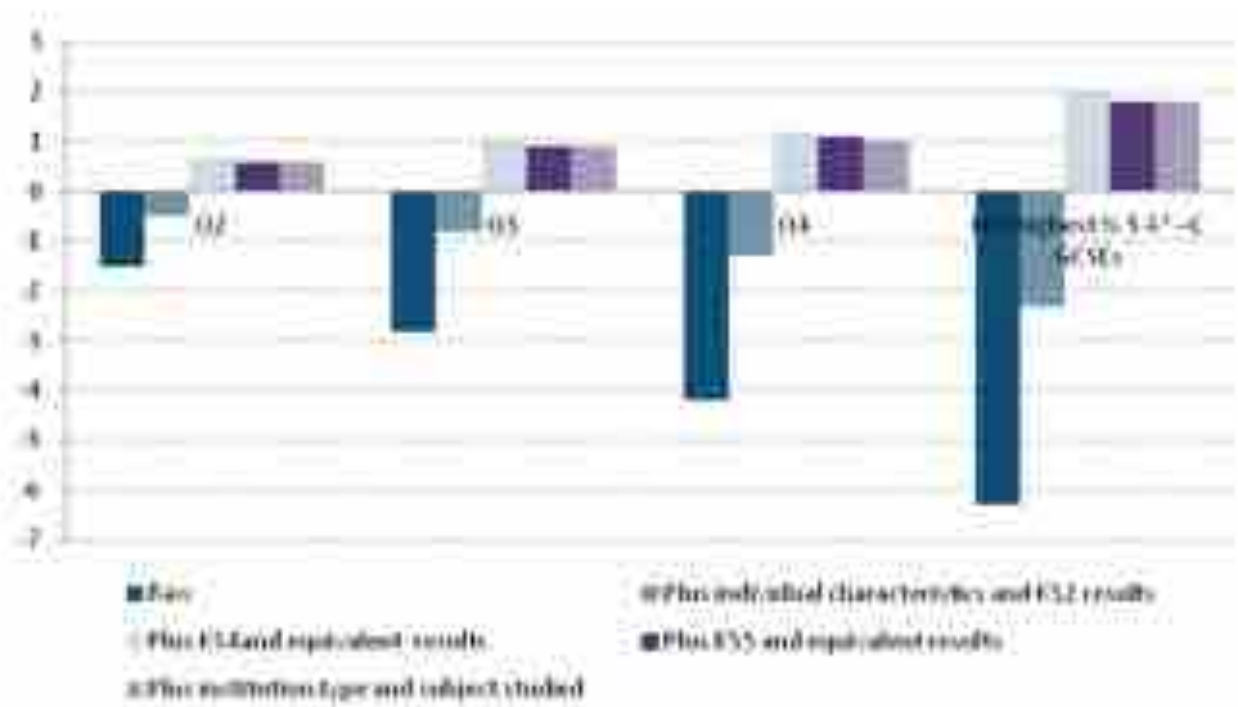


Figure A2.6: Differences in degree completion by school performance
(relative to quintile 1: lowest % 5 A*-C GCSEs)

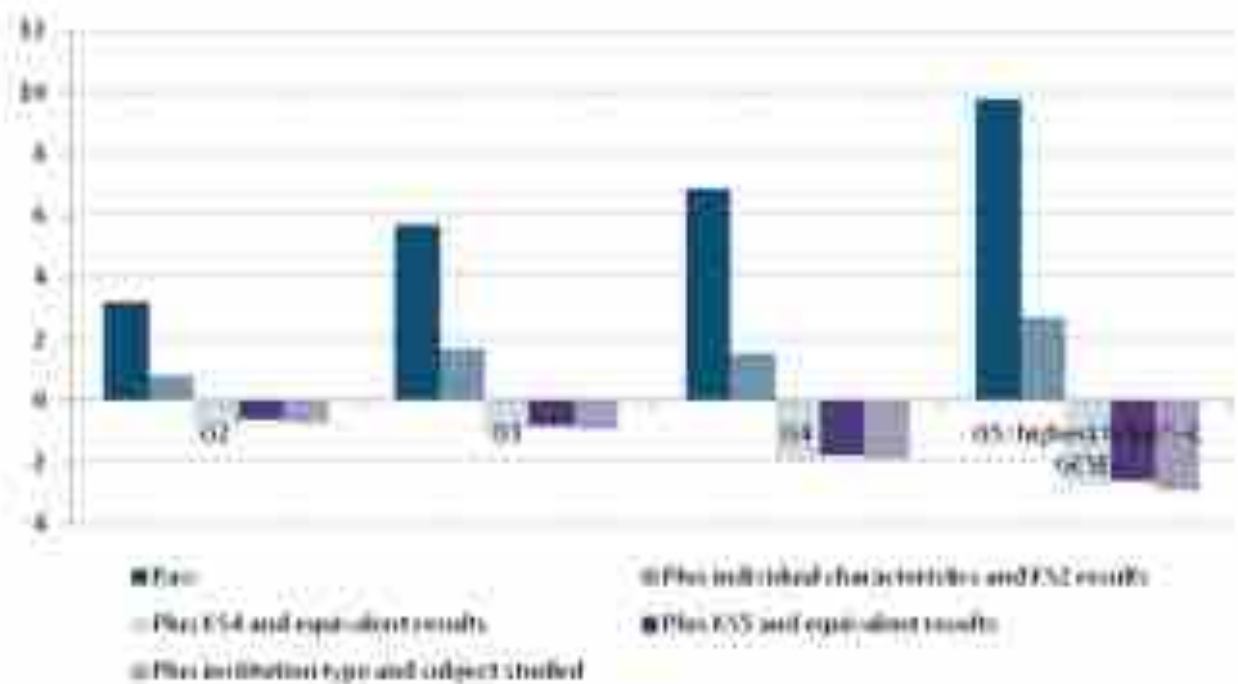
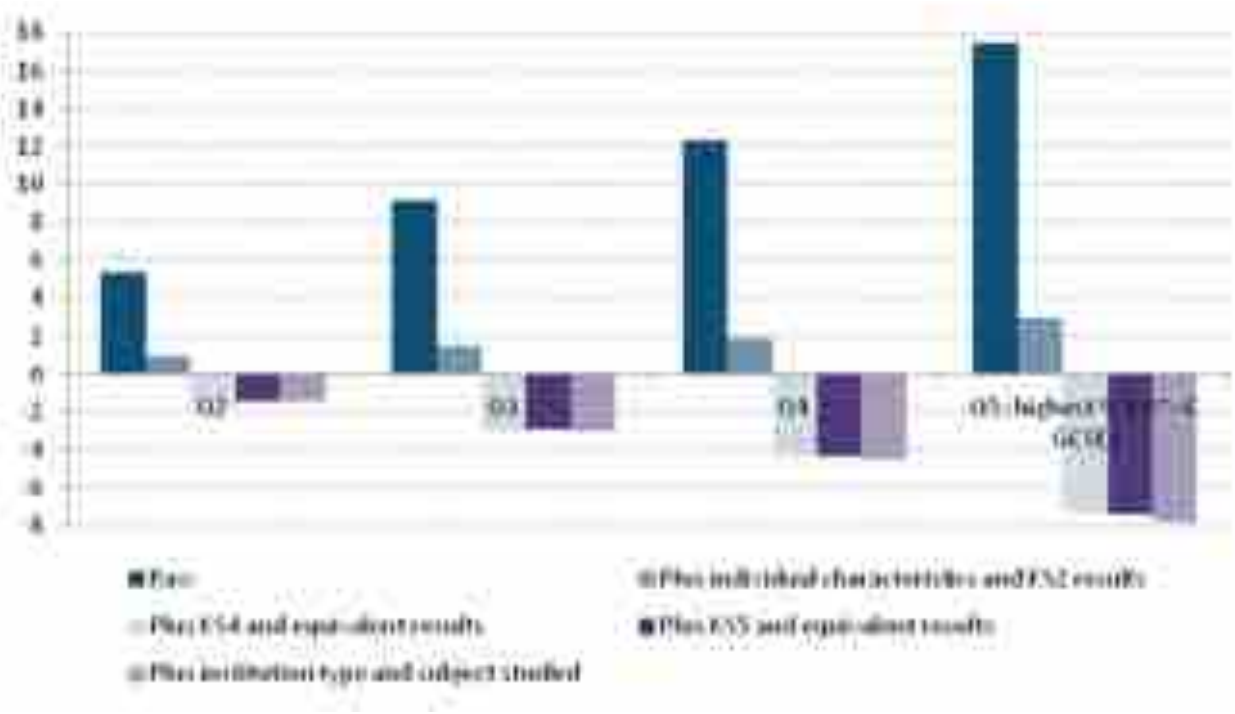


Figure A2.7: Differences in likelihood of graduating with a first or a 2:1 by school performance (relative to quintile 1: lowest % 5 A*-C GCSEs)





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