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# Assessing the role of grammar schools in promoting social mobility

Simon Burgess<sup>1</sup>, Claire Crawford<sup>2</sup> and Lindsey Macmillan<sup>3</sup>

## Abstract

One of the main motivations given for the proposed new expansion of grammar schools in England is to improve social mobility. We assess the role of existing grammar schools in promoting social mobility by examining a) access to grammar schools, differentiating among the 85% non-poor pupils, and b) the higher education outcomes of those who attend a grammar school relative to those who just miss out and relative to those who attend similar schools in non-selective areas. We find stark differences in grammar school attendance within selective areas by SES, even when comparing pupils with the same Key Stage 2 attainment. We also find that grammar school pupils are more likely to participate in higher education, and attend a high-status university than those who just miss out in selective areas. However, conditional on attendance and prior attainment, they do not perform as well at university. Worryingly, those who miss out on grammar places in selective areas who are high-attaining at primary school are significantly less likely to participate in university, attend a high-status university or achieve a good degree classification compared to equivalent pupils in non-selective areas. This highlights the harm that selective systems cause to those who do not make it into grammar schools. Taken together, these inequalities in access and outcomes suggest that grammar schools do not promote social mobility and actually work against it.

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## 1. Introduction

The never-fully-dormant policy debate on grammar schools in England was given a dramatic new lease of life by the Prime Minister's announcement in 2016 of an intention to significantly expand the role of academic selection<sup>4</sup>. The proposal came in a speech focussed on raising social mobility, so the link between the two concepts deserves strong scrutiny.

This is the aim of this paper. Social mobility relates where you end up in life to where you started from. We address the role of grammar schools in both parts of this, and contribute two new sets of evidence to the debate. First, focussing on where you start in life, we document for the first time the differences in the likelihood of attending a grammar school across the full range of socio-economic status (SES) in England, using a broad-based measure. While a lot of work (Andrews et al., 2016, Andrews and Hutchinson, 2016, Cribb et al., 2013) has conclusively demonstrated strong inequalities across the binary divide of a poverty line, our index provides new evidence assessing inequalities within the 85% non-poor population<sup>5</sup>. Second, turning to factors central to where you end up in life, we analyse the impact of academic selection on higher education (HE) participation and outcomes. This is also new evidence, showing for the first time the HE consequences of school selection: on those attending grammar schools, on high attainers just missing out, and, crucially, the matched counter-part pupils in non-selective areas. HE provides the key educational link between school outcomes (the typical outcome studied in this literature) and research looking at earnings outcomes<sup>6</sup>.

We confirm that access to grammar schools is highly skewed by SES: of the most deprived families living in selective areas, 6% attend a grammar school. The new data allows us to go further and show dramatic differences in access within the 85% non-poor families living in selective areas. For example, among families in the range from the 20<sup>th</sup> to the 40<sup>th</sup> percentile of SES, only 12% attend a grammar school. This

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<sup>4</sup> <http://www.newstatesman.com/politics/education/2016/09/full-text-theresa-mays-speech-grammar-schools>

<sup>5</sup> Cribb et al. (2013) and Cullinane (2016) also consider variation in access to grammar schools within the 85% non-poor population, although they both use IDACI quintiles, which are helpful but less informative than the evidence presented here.

<sup>6</sup> See Burgess et al (2014), Gregg et al. (2016), Crawford et al. (2016), Blanden et al., (2007), Blanden and Machin (2004, 2013).

group is of particular interest as they correspond to the Government's targeted social group, the 'Just About Managing' (JAM) families.

The starkest comparison is this: only as high as the 90<sup>th</sup> percentile of SES do more than half of the students in selective areas attend a grammar school, whereas in the top percentile 80% of pupils attend. This shows clearly that academic selection is a policy that really only benefits the very affluent.

These differences in attendance probabilities remain striking when we compare children with identical attainment at age 11 (Key Stage 2, KS2). Two children, one from the poorest SES quintile and one from the least deprived SES quintile, both performing at the 80<sup>th</sup> percentile of the KS2 distribution, differ by 45 percentage points in the fractions attending a grammar school.

Our second focus is on HE outcomes. We compare the outcomes for different groups of pupils within selective areas, and for matched groups between selective and non-selective areas. Within selective areas, those who attend grammars are 22 percentage points (ppts) more likely to participate in higher education than those who just miss out on a place<sup>7</sup>. They are also 17 ppts more likely to attend a high-status university.

Comparing higher education outcomes between those attending similar schools in selective compared to non-selective areas, we show that the outcomes for those who just miss out on attending a grammar are significantly and substantially worse than the outcomes for similar pupils attending similar schools in non-selective areas. This is a prime example of the harm that a selective system can do to attainment. We also find that grammar-educated pupils have similar chances of participating in, completing and achieving a high grade at university compared to those who attend high KS2 intake schools in non-selective areas.

The paper now proceeds as follows. In section 2 we review the existing evidence on access to grammar schools and on inequalities between selective and non-selective systems in the UK. Next we describe our main research questions, the data used in our analysis and the empirical strategy. In section 4 we present our two sets

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<sup>7</sup> We refer to pupils with high prior attainment who did not get into grammar schools as "just missing out", to distinguish them from low attaining pupils not in grammar schools who would have significantly missed out. Without access to actual 11+ scores we cannot know whether they literally "just" missed out – we do not claim that this is a regression discontinuity.

of results, and we end in Section 5 with a discussion of the implications of these results for policy on selection and on social mobility.

## **2. Evidence review**

Our research adds new evidence to two issues in selective schooling: access to grammar schools, and the association between selective systems and the inequality of later outcomes.

The first strand of literature on access to grammar schools has highlighted the disparities in access by pupils from different family backgrounds. Cribb et al. (2013) and Andrews et al. (2016) illustrate that only 3% of grammar school pupils are eligible for Free School Meals (FSM), the main measure of family background in administrative data, compared to 13% in other non-selective schools. While Andrews et al. (2016) state that this is not surprising given the gap in attainment between deprived and non-deprived pupils that exists by age 11, Cribb et al. (2013) takes this work further, by comparing access to grammar schools by FSM status for children who are high-achieving at age 11 in their Key Stage 2 tests, those who perform above the expected level (Level 5+). They find that only 40% of high-achieving FSM eligible pupils get into grammar school compared to 66% of high-achieving non-FSM pupils.

There is only one contemporary study, plus an historical one, presenting more disaggregated data on access to grammars beyond the simple binary FSM/Non-FSM distinction. This is important as we need to understand how access varies within the 85% of the population who are not eligible for FSM. Hart et al (2012) show that the last big expansion of grammar schools, prompted by the 1944 Education Act, did not improve the chances of disadvantaged children entering grammar schools. Indeed, they find that access, based on ability tests, was almost certainly biased in favour of those from middle-class backgrounds. A recent report for the Sutton Trust by Cullinane (2016) shows a strong social gradient across a neighbourhood-based measure of deprivation (IDACI quintiles). We contribute to this literature by illustrating how access to grammar schools varies across a broader measure of socio-economic status (SES), based on IDACI but incorporating other family background factors too.

The second strand of literature that we contribute to compares the distribution of various outcomes between selective and non-selective areas. The studies closest to ours are those by Atkinson et al. (2006) who consider schooling outcomes, and Burgess et al. (2014) focussing on earnings. Atkinson et al. (2006) use census population data from the National Pupil Database (NPD) for England and Wales, to compare Local Authorities (LAs) that are still selective now to similar matched non-selective LAs. They find that grammar-educated children in selective LAs outperform similar children in non-selective LAs on average while non-grammar-educated children in selective LAs underperform compared to similar children in non-selective LAs.

Burgess et al. (2014) use a nationally representative longitudinal panel dataset, *Understanding Society*, to compare the adult earnings of those growing up in LAs with grammar schools (selection by ability) compared to similar LAs with comprehensive systems (selection by house prices). They find strong evidence that earnings inequality is significantly higher among individuals that grew up in selective areas compared to those who grew up in comprehensive system areas. The magnitude is substantial and the differences are statistically significant: if you grow up in a selective system and end up a top earner, for example with earnings at the 90th percentile, you earn 9% more than the similar individual who grew up in a comprehensive system. At the other end of the scale, if you grow up in a selective system and don't do so well – earning at the 10th percentile – you earn 35% less than the similar individual who grew up in a comprehensive system.

We contribute to this research by adding the intermediate stage between school test scores and adult earnings – higher education outcomes.

There is a further literature on the impact of attending a grammar school on the marginal child, reviewed in Burgess et al (2014), which we do not address in this paper. There is also of course a substantial amount of research on the impact of ability-based selection across schools (often called “tracking”) in other European countries; see Burgess (2016) for a review of this evidence.

### 3. Data and methodology

#### a) *Research questions*

We are interested in comparing the access to and outcomes from selective and non-selective systems. Specifically, we want to ask:

1. How much does access to grammar schools vary by the SES of the family?
2. How much does access to equivalent high-performing intake schools in non-selective areas vary by the SES of the family?
3. Do grammar school pupils have better outcomes at higher education than those who just miss out on attending a grammar school and low attaining pupils within selective areas?
4. Do higher education outcomes differ for those who attend grammar schools in selective areas compared to equivalent schools in non-selective areas?
5. What about the rest of the population of selective and non-selective areas – do they have different higher education outcomes?

We have two groups of questions: first, comparing different groups of pupils within selective areas, those who made it into grammar schools and two different categories of those failing – those just missing out, and all the remainder. Second, we compare outcomes for very similar groups of pupils between selective and non-selective areas. We define a number of different groups to make these comparisons; whilst they are clear in principle, the empirical implementation can only of course be approximate. The degree of success of the matching is described below.

Table 1 sets out the six groups of interest across selective and non-selective areas: grammar attendees (group A); high-achieving pupils in selective areas who do not attend a grammar (group B); lower-achieving pupils in selective areas who do not attend a grammar (group C); pupils in non-selective areas who attend an equivalently high-performance intake school (group D); high-achieving pupils in non-selective areas who do not attend a grammar-equivalent (group E); and lower-achieving pupils in non-selective areas who do not attend a grammar-equivalent (group F).



## *b) Data*

We use administrative data from the National Pupil Database (NPD), covering all state educated pupils in England. This is linked to records from the Higher Education Statistics Agency (HESA), which enables us to follow all pupils attending secondary schools in England on to university anywhere in the UK. We choose as our sample the cohorts which took their GCSEs between 2003 and 2006<sup>8</sup>, and which potentially entered university at either age 18 or age 19 between 2005-06 and 2009-10. This sample choice enables us to follow the same cohort of students through university and observe their outcomes at the end of their course of study (up to five years later). The data contains information on individual performance at Key Stages 2 and 4, measures of the performance of the school the individual attended, other school-level characteristics and a number of local area identifiers. We are therefore able to identify the local authority of the school that the pupil attended and the type of school attended. The HESA data also provides information on higher education participation and outcomes.

A measure of socio-economic status (SES) is central to our analysis, and we follow the approach of Chowdry et al (2013). This uses an individual-level measure from the NPD (FSM eligibility) and enriches it with very-local neighbourhood measures to produce an index of socio-economic status. We use a principal components approach. The neighbourhood measures are: the Index of Multiple Deprivation score (available for neighbourhoods containing approximately 700 households); the classification of neighbourhood type (available for neighbourhoods containing approximately 15 households); and three very local area-based measures from the 2001 census; specifically, the proportion of individuals in each area (i) who work in higher or lower managerial or professional occupations, (ii) whose highest educational qualification is national qualification framework level 3 or above and, (iii) who own (either outright or through a mortgage) their home; (these are available for neighbourhoods containing approximately 150 households). All of these are linked in to the NPD using the home postcode when the focus child is 16 years old. See Chowdry et al (2013) for further details and robustness analysis of the construction of

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<sup>8</sup> Note that we have replicated our analysis using cohorts which took their GCSEs between 2006 and 2009 and find similar results for access and HE participation.

this index. This is therefore a considerably broader measure than simply using IDACI.

To explore differences in higher education outcomes across groups we use information from the linked HESA records. First, participation measures – outcomes that occur at age 18/19, including whether the pupil participated in higher education and whether they attended a high-status institution<sup>9</sup>. Second, outcome measures – outcomes that occur towards the end of university, including dropping out within two years, degree completion within five years and degree classification, defined as achieving a first or 2:1 relative to a lower classification (see Crawford, 2014).

### *c) Matching*

Our first task is to identify a comparable set of selective and non-selective areas. We follow Burgess et al. (2014) in designating an area as “selective” if more than 20% of each academic cohort attends a grammar school and restricting non-selective areas to those in which less than 5% of each academic cohort attends a grammar school. We ensure that we are comparing similar selective and non-selective areas by matching non-selective areas to all selective areas based on historical local-area characteristics that may drive differences in whether those areas are selective or not: whether they had a Conservative majority in 1981 and the corresponding population density from the 1981 census<sup>10</sup>.

Table 2 shows that our selective and non-selective areas look very similar across a range of local-area characteristics including the proportion of the population with a degree, the proportion working in top NS-SEC occupations, average earnings and unemployment levels and the proportion inactive. No area-level differences between selective and non-selective areas are statistically significant at conventional levels. Our matched areas also have very similar overall levels of individual-level Key Stage 2 performance. The selective areas have marginally higher performance at Key

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<sup>9</sup> To derive our measure of ‘high status’, we followed Crawford (2012) who linked institution-level average Research Assessment Exercise (RAE) scores – a measure of research quality – from the 2001 exercise, and included all Russell Group institutions plus any UK university with an average 2001 RAE score exceeding the lowest found among the Russell Group. This gives a total of 41 ‘high-status’ universities out of 163 institutions. See Crawford (2012) for a full list of institutions included.

<sup>10</sup> Note that matching including this wider range of characteristics provided a lower quality of match. Results available from the authors on request.

Stage 4 with 59.8% (50.5%) attaining 5 or more GCSEs grade A\*-C (including English and maths) in selective areas compared to 58.7% (49%) in non-selective areas. The individual-level differences, although qualitatively small, are significant at 5% levels<sup>11</sup>.

Our second task is to identify the groups of interest defined in Table 1 within our matched selective and non-selective areas. While we are able to observe in the data whether a pupil attended a grammar school or not, making the identification of groups in selective areas (A, B and C) fairly simple, the task of identifying comparable groups in non-selective areas is more difficult. We have to make a choice about the type of schools in non-selective areas that are similar to grammars, and we chose those that have a similar Key Stage 2 intake to that of grammar schools in selective areas, because that is the essence of selection by ability. To do this, we match secondary schools in selective and non-selective areas based on school-level Key Stage 2 scores; this is groups A and D in Table 1. However, because the intakes are so extremely selected in grammar areas, there are not many schools with similar intakes in non-selective areas; we therefore discuss the sensitivity of our results to the approach below.

One factor complicating the precise identification of the equivalent to the grammar/non-grammar boundary in non-selective areas is that some pupils scoring at the 50<sup>th</sup> percentile of Key Stage 2 are found in grammar schools. By matching on school-level Key Stage 2 intakes we aim to replicate what grammar schools look like, rather than identifying selection for each individual pupil.

For those not attending grammar schools or equivalent schools in non-selective areas, we separate out two groups based on individual-level Key Stage 2 performance: those who just miss out on attending a grammar or equivalent who attain in the top half of the Key Stage 2 distribution (groups B and E in Table 1); and those who do not attend a grammar or equivalent and who attain in the bottom half of the distribution of Key Stage 2 (groups C and F in Table 1). We therefore identify these pupils by taking all pupils not in grammars in selective areas (and all pupils not

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<sup>11</sup> Note that given the fact we use population data, almost any difference is likely to be statistically significant.

in grammar-equivalents in non-selective areas) and divide them into two groups by their KS2 scores – those scoring in the top half and those in the bottom half.

Table 2 shows that our matched grammar and equivalent high KS2 intake schools in non-selective areas (group A and D) have similar school-level characteristics in terms of the proportion sixth forms and initial intake but grammars are more likely to be single sex schools and perform slightly higher at Key Stage 4. All school-level differences, again although substantively small, are significantly different in the pupil level data (with the exception of the proportion of schools with sixth forms – every school in both groups has a sixth form). The non-grammar and equivalent schools (groups B/C and E/F) have similar gender mixes and initial intake. The selective area schools are more likely to have sixth forms (80% compared to 60% in non-selective areas) and also perform slightly better at Key Stage 4 although slightly worse when including the restriction of achieving an A\*-C in English and maths.

In summary, the matching of areas and schools is not perfect, but given the data we have it is sufficiently close to support the type of inference we wish to make in this analysis, discussed next.

#### *d) Empirical models for Higher Education measures*

Our approach to answering our first two research questions on access to grammar schools is purely descriptive: we describe the proportion of pupils from each SES percentile attending a grammar graphically. We also show the relative chances of attending a grammar in a selective area compared to an equivalent high-intake school in a non-selective area, adjusting for different group sizes here by standardising the relative chances for each group (adjusting for the group mean and standard deviation). Finally, we also show graphically how grammar attendance rates vary by SES quintile for pupil performance at each KS2 percentile.

For our three remaining research questions on higher education outcomes, we use simple linear probability models to describe the associations between outcomes, pupil characteristics and school attended. While we interpret these regressions as giving a broad sense of the impact of being assigned to specific school types, we are certainly not claiming that these are causal estimates. For these to identify true causal effects, there would need to be no unobservable factors sorting pupils into

schools that are correlated with outcomes; while our included covariates will absorb a great deal of heterogeneity, we do not claim that they account for it all.

When considering the HE participation questions, we address research question 3, the within-selective area question, using this model:

$$Participation_{i,s} = \alpha + \beta grammar_{i,s} + X_{i,s}^{primary} + u_{i,s} \quad (1)$$

for pupil  $i$  in school  $s$ . The dummy  $grammar_{i,s}$  is defined respectively relative to the just missing out group (group B), and then to the low-attaining pupils at Key Stage 2 (group C). The following standard individual controls are included in  $X_{i,s}^{primary}$ : gender, ethnicity, region, cohort, SES quintile, Key Stage 2 English quintile, Key Stage 2 maths quintile, and Key Stage 2 science quintile.

Research questions 4 and 5, the between-areas participation questions, are similarly addressed, with the coefficient of interest being on the dummy variable for living in a selective compared to non-selective area ( $selective_{i,s,a}$ ); this is estimated three times comparing across our three groups: grammars and equivalent high-intake schools (A versus D), high performing non-grammar pupils (B versus E) and low performing non-grammar pupils (C versus F).

$$Participation_{i,s,a} = \alpha + \gamma selective_{i,s,a} + X_{i,s}^{primary} + e_{i,s,a} \quad (2)$$

The  $X_{i,s}^{primary}$  set of variables is the same.

Finally, we consider the HE outcomes, conditional on participation at university. First, in the within-area context (research question 3), comparing the outcome of attending a grammar school:

$$Outcome_{i,s,a} = \alpha + \tau grammar_{i,s} + X_{i,s}^{primary} + Z_{i,s}^{secondary} + \varepsilon_{i,s} \quad (3)$$

And second, in the between-area context (research questions 4 and 5):

$$Outcome_{i,s,a} = \alpha + \rho selective_{i,s,a} + X_{i,s}^{primary} + Z_{i,s}^{secondary} + \epsilon_{i,s,a}$$

(4)

In both cases, the additional control vector,  $Z_{i,s}^{secondary}$ , contains a standard set of individual-level secondary school controls (see Crawford, 2014 for further details): GCSE English and maths point score, Number of A\* in EBacc subjects, Number of As in EBacc subjects, Number of Bs in EBacc subjects, Number of Cs in EBacc subjects, Number of D-Gs in EBacc subjects, Number of A\* in other GCSE subjects, Number of As in other GCSE subjects, Number of Bs in other GCSE subjects, Number of Cs in other GCSE subjects, Number of D-Gs in other GCSE subjects, A in GNVQ, B in GNVQ, C in GNVQ, D-G in GNVQ, Level 2 grade A-C quintile, a Level 2 FE qualifications score and a Level 2 vocational qualifications score.

## 4. Results

### a) Access to grammar schools

Previous research on access to grammar schools has been largely limited to the use of a binary indicator of poverty (eligibility for FSM), which typically separates the population into 15% and the remaining 85%. Our data allow us to use a much broader, and continuous, measure of SES, and in particular differentiating among the 85% of families who are non-poor.

Figure 1 illustrates the difference in attendance at grammar schools in selective areas across the entire distribution of SES for the first time (research question 1). While other studies have shown differences in access by IDACI quintile, we can see that there are stark non-linearities even within quintiles of the population. We find that access to grammar schools is highly skewed: only 6% of those at the 10<sup>th</sup> percentile of SES attends a grammar school. This increases slowly for the bottom half of SES with only 9% of those at the 20<sup>th</sup> percentile attending grammar schools, and only 17% of those at the 40<sup>th</sup> percentile (this is broadly the range of the ‘just about managing’

group of families identified by the UK government<sup>12</sup>. For those from median SES families, 23% attend a grammar and at the 75<sup>th</sup> percentile 34% attend. There is a stark contrast to those from the richest 10% of families. 51% of those at the 90<sup>th</sup> percentile of SES attends a grammar and 79% of the top 1% of SES attend a grammar.

Figure 2 addresses research question 2, comparing the relative chances of attending a grammar school in selective areas to the chances of attending a similarly high-performing intake school in a non-selective area. It is clear that in comparison to access to grammar schools in selective areas, the relative chances of attending a comparable school in a non-selective area is far more evenly spread across the distribution of SES, with those from more deprived families only slightly less likely to attend comparable-intake schools than those from the 70<sup>th</sup> percentile. While there is also an increase in the relative chances of attending a high-performance-intake school at the top of the distribution of SES in non-selective areas, the gradient is far less pronounced than that found in selective areas.

Given that there is a positive correlation between SES and attainment, it may be the case that these SES gradients are simply reflecting higher achievement among pupils from more affluent families. In Figure 3, we therefore present differences in access to grammar schools within selective areas by SES for a given level of Key Stage 2 achievement.

When considering SES gradients conditional on attainment at age 11, there are clear differences in access by family background. Children from the most affluent families performing in as low as the 35<sup>th</sup> percentile of the Key Stage 2 distribution have a positive chance of accessing a grammar school in selective areas. For those from the most deprived families, they need to be achieving at least at the 50<sup>th</sup> percentile before there is a chance of attending a grammar school. There is a gap of around 25-30 percentage points on average between the chances of accessing a grammar for those from high and low SES families from the 50<sup>th</sup> to the 100<sup>th</sup> percentile. If we compare two children, one from the poorest SES quintile and one

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<sup>12</sup> Theresa May: “It means putting government firmly on the side of not only the poorest in our society, important though that is and will remain, but also of those in Britain who are working hard but just about managing.” <http://www.newstatesman.com/politics/education/2016/09/full-text-theresa-mays-speech-grammar-schools> . Possible definitions of the “just about managing” are discussed here: <http://www.bbc.co.uk/news/uk-politics-38049245> . In our data, we use a definition of between the 20<sup>th</sup> and 40<sup>th</sup> percentile of the SES distribution.

from the least deprived SES quintile, both performing at the 80<sup>th</sup> percentile of the Key Stage 2 distribution, the most deprived pupil has only a 25% chance of attending a grammar compared to a 70% chance for the least deprived pupil - a 45 percentage point gap for children with the same achievement at age 11.

To summarise, access to grammar schools within selective areas is strongly socially graded, to a much greater extent than access to similar high-intake schools in non-selective areas, and this is not purely driven by the positive association between SES and attainment. Even comparing pupils who achieve the same at Key Stage 2, there are large differences in the chances of accessing a grammar school within a selective area by SES.

*b) Higher education participation by secondary school experience*

We now turn to considering how higher education participation decisions differ for those within selective areas and for comparable groups in selective and non-selective areas. First, in panel A of Table 3, we present results on the within-area question (research question 3): we compare the performance of those who attend grammars, first, to those who just miss out and second, to those who are low-achieving at Key Stage 2, within selective areas. As we would expect, those who attend grammar schools are significantly more likely to participate in higher education and attend a high-quality university than those who just miss out on attending a grammar school. Conditional on demographics and attainment at Key Stage 2, grammar school students are 22 percentage points more likely to attend university and 17 percentage points more likely to attend a high-status university than those who miss out on a grammar school.

For those who achieve in the bottom half of the distribution at Key Stage 2, unsurprisingly they are 35 percentage points less likely to attend any university and 12 percentage points less likely to attend a high-quality institution, after conditioning on demographics and primary school performance<sup>13</sup>.

The second panel of Table 3 presents the between-areas results (research questions 4 and 5): the differences in participation between selective and non-

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<sup>13</sup> We note that while this result is not surprising, once we condition on KS2 the common support is small, as we can see from figure 1 and 3.



selective areas for our groups of interest. Comparing first grammar pupils to those who attend schools with similarly high-performing intakes, these students have very similar probabilities of participating in higher education although grammar pupils are 8 percentage points less likely to attend a high-status university compared to their non-selective grammar equivalents (relative to a mean of 39 percent), controlling for demographics and KS2 attainment.

One key finding is that comparing those who just miss out on attending a grammar school in selective areas to their equivalents in non-selective areas, the former group are significantly less likely to participate in university at all (3 percentage points) and 8 percentage points less likely to attend a high-quality university. This is in some ways a central part of the case against grammar schools – the presence of selection implies significant harm to high-performing pupils who just fail to clear the hurdle of the selection exam.

Finally, comparing low-attaining pupils in selective and non-selective areas, the chances of participating in university are low for both, and very similar. Nevertheless, the low-attaining pupils from selective areas are 3 percentage points less likely to attend a high-quality university compared to their non-selective counterparts.

Taken together, those in non-selective areas have a more equal chance of attending higher education and high-quality universities across their secondary school experience, compared to those from selective areas. This fits well with the findings of Burgess et al (2014) on the greater inequality of earnings in selective areas.

### *c) Higher education outcomes by secondary school experience*

Finally, moving on to consider later outcomes from higher education, we consider differences within and between areas in terms of: dropping out of a degree within two years, completion of a degree course within five years and achieving a first or 2:1 classification upon completion. Table 4 Panel A compares HE outcomes within selective areas (research question 3).

The results show that grammar pupils are significantly less likely to drop out of university and significantly more likely to complete a degree course and attain a first or a 2:1 than those who just miss out on attending a grammar or low-achieving pupils

at Key Stage 2, both unconditionally and conditional on demographics and KS2 attainment. However, when we control for individual-level KS4 attainment measures (noted above,  $Z^{secondary}$ ), the signs reverse and grammar school pupils appear to be somewhat more likely to drop out, less likely to complete their course and less likely to attain a high classification than a “just-missing-out” pupil<sup>14</sup>. This mirrors previous findings on private school pupils, which suggests that they do not do as well at university when compared to similarly-performing state-educated pupils (Smith and Naylor, 2005). Possible explanations include the fact that, like private schools, grammar schools are good at preparing students to perform well in their secondary school exams but their pupils are less prepared for independent study as a result.

Comparing across selective and non-selective areas (research questions 4 and 5), panel B illustrates that grammar school pupils are slightly more likely to drop out of university, not complete their course and achieve lower than a first or a 2:1 degree classification compared to those from similarly high-performance intake schools in matched non-selective areas in our raw comparisons. Conditioning on demographics and primary school attainment does little to change this story but once we condition on secondary school attainment there is no difference in degree attainment, although grammar school pupils are still slightly less likely to complete and more likely to drop out (less than 1 percentage point).

However, similar to our findings for degree participation, when comparing those who just miss out on attending a grammar in a selective area to their equivalents in non-selective areas, those who miss out on attending a grammar school are more likely to drop out of university and less likely to complete their course or attain a first or 2:1 classification compared to their non-selective counterparts. Even conditional on a broad range of measures of secondary school attainment, those who just miss out on a grammar are 3 percentage points less likely to attain a high-classification at degree level compared to non-selective equivalents, with a similar difference in probability when comparing low-attaining pupils at Key Stage 2 from selective and non-selective areas. This again suggests that higher education outcomes are more unequal among selective compared to non-selective areas.

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<sup>14</sup> This change in coefficients implies that attendance at a grammar school has a significant effect on KS4 scores in this data; other researchers have also found this. As we noted earlier, this is not the dataset to try to establish a water-tight causal effect of grammars on KS4 outcomes, so we do not emphasise that here.

#### *d) Robustness*

The methodology for identifying our key groups of interest requires a set of assumptions and clearly other decisions could have been made. Whilst we cannot test every alternative, we have replicated our findings for some other definitions of grammar-equivalents in non-selective areas as perhaps the key decision. Note that this has an impact on the definition of group D but also groups E (and to a lesser extent) group F, as these are the remaining schools (pupils) that are not defined as grammar-equivalents. Our base case is to compare grammars (group A) to schools with similarly high-performing intakes in non-selective areas (group D); this seems to most closely approximate the defining sense of a grammar school as having very high average intake attainment.

An alternative strategy however is to use some combination of intake and school performance (school-level Key Stage 4 value added). Appendix Tables A1 and A2 present our results for this alternative definition of 'grammar equivalent' in non-selective areas. As can be seen, the results are almost identical to those presented in sections b) and c) above, suggesting that our results are not sensitive to our choice of definition here.

We also considered a straight-forward alternative of Key Stage 4 performance for non-selective equivalents: attending a school in the top 10% of school performance at Key Stage 4. Again, the findings from using this third definition of grammar-equivalents in non-selective area are reassuringly similar to those found in the main results presented here (results available from the author on request).

## **5. Conclusions**

A grammar school system – selection by ability – is often proposed as a way to boost social mobility. Most recently, this seems to be the view of the UK Prime Minister. Taking this case head on, we have shown that there is no support for it in the data.

First, we offer new evidence on access to grammar schools. We have shown that only among the very affluent do more than half of the pupils get into a grammar school; the grammar system has nothing to offer to most families. Even at the 75<sup>th</sup> percentile of the SES distribution, only a third of children in selective areas access

grammars, whereas the chance is 80% for a family at the 99<sup>th</sup> percentile. Second, we analyse higher education outcomes as a key proximate determinant of life chances. We have shown that the system harms the university prospects of bright pupils who do not quite make it into grammar schools, relative to their peers in non-selective areas. For example, they are 8 percentage points less likely to attend a high-quality university, are less likely to achieve a good degree classification and are more likely to drop out. Furthermore, the selective system does not even produce clear gains in university outcomes for those who do attend grammars.

Taken together, our results suggest that access to grammar schools is strongly related to family background, even conditional on KS2 attainment, and the cost of not accessing a grammar school in a selective area is high in terms of later outcomes. This combination of inequality in access and harm in outcomes serves to exacerbate inequalities across generations, severely limiting equality of opportunity and life chances of those from more deprived families.

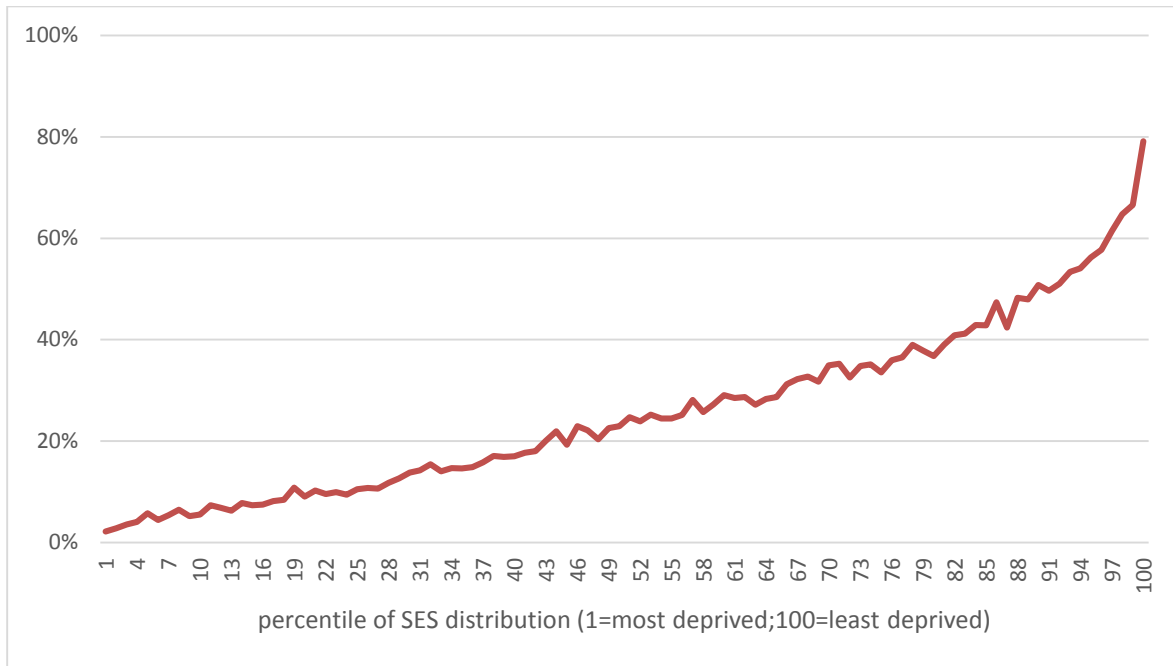
Our findings on access to grammar schools have a final implication. Given that the likelihood of getting into a grammar school is really only significant for the very affluent (above the 90<sup>th</sup> percentile of SES), the politics of assembling a majority for a return to a grammar school system might not be as straightforward as often assumed.

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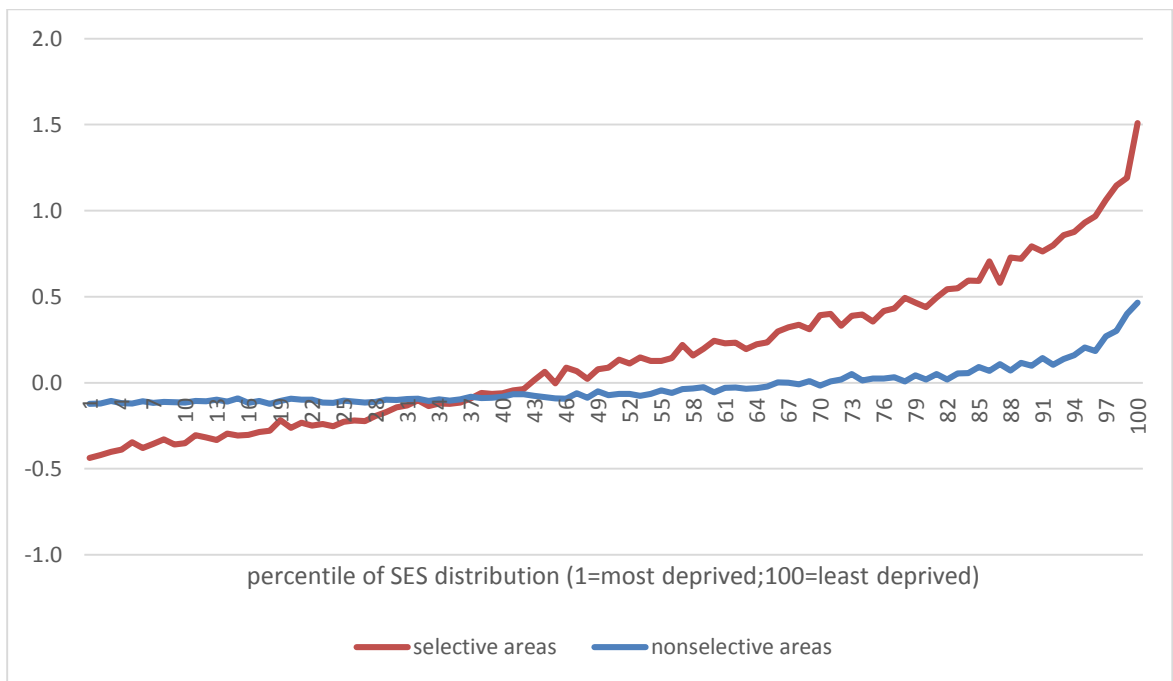
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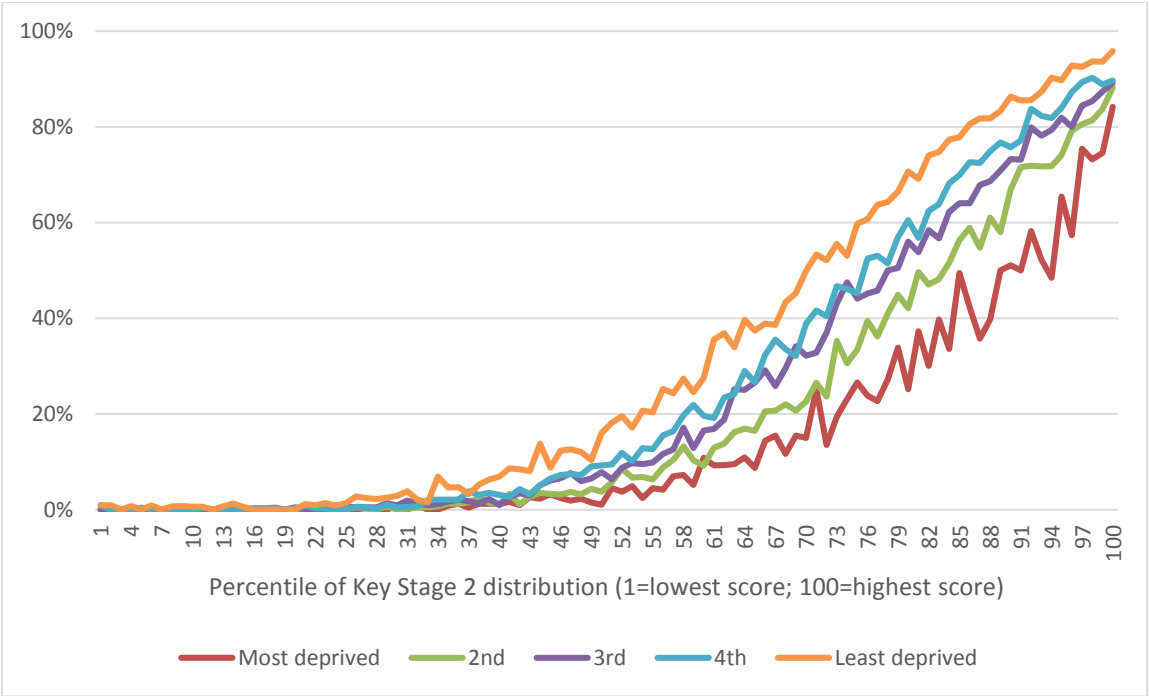
**Figure 1:** Grammar school attendance in selective areas by socio-economic status



**Figure 2:** Relative chance of attending a grammar school in selective areas compared to schools with similar Key Stage 2 intakes in matched non-selective areas by socio-economic status



**Figure 3:** Grammar school attendance in selective areas by Key Stage 2 attainment and socio-economic status





**Table 1:** Defining comparable groups in selective and non-selective systems

	Selective	Non-selective
Grammar or equivalent	Attends a grammar school  <b>(A)</b>	Attends a school matched with grammar on KS2 performance  <b>(D)</b>
Non-grammar high KS2 attainment – Just missing out	Not at grammar school but achieves in top 50% at KS2  <b>(B)</b>	Attends a school matched with non-grammar on KS2 performance but achieves in top 50% at KS2  <b>(E)</b>
Low KS2 attainment	Not at grammar school and achieves in bottom 50% at KS2  <b>(C)</b>	Attends a school matched with non-grammar on KS2 performance and achieves in bottom 50% at KS2  <b>(F)</b>

**Table 2:** Comparing local area-, individual-, school-level average characteristics across matched selective and non-selective areas

	<b>Selective</b>	<b>Non-selective</b>	<b>Difference</b>
<b>Area</b>			
Population Density	20.7	18.3	2.4
Conservative majority	18.9	17.0	1.9
Proportion unemployed 1981	11.3	10.1	1.2
Average earnings 1981	328.15	327.03	1.1
% with a degree 1981	5.4	7.2	-1.7
% inactive 1981	10	10	0
% in top social class in 1981	4.9	5.5	-0.6
<b>Individual</b>			
Key Stage 2 level	4.5	4.5	0.0**
% 5+ A*-C at GCSE	59.8	58.7	1.1**
% 5+ A*-C at GCSE (inc. E+M)	50.5	49.0	1.5**
<b>School</b>			
<b>Grammar or equivalent (A / D)</b>			
Proportion sixth form	1.0	1.0	0.0
Proportion single sex	0.7	0.5	0.2**
Key Stage 2 level	5.2	5.1	0.1**
% 5+A*-C at GCSE	97.9	95.4	2.4**
% 5+ A*-C at GCSE (inc. E+M)	96.9	93.1	3.8**
<b>Non-grammar or equivalent</b>			
Proportion sixth form	0.8	0.6	0.2**
Proportion single sex	0.1	0.1	0.0**
Key Stage 2 level	4.3	4.3	0.1**

% 5+A*-C at GCSE	47.7	45.5	2.1**
% 5+ A*-C at GCSE (inc. E+M)	34.3	34.8	-0.4**

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**Table 3:** Participation in higher education within selective areas and across matched selective and non-selective areas

	<b>Raw</b>	<b>Primary controls</b>
<b>Panel A: Within selective areas</b>		
Grammar vs Just missed out (A v B)		
<i>Attending university</i>	0.371** (0.003)	0.216** (0.003)
<i>Attending a high-status university</i>	0.316** (0.004)	0.168** (0.005)
Grammar vs Low KS2 attainment (A v C)		
<i>Attending university</i>	0.620** (0.002)	0.350** (0.005)
<i>Attending a high-status university</i>	0.437** (0.005)	0.121** (0.011)
<b>Panel B: Between selective and non-selective areas</b>		
Grammar vs non-selective equivalent (A v D)		
<i>Attending university</i>	-0.006 (0.004)	-0.008* (0.004)
<i>Attending a high-status university</i>	-0.094** (0.005)	-0.075** (0.005)
Just missed out vs non-selective equiv. (B v E)		
<i>Attending university</i>	-0.099** (0.002)	-0.025** (0.002)
<i>Attending a high-status university</i>	-0.143** (0.004)	-0.076** (0.004)
Low attainment vs non-selective equiv. (C v F)		

<i>Attending university</i>	-0.012**	0.004**
	(0.001)	(0.001)
<i>Attending a high-status university</i>	-0.033**	-0.033**
	(0.003)	(0.004)

Notes: Participation samples within selective areas – (A v B) = 106,970, (A v C) = 144,787. Between selective and non-selective areas – (A v D) = 75,053, (B v E) = 279,660, (C v F) = 356,567. High quality university attendance samples within selective areas – (A v B) = 61,601, (A v C) = 54,118. Between selective and non-selective areas – (A v D) = 56,131, (B v E) = 127,856 (C v F) = 48,181. Primary controls include: Gender, ethnicity, region, year of GCSEs, SES quintile, Key Stage 2 English quintile, Key Stage 2 maths quintile, Key Stage 2 science quintile.

**Table 4:** Higher education outcomes within selective areas and across matched selective and non-selective areas

	<b>Raw</b>	<b>Primary controls</b>	<b>Secondary controls</b>
<b>Panel A: Within selective areas</b>			
Grammar vs Just missed out (A v B)			
<i>Drop out of university</i>	-0.050** (0.003)	-0.023** (0.003)	0.014** (0.003)
<i>Completing university</i>	0.045** (0.004)	0.024** (0.004)	-0.015** (0.005)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	0.107** (0.005)	0.039** (0.005)	-0.034** (0.006)
Grammar vs Low KS2 attainment (A v C)			
<i>Drop out of university</i>	-0.109** (0.003)	-0.025** (0.007)	0.042** (0.007)
<i>Completing university</i>	0.094** (0.005)	0.024* (0.010)	-0.046** (0.011)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	0.268** (0.006)	0.075** (0.014)	-0.035* (0.014)
<b>Panel B: Between selective and non-selective areas</b>			
Grammar vs non-selective equivalent (A v D)			
<i>Drop out of university</i>	0.010** (0.003)	0.006* (0.003)	0.006* (0.003)
<i>Completing university</i>	-0.015** (0.004)	-0.009* (0.004)	-0.008* (0.004)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	-0.016** (0.005)	-0.013* (0.005)	-0.002 (0.005)

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Just missed out vs non-selective equiv. (B v E)

<i>Drop out of university</i>	0.032** (0.002)	0.017** (0.002)	0.006* (0.002)
<i>Completing university</i>	-0.026** (0.003)	-0.016** (0.003)	-0.006 (0.003)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	-0.078** (0.004)	-0.049** (0.004)	-0.032** (0.004)

Low attainment vs non-selective equiv. (C v F)

<i>Drop out of university</i>	0.018** (0.004)	0.007 (0.004)	0.002 (0.004)
<i>Completing university</i>	-0.006 (0.006)	-0.007 (0.006)	-0.002 (0.006)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	-0.023** (0.007)	-0.034** (0.007)	-0.026** (0.007)

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Notes: Dropout outcome samples within selective areas – (A v B) = 61,601, (A v C) = 54,118. Between selective and non-selective areas – (A v D) = 56,131, (B v E) = 127,856 (C v F) = 48,181. Completion outcome samples within selective areas – (A v B) = 53,537, (A v C) = 45,930. Between selective and non-selective areas – (A v D) = 49,740, (B v E) = 111,033 (C v F) = 35,792. Final grade outcome samples within selective areas – (A v B) = 43,836, (A v C) = 37,476. Between selective and non-selective areas – (A v D) = 41,535, (B v E) = 89,802 (C v F) = 26,538. Primary controls include: Gender, ethnicity, region, year of GCSEs, SES quintile, Key Stage 2 English quintile, Key Stage 2 maths quintile, Key Stage 2 science quintile. Secondary controls include: GCSE English and maths point score, Number of A\* in EBacc subjects, Number of As in EBacc subjects, Number of Bs in EBacc subjects, Number of Cs in EBacc subjects, Number of D-Gs in EBacc subjects, Number of A\* in other GCSE subjects, Number of As in other GCSE subjects, Number of Bs in other GCSE subjects, Number of Cs in other GCSE subjects, Number of D-Gs in other GCSE subjects, A in GNVQ, B in GNVQ, C in GNVQ, D-G in GNVQ, Level 2 grade A-C quintile, Level 2 FE qualifications score, Level 2 vocational qualifications score.

## Appendix

**Table A1:** Participation in higher education across matched selective and non-selective areas, matching based on school-level value added

	Raw	Primary controls
<b>Panel A: Between selective and non-selective areas</b>		
Grammar vs non-selective equivalent (A v D)		
<i>Attending university</i>	0.003 (0.004)	-0.009* (0.004)
<i>Attending a high-status university</i>	-0.080** (0.005)	-0.073** (0.005)
Just missed out vs non-selective equiv. (B v E)		
<i>Attending university</i>	-0.088** (0.003)	-0.019** (0.002)
<i>Attending a high-status university</i>	-0.133** (0.004)	-0.073** (0.004)
Low attainment vs non-selective equiv. (C v F)		
<i>Attending university</i>	-0.009** (0.001)	0.006** (0.001)
<i>Attending a high-status university</i>	-0.032** (0.003)	-0.033** (0.004)

Notes: Participation samples between selective and non-selective areas – (A v D) = 75,491, (B v E) = 243,588 (C v F) = 322,436. High quality university attendance samples between selective and non-selective areas – (A v D) = 56,300, (B v E) = 108,449 (C v F) = 42,760. Primary controls include: Gender, ethnicity, region, year of GCSEs, SES quintile, Key Stage 2 English quintile, Key Stage 2 maths quintile, Key Stage 2 science quintile.



**Table A2:** Higher education outcomes across matched selective and non-selective areas, matching based on school-level value added

	<b>Raw</b>	<b>Primary controls</b>	<b>Secondary controls</b>
<b>Panel A: Between selective and non-selective areas</b>			
Grammar vs non-selective equivalent (A v D)			
<i>Drop out of university</i>	0.004 (0.003)	0.004 (0.003)	0.003 (0.003)
<i>Completing university</i>	-0.003 (0.004)	-0.002 (0.004)	-0.001 (0.004)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	-0.011** (0.005)	-0.014* (0.005)	0.001 (0.005)
Just missed out vs non-selective equiv. (B v E)			
<i>Drop out of university</i>	0.031** (0.002)	0.017** (0.002)	0.008* (0.002)
<i>Completing university</i>	-0.025** (0.003)	-0.016** (0.004)	-0.007* (0.003)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	-0.077** (0.005)	-0.050** (0.005)	-0.034** (0.004)
Low attainment vs non-selective equiv. (C v F)			
<i>Drop out of university</i>	0.017** (0.004)	0.007 (0.004)	0.002 (0.004)
<i>Completing university</i>	-0.003 (0.006)	-0.005 (0.006)	-0.000 (0.006)
<i>Achieving a 1<sup>st</sup> or a 2:1</i>	-0.019* (0.008)	-0.032** (0.008)	-0.0233** (0.007)

Notes: Dropout outcome samples between selective and non-selective areas – (A v D) = 56,300, (B v E) = 108,449 (C v F) = 42,760. Completion outcome samples between selective and non-selective areas – (A v D) = 49,898, (B v E) = 94,075 (C v F) = 31,743. Final grade outcome samples between selective and non-selective areas – (A v D) = 41,524, (B v E) = 75,934 (C v F) = 23,469. Primary controls include: Gender, ethnicity, region, year of GCSEs, SES quintile, Key Stage 2 English quintile, Key Stage 2 maths quintile, Key Stage 2 science quintile. Secondary controls include: GCSE English and maths point score,

Number of A\* in EBacc subjects, Number of As in EBacc subjects, Number of Bs in EBacc subjects, Number of Cs in EBacc subjects, Number of D-Gs in EBacc subjects, Number of A\* in other GCSE subjects, Number of As in other GCSE subjects, Number of Bs in other GCSE subjects, Number of Cs in other GCSE subjects, Number of D-Gs in other GCSE subjects, A in GNVQ, B in GNVQ, C in GNVQ, D-G in GNVQ, Level 2 grade A-C quintile, Level 2 FE qualifications score, Level 2 vocational qualifications score.