Understanding parental choices of secondary school in England using national administrative data

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Abstract

We study the process of school choice in England, using a new dataset giving all the preferences of all parents seeking a school place in state secondary schools. We set out new facts on the number of choices made, the chance of getting an offer from the first choice, and whether the nearest school is first choice. We use the rich data available to describe these choices by pupil characteristics, school characteristics and neighbourhood characteristics. We show that parents do pro-actively use the choice system, but that the admissions criteria do not work well for poorer families.

Keywords: school admissions; school choice; inequality.

JEL Code: I24, I28

1. Introduction

Schools matter and schools differ: educational attainment is key to a child's life chances, and schools vary in their ability to raise attainment. For this reason, the process that a country uses to assign its children to schools is important for their subsequent academic achievement and their life chances. Since 1988, England has used a system of school choice to do this.[1] Parents nominate their preferred schools and, given school capacities, a set of codified criteria are fed into an algorithm to determine the allocation of pupils to schools. Given the centrality of the school assignment process for inequality and social mobility, surprisingly little is known about the operation of the school choice process, and in particular the role of parental preferences and constraints.

In this paper, for the first time, we use a national census dataset at pupil-level, which includes all the choices made by all parents seeking a place for their child in a state secondary school in England.[2] These data are further matched to characteristics of the pupils and to characteristics of the schools. Using these data, we set out a number of new facts about families' choices of school. These include the number of choices parents make – for example, whether they make just once choice or the maximum number allowed; the chance of getting that first choice – a balance of ambition and opportunity; and the propensity to choose the nearest school. We use the pupil-level data to characterise how these facts vary according to pupil characteristics, school characteristics and neighbourhood characteristics.

One focus for the paper is understanding the substantial socio-economic gap in the academic quality of the schools attended by pupils, although we show equally important differences between other groups. In our data, children eligible for Free School Meals (FSM) are enrolled in schools that have, on average, 12% lower academic attainment than the schools of more affluent children.[3] This could be due to geography (where people live and so which schools are commutable), different opportunities (for example mode of travel) or it could be due to the operation of the school choice system (for example decreasing probability of admission further from a good school). We show it is not simply geography. In fact, the academic quality of school that a child can reach within a reasonable school commute varies very little across the country.[4] For example, 37% of FSM-eligible pupils can reach a high-performing school[5], compared to 43% of non-FSM pupils. However, the chances of actually attending such a school vary dramatically: 4% of FSM-eligible pupils, compared to 17% non-FSM pupils. The new data described here allow us to explore FSM differences across a number of dimensions of school choice.[6] Our results therefore inform the debate about the role of education in inequality and social mobility, and is relevant to the growing concern in the UK about the consequences of gross inequalities in the social and economic circumstances of children and their families ("Britain, the great meritocracy" Prime Minister's speech, 9th September 2016[7]).

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[1] The Education Reform Act of 1988.
[2] We will consider differences between primary and secondary schools in a later paper.
[3] We use the percentage of pupils achieving at least 5 good passes including English and Maths (%5A*C(EM)).
[4] We base this on our data, taking the 80th percentile of first choice school-home distance as a measure of how far people are prepared to travel.
[5] A school where at least 80% of pupils achieve 5A*-C grades.
[6] We will take this analysis further in subsequent papers when we estimate causal models with this data.
[7] https://www.gov.uk/government/speeches/britain-the-great-meritocracy-prime-ministers-speech accessed 24/10/2017

Our results also inform the debate about the effectiveness of the school choice system itself. There are several requirements for a school choice system to operate effectively, in that school choice improves education outcomes and that choice is meaningful for parents. The first is that parents must make a choice. If parents make no choice at all or only one choice, this might imply that the school choice system is either not properly understood or that parents do not have strong preferences. It may also mean in some areas that there is only one choice that appears feasible to parents. Hence another condition for a functioning school choice system is that parents need to have a reasonably high probability of being admitted to a chosen school.[8] If parents have little chance of securing a school of their choice they are less likely to engage with the process. Lastly, for a school choice system to operate effectively to raise education outcomes it is not enough for parents to make choices. Parents must also value academic performance so that schools have an incentive to improve. If parents simply choose their nearest school this will not provide a strong incentive for schools to try to improve pupil attainment. In this paper, we provide empirical evidence on the extent to which these conditions hold.

The paper is structured as follows. Section 2 offers a brief summary of the school choice system in England. Section 3 describes our framework for analysis, and provides some intuition for interpreting the results. Section 4 describes the new dataset. Section 5 details the results and we offer an overview of the findings and broader discussion in section 6.

2. The school choice process in England

Parents in the English education system have the right to choose their child's school. More precisely, they have the right to express a preference for the school that they would like their child to go to. Parents provide a ranking of their preferred choices of school on a form that is submitted as part of a centralised system to their Local Authority (LA). Although there are different types of state schools in England (discussed further below), all government funded schools use this common application system. Private schools are outside this system, although parents can apply to both private and state schools simultaneously. On the LA form parents can provide up to 3-6 choices of school in rank order, depending on the area they live in, and they are instructed by most Local Authorities to list up to 3 schools. Children are then allocated to schools on the basis of parental choice and the availability of places at the schools selected. A set of published school prioritisation criteria are used where a school is over-subscribed. Typically these include: whether the child has a statement of special educational need; whether the child is looked-after by the local authority; whether the child has a sibling at the school already; the distance of the family home from a school; and less commonly, the faith or aptitude of a child.[9] Each child is allocated to their highest ranked school where they are admitted according to the criteria of each school. If a pupil is not allocated to any preferred school they are assigned to a school with spare capacity (which are typically lower quality).

The school choice system in England was amended in 2007 to encourage parents to choose their truly most preferred schools rather than to make safety-first or strategic choices.[10] The algorithm

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[8] It does not follow, however, that parents having very high chances of securing their top choice is the best outcome, as we discuss below.

[9] This is explicitly intended not as a measure of general ability, but a specific aptitude such as music, sport or maths for example.

[10] Prior to 2007, different Local Authorities in England used either a first preference first or an equal preference allocation mechanism. The first preference first system was outlawed in the 2007 admissions code

used (student optimal stable allocation, see Pathak and Sonmez, 2013) is weakly truth revealing, meaning that parents can do no better than by reporting their true preferred schools. This may not be fully understood by parents however, who may believe that they are more likely to be allocated their most preferred school by only making one choice, or that they will be penalised for entry to their second-choice school by making an "ambitious" first choice.

High-performing schools are more popular and are more likely to be over-subscribed.[11] Hence the over subscription criteria and their enforcement are an important part of the system. As well as requiring each school to publish these criteria, there is an admissions code of practice which determines what criteria are acceptable for schools to use.[12] An interview with a parent for example, is not an acceptable criterion. In the event that a child is refused a place at a school, there is the right of appeal to an independent appeal panel. In 2015/16 the percentage of admissions resulting in an appeal was 3.7%, of which around one fifth found in favour of the parent(s).[13]

More autonomous types of schools, which now constitute around 62% of all secondary schools, determine their own admissions criteria, though they must still adhere to the admissions code and parents use the same form to apply to these schools as to other school types.

3. Incentives for parents in the school choice process

The school admissions system gives some agency to parents – they make choices and those choices matter. This section considers the incentives that parents face when making these school choices, and how these incentives may affect the outcomes observed in the data we explore.

It is reasonable to assume that parents vary in their preferences for different school characteristics. The most commonly cited preferred school characteristics that parents value include academic quality (performance), distance between home and school and the social and ethnic composition of the school, although there are myriad other factors (Burgess et al. 2015; Gibbons and Silva, 2011; Raveaud and Van Zanten, 2007; West and Hind, 2007). Parents will therefore make different school choices given their preferences and location (which influences the set of schools in their local area). Perhaps the key trade-off is between quality and distance – how much further is it worth it to go to attend a better school?

Despite the truth revealing school assignment mechanism described in the previous section, parents may face incentives to list school choices that are not truly their most preferred. For example, listing one "safe" school may be advantageous to avoid allocation to a school with spare capacity. The

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since it prioritises students on the basis of the rank order of parents' choices. Hence a parent making an ambitious first choice school might lose out on a place at their second-choice school simply because they did not put the latter first on their list of choices.

[11] In our data, top performance quartile schools are on average over-subscribed by 60% (according to a measure of total choices where the household hasn't already been allocated to a more preferred school, relative to offers made), while bottom quartile schools are not at all.

[12] The latest admissions code (2014) is published here:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/389388/School_Admissions_Code_2014_-_19_Dec.pdf

[13] Department for Education (2017)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/640212/SFR44_2017_Appeals_Text.pdf

possibility to list more school choices may mitigate this to some extent, and allow more "ambitious" choices in terms of school academic quality, which we explore in our data.

Parents can also devise strategies to maximise their chances of getting into their preferred school, for example by choosing a nearby home. Parents may therefore appear to value school proximity highly, but in fact the distance between home and school is driven by the admissions criteria and earlier house moves. The higher demand for homes close to popular schools has been studied empirically and is acknowledged to increase house prices around "good" schools (Gibbons et al. 2013; Kane et al. 2006).

In this paper, we explore parents' school choices nationally in England we focus on how many choices parents make, what their success rate is, whether the first-choice school is the nearest, and what happens after the offers are made.

a) Number of school choices

The number of school choices that parents can make varies across Local Authorities in England. In most places parents are limited to nominating 3 schools, though in some (including most prominently London) 6 schools can be nominated.

Making more choices delivers a higher chance of achieving a more preferred school. Furthermore, not making any choices on the form is potentially damaging. It is taken by the algorithm to imply indifference between all schools, and this will generally not be so. Parents may not all fully understand the admissions process. One common misconception is that only naming one school increases the chance of admission at that school. This is not the case and making only one choice harms the chance of obtaining a place at a school that is preferred.

Making choices requires parental investment of time in understanding the rules and finding out about schools. While the former is a fixed cost, making more choices obviously requires discriminating between more schools and hence requires more time. There is therefore a trade-off between the value a household attaches to making the best choice, and the value of the time spent making that choice. The other factor entering the trade-off is whether the household has made other decisions that make the chance of getting into the most desired school very high (for example, through choosing a house location, or through already having an older child in the school). In this case, the trade-off might be decisively tipped towards just making one choice. We consider this in the results section where we look at the chances of those making just one choice of getting their choice.

This implies that the group of people making the maximum number of choices available value the choice outcome very highly relative to the effort of making the choice. It might suggest that the household has made an "ambitious" first and second choice and understands the allocation mechanism, or that the cost of making an additional choice is low. At the other end of the scale, those making just one choice either do not value the outcome highly, or feel completely certain of getting in to their first choice because of their previous actions. For example, the focus child may already have an elder sibling at the school and hence is almost guaranteed admission. Taking those previous actions of course also implies a high value placed on the choice outcome, and, in the case of a house move, suggests some anticipation that their chosen school will be over-subscribed and hence the need for other strategies to ensure that they secure a place at the school.

b) Allocation to the first-choice school

Does a high percentage of households allocated to their first-choice school indicate success – that most people are allocated to their genuinely preferred school? Or that parents have made pragmatic school choices based on their perceived chance of admission?

The probability of getting an offer from a first-choice school depends first on how competitive an area is, in terms of the number of schools, and the relative attractiveness of different schools in the area. Imagine, for example, that there are only two nearby schools in a rural area and the schools have similar characteristics. Parents in this scenario are more likely to be able to secure a place at their first-choice school. By contrast, in an urban area with a large number of schools with very different characteristics, it is likely that on average parents will be less likely to secure a place at their first-choice school. The probability of getting a first-choice school also depends on the degree of ambition of the choices. First choices that nominate popular schools are necessarily less likely to succeed than nominations of unpopular schools. So ambitious choices made in urban areas are least likely to generate an offer. Parents making ambitious first choices may also make ambitious second choices (before "playing safe" lower down the ranking) and so they may well be assigned a higher quality school than parents who successfully got an offer in a less popular school. Of course, having a sibling in the school or strategically moving house before the choice process can also raise the chance of success dramatically.

What about discrimination? Might it be that some groups systematically miss out on their first choices for other reasons? For example, might low achieving students (or more precisely students that statistically are likely to be low achieving due to their personal characteristics) miss out on places? In the English system, this seems less likely at the point of admission. The system is now sufficiently centralised and regulated that schools themselves have little discretion in the allocation of pupils to schools. The risk is perhaps higher in the case of semi-autonomous schools like Academies, who control their own admissions. However even with these schools there is limited scope for them to use illegal criteria to determine entry and they are likely to be subject to a lot of parental legal appeals.

One of the key features generating differential access to popular schools is the centrality of the proximity criterion. This is not however covert discrimination, this is explicitly permitted as an allowable school priority criterion. In this way, there is systematic bias in the ability of pupils from different backgrounds to attend schools that are deemed to be popular or high quality by parents.

Nationally, 85% of families were offered a place in their top choice school. Despite this high proportion, there is often a sense in the media that "only" 85% were successful. However, as we have argued, the fraction also reflects the degree of ambition of families' choices. If a sizeable fraction of families nominates less popular schools, then in principle, everyone can get their first choice. But if everyone applies to a popular school, say a school rated as "Outstanding" in England, then the fraction successful is simply the fraction of places in Outstanding schools (26% at time of writing). In this case, an 85% success rate reflects the nature of the choices made, as much as the efficacy of the system.

c) Choosing the nearest school

Households could have two different motives for nominating their nearest school as first choice. First is the trade-off noted above between distance and quality: a nearby school is convenient, offers a shorter commute and this may be highly valued. The second reason is that given the widespread use of proximity as a school priority, there is a higher chance of getting in if the school is oversubscribed.

For some there is no trade off, as the nearest school is also the most preferred, either by luck or by the family having moved house in advance of the choice process. For others this is not true, and there is a meaningful trade-off between distance and quality. There may appear to some parents to be a trade-off between choosing a nearest school because they are very confident of securing a place at the school and choosing a school that is further away but that they prefer. Yet the English choice system as described above does not require parents to make this kind of trade-off. Households can put their genuinely preferred school as their first choice and their nearest school as a lower safety choice. The system does not penalise them for doing this. In areas where parents are only allowed 3 choices this may however mean that the third-choice school would definitely need to be the school with the most guarantee of admission, even if there were other schools that the parent might prefer.

d) Outcome given the preferences and the choices made

The outcome from the school choice process is the allocation of all children to a school. So what constitutes success in this process? Parents may secure their first choice of school or not and, as we have noted, it is by no means clear that a large proportion of parents getting a first-choice school is the right measure of success for the system as a whole. Parents who make ambitious choices may end up with their second or third choice school but that might still be a better option for them than if they simply choose their nearest school. For parents who make only one choice, getting an offer from that school may reflect the parents' strong desire for their child to go to that school and/or their high confidence that they would be given an offer. Equally it may mean that parents do not always understand the admission process and that the parent simply chose the nearest school "to be safe". Unpicking the outcomes from school choices and determining what constitutes a successful outcome is therefore more complex than it first appears.

In section 5 we use this framework to discuss the empirical evidence presented below on how many choices different parents make, the nature of those choices, the extent to which parents are choosing their nearest school and the outcomes from parents' choices. Before this we describe the data.

4. Data

We use globally unique administrative data on parental preferences. Most school choice analyses have had to rely either on partial information on choices or on data from a particular locality or city. Unusually, our data covers the whole cohort of pupils who sought admission to any English state

secondary school in the school year 2014/15.[14] The parental choice data contain for each pupil: the ID of each nominated school (e.g. first, second and third choices in some areas and up to 6 choices in others), and the identity of the school that the child was offered, which may differ from the school that the pupil was finally enrolled in. Our dataset takes the preference data as a base (all those that made a choice) and links from that to the National Pupil Dataset (NPD). We therefore have no pupils in the dataset for whom we see no choices: those that made a choice but don't enter the state-sector are included in the data, those that enter the state-sector but did not make a choice are not. The NPD is also a census of all pupils in the English education system.

The two datasets together provide us with: the characteristics of pupils and the detailed characteristics of all the schools they applied to (not just the one they enrol in), and also their home location in relation to all their preferred schools and to their allocated school.[15] One of the characteristics of schools is their academic quality, so we are able to model the choices families make in terms of school quality. The sample is large, over 526k pupils, and this allows for very fine-grained analysis. With only a few exceptions, we analyse the whole cohort. We exclude middle school areas as the admissions system is very different and involves two school moves rather than one. We include selective areas in which students must pass an examination to get into some schools (grammar schools)[16], and compare those results to the results from non-selective areas. We also compare Local Authorities where more than three or only three school choices are allowed, and areas with higher and lower numbers of schools in the local area as a measure of population and school density.

For pupil characteristics, we focus on eligibility for Free School Meals (FSM), as a marker of poverty, and aggregate ethnic groups.17 We also considered whether a pupil has English as an Additional Language (EAL), and IDACI as a measure of neighbourhood deprivation.[18] We set out our choices of detailed definitions for variable creation in Appendix 1. Appendix Table 1 shows the sample size for each subgroup.

There are limitations to the data. We do not know the admissions criteria for each school. While these criteria almost always involve similar rules, as we discussed above, there will be local variation in detail that may be decisive for some schools and pupils. We plan to investigate this comprehensively in some case study areas for later papers on this topic.

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[14] We also have data for secondary school admission for 2013/14 and for primary school admission in 2013/14. We will report on these other data shortly. In particular, a comparison of primary and secondary school admissions will provide useful information.

[15] The family's postcode is taken from the NPD – at the closest point to when the choice was made. If this is not available, the postcode recorded in secondary school is used.

[16] Defined as having at least 10% of pupils that attend school in the LA attend a school classified as "selective" in *Edubase*. We repeated the analysis with a choice of 5%, 15% and 20% with no major changes.

[17] Ethnic group is derived from the National Pupil Database, based on minor ethnic group classification. The categories used are 'White British', 'White Other' ('White - Irish', 'Traveller Of Irish Heritage', 'Gypsy/Romany' and 'Any Other White Background'), 'Asian' ('Bangladeshi', Indian', 'Pakistani' and 'Any Other Asian Background'), 'Black' ('African', 'Caribbean', 'Any Other Black Background'), 'Chinese', 'Mixed' ('Mixed White and Asian', 'Mixed White and Black African', 'Mixed White and Black Caribbean' and 'Any Other Mixed Background') and 'Any Other Ethnic Group'.

[18] http://standards.esd.org.uk/?uri=metricType%2F382&tab=details

The most important limitation is that we do not know the nature of the priority of each pupil for each of their school choices.[19] In particular, we do not know whether the child has an older sibling at the school, or whether the child is a "Looked After Child", both of which have high priority in over-subscribed schools, overriding proximity. Given that there are far more siblings than Looked After Children, this is the more major issue. In the Millennium Cohort Study, about 43% of pupils have an older sibling of secondary school age at the time of admission to secondary school which will in general give them a significantly higher priority at one school. For them, the key school preference decision was made for the older child, presumably with the understanding that the choice would hold for all subsequent siblings. Not having this information certainly complicates the analysis of parents' choices.[20] If the incidence of "having an older sibling" was randomly distributed through the cohort then in principle this problem should not bias our analyses of parental choice but we cannot necessarily rely entirely on that being true. In the Millennium Cohort Study, the presence of an older sibling of secondary school age is strongly correlated with household income: 67% of children in the lowest income decile have an older sibling of school age at the point relevant for school admission, compared to 33% in the highest income decile. Priority to a preferred school (which we do not observe) may therefore be correlated with household characteristics such as eligibility for free school meals. This point needs to be borne in mind when considering the results below.

5. Results

We present results on the number of choices made by households, whether a household received an offer from its first choice, whether the first-choice school is the nearest, and how the school in which the child is eventually enrolled relates to the choices made by her parents. We postpone a broad discussion of the findings to the final section of the paper.

a) Number of choices made

Table 1 presents results for the whole cohort, some 526k pupils. Results in this and subsequent tables are broken down by personal characteristics such as FSM, ethnicity, EAL status and neighbourhood poverty level. We also show neighbourhood characteristics based on where the family making the choices lives: whether the LA is selective or not, the number of choices families can make, and population density.

The overall average number of choices made is 2.4, but there is wide dispersion. 35% of households make only one choice, while at the other extreme, 27% make the maximum number of choices permitted.

Being able to study the variability in behaviour between household types is one of the key advantages of the large and rich data set. The first point to note is that there is in fact very little

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[19] This information was used for example by Allen, Burgess and McKenna (2013) in modelling the outcome of the Brighton and Hove school lottery.

[20] We plan to use the Millennium Cohort Study, which has such data, to complement this analysis.

difference, on average, between the number of choices made by richer and poorer households, as measured by the child's Free School Meal status (FSM). Similar proportions of FSM and non-FSM households make only 1 choice and indeed similar proportions make the maximum number of choices. There are much bigger differences when we look at ethnicity and EAL status however. For example, 41% of White British households only make 1 choice, compared to 17% of Asian households and 12% of Black households. Again, 37% of these latter groups make as many choices as they can, compared to 24% of White British households. These differences are reflected in the split by EAL status, with a much higher fraction of those who have English as an Additional Language making all choices possible and a higher mean number of choices.

Turning to the neighbourhood characteristics, there are some striking findings. First, the maximum number of choices allowed does make a substantial difference.[21] In LAs where more choices are allowed, more are made, almost twice as many on average. So, despite the substantial number of people choosing to make just 1 choice, this suggests a frustrated demand to make more choices in places where 3 is the maximum. Second, population density makes a big difference: people make more choices in dense neighbourhoods, with far fewer making just the one choice. We can illustrate this looking at specific places at either end of the spectrum of density. In Hackney in central London for example only 9% of people make just one choice, while 27% make the maximum allowable six choices. Similarly, in Birmingham, 35% make six choices and over half make at least four choices. By contrast, in Cornwall, 77% of parents make just one choice. Appendix Table 2 shows the number of choices made in each LA in England.

There are also differences in the number of choices made in selective (i.e. grammar school) areas compared to non-selective areas, though perhaps not as substantial as expected. In selective areas, households make more choices, perhaps as a precautionary measure, and substantially fewer make only one choice.

Finally, as with the individual poverty measure, FSM, there are relatively slight differences in the number of choices made by neighbourhood poverty, the mean number of choices made being slightly higher in poorer areas.

Of course, many of these factors are strongly correlated, for example urban density with neighbourhood poverty. For this reason, we run a simple multivariate regression to control for these factors simultaneously. The results are in Appendix Table 3. Columns 1 to 4 show the results relevant to the number of choices made. The points made above from the raw data in Table 1 are confirmed by regression analysis, with all of the highlighted patterns remaining.

Finally, we can relate the number of choices made by families to the academic performance of the schools that they choose, which perhaps can best be described as the degree of "ambition" in the choices. Specifically, we investigated the mean GCSE scores (% 5 A*-C grades) of schools chosen by parents and examined how these scores varied by the number of choices made. Note that GCSE scores do not of course measure the quality of a school, since they also reflect the prior achievement of pupils. However, GCSE scores are visible to parents and are a proxy indicator of the academic performance of pupils in the school. The data indicate that indeed when parents make a large

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[21] In most areas of the country households can make a maximum of three choices. Exceptions are London (Pan-London co-ordinated admissions) and the surrounding area, Manchester and surrounding LAs, and Birmingham (among others). See the map in Appendix Figure 1.

number of choices, they do tend to make a more ambitious first choice. This suggests that many parents understand the system sufficiently well to use the school choice system to access a good school. More generally we also found that, in a summary regression (reported in Appendix Table 3, columns 11 and 12), the quality of parents' first choice school is higher in LAs where more choices are permitted (this is true even when we take account of school quality being higher in London). This too indicates that where parents are given more choice they use it to make ambitious choices.[22]

A related but distinct question is what impact does the number of choices potentially have on pupils' outcomes? Do households that make more choices actually end up at higher scoring schools? Figure 1 shows the GCSE performance (percentage of pupils achieving at least 5 GCSEs at grades A*-C, including English and maths) of the school a pupil is offered a place at, depending on the number of choices made and the rank of the school the household is offered (for example first choice or second choice). Figure 1 is based on the sample of households in London, where a maximum of six school choices is permitted. For instance, the first group of bars shows the average school performance for households that make one choice, split by those who were offered a place at this school ("1") and not ("0"). The final group of bars shows the average school performance for households that make six choices, where the bars indicate the school the household was offered a place at (where "0" denotes no offer at a chosen school, "1" denotes the child was offered their first-choice school and "6" denotes offered a place at the sixth-choice school). This sample is chosen to focus on a group of households with the same number of possible choices and application procedure, and a high-density area with a lot of schools potentially available.

Figure 1 shows that regardless of how many choices parents make, the average school performance for those not offered a place at any chosen school (those in the "0" bars) is substantially lower than for those offered a place at any chosen school. This reflects the fact that those who were not allocated a school were assigned to, on average, lower performing schools. This highlights the motivation for cautious or strategic choices for some households in areas where admission to a school or set of schools is not guaranteed.

Figure 1 also shows the potential benefit of making more choices. Those who make more choices on average receive an offer from schools higher-performing schools. For example, those making six choices and securing their first choice of school receive an offer from a higher performing school as compared to those making just one choice, even if the latter do indeed get that one and only choice. For example, comparing those who are offered a place at their first-choice school, the percentage of pupils in the school achieving 5 A*-C is 62% for those who make one choice compared to 68% for those who make six choices. This may be because making more choices allows the household to be more "ambitious" with their top choices – choosing high performing schools where admission is not guaranteed. Those who make more choices are also offered higher performing schools even if they are allocated to one of their lower ranked school choices (for example their second or third choices). Indeed, the average school performance of second choice schools for those who made six choices is higher than those allocated to their first choice of school where the household made fewer than four choices. This is relevant to the discussion in the next section: admission to first choice may not imply admission to a higher quality school.

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[22] This simple regression suggests that for households eligible for free school meals there is not a significant positive relationship between the quality of first choice school and number of choices permitted. This suggests that increasing the number of choices would not necessarily reduce inequality in access to good schools, but a more comprehensive analysis is required for such a conclusion.

It would appear that if a parent makes more choices, they are more likely to secure a higher performing school. This may not be a causal relationship however. It could also be that the kinds of parents who make more choices are more focused on education or wealthier and hence may be located in areas which have access to better schools. Equally those who make few choices could prioritise education less highly, or prioritise a school where an older sibling is already present and admission therefore almost guaranteed.[23]

b) Admission to first-choice school

Table 2 reports the fraction of households that are observed in their first-choice school in the Spring term after school entry. As the table shows, this is slightly different to the fraction receiving an offer from their first-choice school, suggesting some offers are not taken up, some individuals get put on waiting lists and then secure a place at their school of choice, and some successfully appeal decisions. Our discussion focusses on the receipt of an offer, but we note any interesting discrepancies between the two measures.

The overall fraction of households receiving an offer from their first-choice school is high at 85%. We again see essentially no difference in this fraction between FSM and non-FSM families, with respectively 84% and 86% being successful. Comparing offers and attendance, for FSM pupils 81% attend their first-choice school, compared to 84% who received an offer, whereas the change goes the other way for non-FSM pupils - more attend their first choice than receive an initial offer. This might indicate that such non-FSM pupils are achieving their first choice on appeal. Looking instead at neighbourhood poverty, households in *less* disadvantaged neighbourhoods are somewhat more likely to receive an offer from their first-choice school.

Again, there are bigger differences between ethnic groups and by EAL status. Black and Asian households are less likely to have an offer from their first-choice school than White British households; similarly, EAL households are less likely to have an offer from their first choice (73% relative to 88%). We discussed possible interpretations of this above and return to this in the final section of the paper.

There are also significant differences between types of area. In densely populated urban areas (above median number of schools within 20km) applicants have a lower probability of receiving an offer from their first-choice school. This may reflect a wider variation in school quality, more schools within a feasible travel distance, more competition for places at popular schools and parents being less able to predict the popularity and demand for each school.

Households in LAs where only three choices are allowed are also more likely to receive an offer from their first choice. There are a number of potential explanations for this. It is the case that many of the areas that only allow three choices are more rural and this lower density of schools will tend to increase the chances of an individual securing their first choice. Equally though, it could also be that households make more cautious choices in those areas that only allow them three options, as discussed in the previous section.

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[23] Note that in this case if school quality over time is correlated then school quality for the current child should correlate with school quality for the older child.

Finally, households in selective LAs are slightly less likely to receive an offer from their first-choice school (81% vs 86%), though the difference is perhaps less than might have been expected. Again, it may be that the nomination reflects what families think are their likely outcomes.

Another feature of the data is that the number of choices made is also strongly correlated with the percentage that receive an offer from their first choice. 97% of households that make only one choice receive an offer from this school. This suggests that their offer was almost guaranteed, perhaps due to proximity or the fact that the child had a sibling in the school or some other characteristic that gave them priority status. For those making the maximum number of choices, 77% received an offer from their first-choice school. Again, there are a number of interpretations of this: first, families who feel that they do not stand much chance of getting into their preferred school use all their available choices to do the best they can, consistent with them having a lower chance of securing their first-choice school. Second, it may be that these families are more sophisticated users of the system, make all the choices they can including an ambitious nomination as first choice, and consequently face a lower chance of securing that choice.

Overall, Table 2 shows that pupils have a lower chance of getting an offer from their first-choice school if: they live in dense urban areas; they live in areas where more choices are permitted; they live in poorer neighbourhoods; they apply to high performing schools; or they are from minority ethnic backgrounds. The largest differences arise from density, school quality and the maximum number of choices permitted.

Of course, all of these factors are correlated. Because of the importance of population density in affecting the outcome, and because it is correlated with other factors of interest such as poverty, ethnicity, school academic quality, and the number of choices allowed, we revisit some of the results in Table 2 controlling for density. These results are in Figures 2 to 4.

Figure 2 shows that the similarity of outcomes for FSM and non-FSM eligible families holds across the distribution of school density (number of schools within 20km).[24] Figure 3 shows that Black or Asian households are less likely than White British households to receive an offer from their first-choice school throughout the range of school density, apart from in the most urban areas where school density is very high indeed. The percentage for Black and Asian households are similar across the distribution. Similarly, EAL households are less likely to receive an offer from their first-choice school across the distribution of school density, again apart from in the areas with the most schools (Appendix Figure 2). This suggests that it is not just location but another attribute of EAL households (perhaps ambition in school choice) that contributes to the differences between EAL and non-EAL households.

Figure 4 illustrates another key factor in the argument – that higher performing schools are harder to get into. This shows that throughout the range of school density, families putting a top quartile school as their first choice are much less likely to receive an offer from their top choice; by contrast families nominating a bottom quartile school as their first choice are almost sure to get an offer from that school. The gap in probabilities is smallest in the areas with fewest schools i.e. most rural areas, and very substantial in the areas with the most schools. This suggests that competition for the

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[24] Households in less disadvantaged neighbourhoods are more likely to receive an offer from their first-choice school across the distribution of school density, but the difference is small (Figure available).

highest attaining schools is higher in more dense areas, and either that the probability of admission is harder to predict in these areas or that households are more ambitious.

Columns 5 to 8 of Appendix Table 3 report the results from the multivariate regression. Again, the key points we make above are confirmed.

c) First-choice school is the nearest school

In Table 3 we report the fraction of households which nominate the nearest school as their first choice. With these data, we can assess the extent to which families have a strong desire for a close-by school for their child. We use each family's postcode and the postcode of the schools to calculate straight-line distances between them, and identify the nearest one.[25]

In fact, only 39% of households nominate their nearest school as their top choice. This is very striking, particularly recalling that there are two different reasons why nearness might be helpful: to raise the chances of getting an offer, and to reduce the school commute. Further, even within the 39% of families who appear to value proximity highly, some will have made an active decision in earlier years by moving house, precisely in order to make their preferred school their nearest school. Around 3.5% of households in the Millennium Cohort Study report moving house as a step to ensure the child is admitted to their preferred school (whether or not there is an older sibling of secondary school age in the household) but many more are likely to have considered local school quality in their choice of home. Even if we widen the definition to ask "is the nominated first-choice school within 20% distance of the nearest one", that is still only true for less than half of all families. This implies that most families do not prioritise distance from the school above all else.

There are important differences in this statistic by area characteristics. Unsurprisingly, households in less dense areas, with fewer schools and longer commute times, are more likely to choose their nearest school. Households in areas where more choices are allowed are also less likely to just pick the nearest (though as London is the largest area with more than three choices, this fact may drive this relationship). This would seem to confirm that there is a degree of caution being exhibited whereby parents are more likely to put down the school that they have the greatest chance of their child being admitted to (often their nearest) when they are only permitted 3 choices on the form. Households in selective areas, perhaps necessarily, also nominate their nearest school less frequently. Households living in more affluent neighbourhoods are more likely to choose their closest school, which may reflect the overall quality of schools there, or preferences.

The differences across sub-groups of families reflect the patterns we have seen so far. There is essentially no difference in the proportion of families choosing their nearest school by FSM-eligibility, 38% versus 39%. By contrast, there are substantial differences by EAL-status and by ethnicity. On the former, 42% of non-EAL pupils put the nearest school top of their list, compared to 27% of EAL pupils. These differences may simply be driven by population density which we consider next.

There is a marked decline in the proportion nominating their closest school by the number of choices made. Only 20% of those making at least four choices nominate the nearest, and even among those that make one choice, only 55% nominate their closest school. This suggests that

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[25] While there will be cases in which straight-line distances are misleading for actual travel-time distances, in most cases, they are an accurate approximation.

proximity is not the most important consideration for secondary school choice, even for those that make only one choice. This adds further evidence to the relationship shown above between the number of choices made and the chance of getting an offer from the first choice.

In Appendix Table 4 we extend the definition further to ask whether *any* of the schools that families nominated were the nearest. Even then, the overall figure is just 55% - almost half of all families do not nominate their nearest school at all.

In Figures 5, 6 and 7 we display this relationship allowing for the number of schools within a 20km radius (i.e. urban density), and find similar patterns to before. Again, there is essentially no difference at all between families by FSM-eligibility at any level of school density (Figure 5). There are significant differences by ethnicity – White British families are more likely to nominate their nearest school than Asian or Black families (Figure 6). Similarly, non-EAL households are much more likely to choose their nearest school across the range, except at the very highest levels of density (Appendix Figure 3).

In Figure 7, we explore the likelihood that a family nominates their nearest school as top choice relative to the academic quality of that school. Households whose closest school is in the lowest quartile of attainment are least likely to choose their closest school: households are more likely to bypass their closest school if it has unsatisfactory academic performance. A similar percentage of parents choose their closest school in the highest attaining three quartiles. In areas with more schools, the proportion nominating their first-choice school falls, irrespective of its performance. Less than 15% of households in very dense urban areas whose nearest school is in the bottom quartile of performance will nominate that school as top choice.

One key issue in deciding whether to opt for the nearest school or pick another school as top choice is the relative academic performance of the two schools. The school choice model essentially predicts that parents will choose the school with significantly higher performance, taking distance and other factors into account. Table 4 shows the relative academic attainment of the first-choice school and closest school, if these are different.[26] Relative academic attainment is equal to 1 if attainment of the first-choice school and closest school is the same, greater than one if the first-choice school has higher attainment than the nearest, and less than one if the first-choice school has lower attainment. There is a great deal of variation across families which reflects both parental choice and the nature of the schools available.

On average, where households nominate a first-choice school that is not their nearest, their first choice school has 20% higher attainment than the nearest. There is wide variation in this: 10% of such households actually choose a school that has at least 30% lower attainment than their closest school, and 10% of households choose a school that has dramatically higher attainment. Non-FSM households, on average, choose a school than is 20% better than their closest school, compared with 10% better for FSM households. Asian and Black parents who choose a school other than closest are slightly more likely to choose a higher performing school than White British parents. EAL and non-EAL households are very similar in this respect.

Columns 9 and 10 of Appendix Table 3 report the results from the multivariate regression. Again, the points we make above are largely confirmed.

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[26] Note that this is therefore a non-random sub-sample of the full population, with fewer observations.

d) Actual school enrolled in relative to households' first choice

We compare the academic quality of the school the pupil is actually enrolled in and the academic quality of the school nominated as first-choice. As we have shown, the majority do receive an offer from their first choice. But among the remaining pupils, the school enrolled in might be academically better than the first-choice, academically similar or worse.[27] Also, both pupils who did and those who did not receive an offer from their top choice might choose to exit the state system in favour of a place in a private school.

We show these outcomes against a measure of neighbourhood disadvantage in Figure 8. As indicated earlier, across all deciles of neighbourhood deprivation, at least 80% of pupils receive an offer from the school they nominated as their first choice. The proportion of students securing their first-choice increases slightly in more affluent neighbourhoods. What is even more striking from Figure 8 is that the majority of pupils who do not get their first choice of school nonetheless receive an offer from a school of similar academic quality to their first choice. However, households in the most disadvantaged neighbourhoods are somewhat more likely to receive an offer from a lower quality school.

The proportion of households that exit the state education sector conditional on receiving an offer from their first choice is unsurprisingly larger for the least disadvantaged neighbourhoods. Although a small proportion, these households demonstrate that the decision between state and private education is not firmly made for all households, even when first choices are met. The probability of exiting the state education sector is in fact not noticeably larger even if the first choice is not met; that is, while for some it may be that the private school is the back up to the first-choice state school, for others, the state is the back up to the private school.

6. Discussion and Conclusions

School quality is a key determinant of pupils' academic performance. Understanding the school choice process and how pupils are allocated to schools is therefore critical if we are to understand and improve educational equality and social mobility. In this paper we use a new and comprehensive dataset to study the school choice process in England. These data, containing all secondary school choices in 2014, can help us determine whether school choice is working to improve outcomes in English state schools.

Our analysis shows that a large proportion of parents use the school choice system pro-actively to achieve a preferred school. First, significant numbers make the maximum number of school choices they can. Second, perhaps contrary to expectations, only a minority of parents choose their nearest school. Third, the local school is more likely to be bypassed where the quality is low. In other words, the data suggest that parents are making active choices for schools and appear to value academic quality.

Further, there is clear evidence of strategic choice which implies that many parents have an understanding of the school choice system as it currently operates. For example, when parents make

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[27] A %5A*-C score different by no more than 10%.

multiple choices, their first choice tends to be more ambitious. Indeed, parents who make more choices tend to end up with an offer from a higher performing school. Equally, people make more cautious choices when constrained to 3 options. This suggests that they would have benefited from having more choices, which is an important note for policy. Local Authorities could improve the percentage of households allocated to a preferred school simply by offering the possibility of making more choices on the common application form. This would be relatively costless and would easily reduce the need for a strategic or "safe" school choice.

While some households clearly engage with the school choice process, which may act to improve standards, choice is curtailed for others by the predominant current school admissions criteria. Allocating places to over-subscribed schools by proximity means that some households have negligible chance of admission to the best schools. Given limited choices permitted, these households may therefore decide that making such an "ambitious" choice would be a waste.

Another aim of our research was to consider how the school choice system operates for different families. There is concern that low income households may not be able to make the same kind of choices as those from higher income households. Our analysis of choice shows that FSM and non-FSM households are similar in the number of choices made, the proximity of first-choice, and admission to first choice school. However, non-FSM households still access better schools due to their proximity to higher performing schools. Would the choice behaviour of FSM and non-FSM households differ if choice was not constrained by the probability of admission to good schools? This is a central topic for our future research.

There is a striking difference between White and Black and Asian families (and relatedly between EAL and non-EAL families). Black or Asian families (or EAL families) make far more school choices and prefer higher performing schools. We cannot conclusively say why what drives these differences. Perhaps these families have a greater focus on education or a better understanding of the school choice system. It is important to note, however, that despite using the school choice system more actively, on average such families still end up being enrolled in lower performing schools.

Our conclusion is therefore that the school choice system is being actively used, though more so in urban areas than in rural areas and more so by Black, Asian and EAL students. Certainly, only a minority of families make just one choice or choose their local school. Further, taken at face value the system appears to be working well. The vast majority of parents get their first choice of school. However, given that most schools do not have spare places, this finding may equally reflect a degree of realism in parents' assessments of whether their child will really be able to get into any particular school. Our data also indicates that where the number of choices are limited, parents make safer options. This implies that parents may benefit from being able to have more choice and hence make more ambitious choices.

In this paper we have used the data to understand parental choices and the allocation of pupils to schools. We have been able to describe some key features of the English school choice system and how it is operating at secondary school level. However, whilst we have certainly been able to document the pattern of choices that parents make, we have not been able to determine the relative importance of parental choice and constraints (e.g. not leaving in close enough proximity to their school of choice) in school allocation. In subsequent papers, we intend to undertake econometric modelling to better understand these relationships.

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Appendix 1: Definitions using preference data

Maximum number of choices in LA

This is based on the data. From the data, we took the 95th percentile of the number of choices made in the LA (based on LA of school attended rather than home). For any LAs where this was greater than three, we checked the LA website to confirm the maximum possible number of choices. The maximum number of choices possible to make on LA application form varies between 3 and 6 across the country.

Number of choices made

The number of choices made on the LA application form, based on the school IDs (LAESTABs) given rather than the school IDs that match to other school-level data. We set "Max" is 0 if the household makes less than maximum number of choices, and 1 otherwise.

Offer to first choice

Binary variable equal to zero if the school ID of the first choice is not equal to the school ID of the school that made an offer. Here we take school IDs from those that match to school-level data. In the whole sample, 55 LAESTABs are presumed to be miscoded.

Attend first choice

Binary variable equal to zero if school ID of first choice not equal to school ID of school attend in following Spring. Here we take school IDs from those that match to school-level data. In the whole sample, 55 LAESTABs are presumed to be miscoded.

Number of schools within 20km

A simple count of the number of schools within 20km radius of pupil's home postcode. Postcode is the earliest observed postcode in the data (Spring before application or Spring after application), which is presumed to correlate with the postcode at time of application.

School quality of first-choice school (measured by % 5A*-C) in quartiles

School quality is taken from KS4 performance profiles from the latest academic year available before choices are submitted. Quartiles are derived from all schools with this measure (rather than all schools that were open to year 7 applications in the relevant year).

First choice is closest school

Binary variable equal to 1 if the school ID of the school named as first preference is the same as the school ID of the closest school (using straight line distance).

Any choice is closest school

As above, but whether school ID of any choices is the same as the school ID of the closest school (using straight line distance).

First choice is closest school (within 20% tolerance)

The distance between home and first-choice school is within 20% of the distance between home and closest school.

Any choice is closest school % (within 20% tolerance)

As above, but for the distance of any choice.

First choice is closest school in LA

The school ID of the first-choice school is the same as the school ID of the closest school (straight line distance) in the same LA as home postcode

Any choice is closest school in LA

As above, but for school ID of any choice.

Relative %5A*-C

The %5A*-C including English and Maths for the first-choice school relative to the %5A*-C for the closest school, where first choice was not the closest school.

Destination after national offer day

Classified as "similar" if within 10% of first choice; Classified as "worse" if offer has attainment more than 10% worse than first-choice school; Classified as "better" if offer has attainment more than 10% better than first-choice school. Attainment defined by %5A*-C

Tables and Figures

Table 1: Number of choices made (secondary)

	1 (%)	2 (%)	3 (%)	4+ (%)	Max (%)	Mean
All	34.55	21.58	26.89	16.98	26.88	2.41
Pupil characteristics						
FSM	36.86	20.49	25.98	16.67	24.31	2.39
Non-FSM	34.15	21.77	27.05	17.03	27.32	2.42
EAL	18.62	16.66	29.81	34.91	34.25	3.20
Non-EAL	38.15	22.69	26.23	12.93	25.22	2.24
White British	40.78	23.52	25.94	9.76	24.03	2.10
Asian	17.06	16.51	31.45	34.97	37.79	3.24
Black	11.84	13.13	26.96	48.07	37.12	3.69
Above median SES (neighbourhood)	37.72	22.89	25.94	13.45	25.67	2.24
Below median SES (neighbourhood)	31.49	20.28	27.81	20.43	28.04	2.58
Local area characteristics						
Selective LA	24.75	20.73	23.79	30.72	27.75	2.85
Non-selective LA	36.51	21.75	27.51	14.23	26.70	2.32
Above median number of schools within 20km	25.55	19.93	26.67	27.85	26.88	2.85
Below median number of schools within 20km	43.73	23.26	27.11	5.89	26.88	1.97
3 choices allowed	44.61	23.62	31.64	0.14	31.78	1.87
More than 3 choices allowed	23.43	19.32	21.64	35.61	21.46	3.01

Note: Overall sample size is 526,329. "FSM" denotes free school meals, a binary indicator for pupil income disadvantage. "EAL" denotes English as an additional language. "Above median SES (neighbourhood)" denotes neighbourhood disadvantage (defined by the Income Deprivation Affecting Children Index) is the more affluent half in the sample.[28] "Selective LA" denotes a local authority (LA) where at least 10% of pupils attend a selective school. "Above median number of schools within 20km" denotes the number of schools within 20km above the median in the sample. "3 choices allowed" denotes the maximum number of choices parents are able to express is 3.
Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

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[28] Source: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015

Table 2: Admission to first choice school

	% with offer to first choice	% attend first choice
All	85.36	85.21
Pupil characteristics		
FSM	84.13	80.64
Non-FSM	85.57	86.01
EAL	72.80	72.97
Non-EAL	88.17	87.91
White British	90.26	89.75
Asian	72.12	73.58
Black	66.34	66.22
Above median SES (neighbourhood)	88.68	89.36
Below median SES (neighbourhood)	82.23	81.08
One choice	97.05	95.31
Two choices	87.31	86.42
Three choices	81.16	81.66
At least four choices	65.54	68.28
Maximum number of choices	77.00	78.17
Local area characteristics		
Selective LA	80.93	81.47
Non-selective LA	86.24	85.95
Above median number of schools within 20km	80.07	80.55
Below median number of schools within 20km	90.72	89.90
3 choices allowed	91.38	90.24
More than 3 choices allowed	78.65	79.58

Note: See Table 1.
Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Table 3: First choice school is closest school

	% First choice is closest school	% First choice is closest school (within 20% tolerance)	% First choice is closest school in LA
All	38.98	45.95	39.56
Pupil characteristics			
FSM	38.03	45.03	38.60
Non-FSM	39.15	46.11	39.73
EAL	27.28	33.47	27.57
Non-EAL	41.63	48.77	42.28
White British	43.90	51.28	44.59
Asian	27.73	34.39	27.88
Black	18.85	23.51	19.23
Above median SES (neighbourhood)	43.73	51.07	44.47
Below median SES (neighbourhood)	34.35	40.95	34.78
One choice	55.43	62.89	56.53
Two choices	37.59	45.25	38.09
Three choices	31.03	37.88	31.30
At least four choices	19.88	25.15	20.01
Maximum number of choices	28.01	34.43	28.17
Local area characteristics			
Selective LA	28.32	35.44	28.18
Non-selective LA	41.09	48.03	41.82
Above median number of schools within 20km	31.66	37.98	32.36
Below median number of schools within 20km	46.43	54.05	46.89
3 choices allowed	45.54	52.95	46.23
More than 3 choices allowed	31.73	38.20	32.18

Note: See Table 1.
Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Table 4: Relative %5A*-C at GCSE (standardised) of first-choice school and closest school (if different)

	P10	P25	P50	P75	P90
All	0.70	0.93	1.20	1.53	1.96
Pupil characteristics					
FSM	0.63	0.83	1.11	1.44	1.83
Non-FSM	0.72	0.95	1.21	1.55	1.97
EAL	0.71	0.92	1.20	1.54	1.96
Non-EAL	0.70	0.94	1.20	1.53	1.96
White British	0.69	0.93	1.19	1.52	1.95
Asian	0.73	0.96	1.24	1.60	2.04
Black	0.75	0.96	1.23	1.56	1.97
Above median SES (neighbourhood)	0.75	0.97	1.20	1.52	1.92
Below median SES (neighbourhood)	0.67	0.90	1.19	1.54	2.00
Local area characteristics					
Selective LA	0.53	0.79	1.20	1.75	2.36
Non-selective LA	0.76	0.96	1.20	1.49	1.85
Above median number of schools within 20km	0.72	0.93	1.19	1.51	1.90
Below median number of schools within 20km	0.68	0.94	1.21	1.57	2.05
3 choices allowed	0.73	0.94	1.19	1.51	1.94
More than 3 choices allowed	0.68	0.93	1.20	1.55	1.97

Note: See Table 1.

Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.
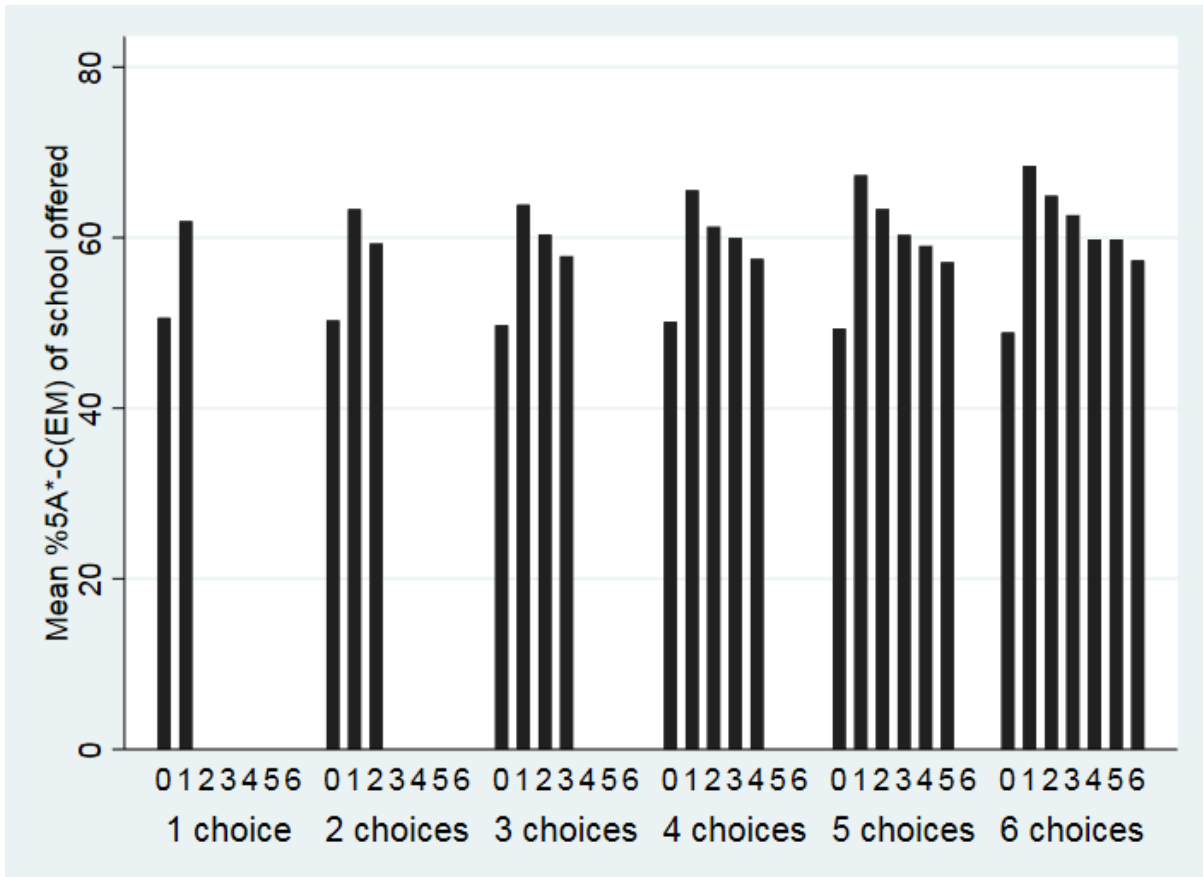
Figure 1: Mean performance of schools, by rank of school choice offered and total number of choices made. London only.

Figure 2: Offer from first-choice school, by number of schools within 20km (vigintiles) and free school meal (FSM) status

Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Figure 3: Offer from first-choice school, by number of schools within 2m (vigintiles) and ethnic group
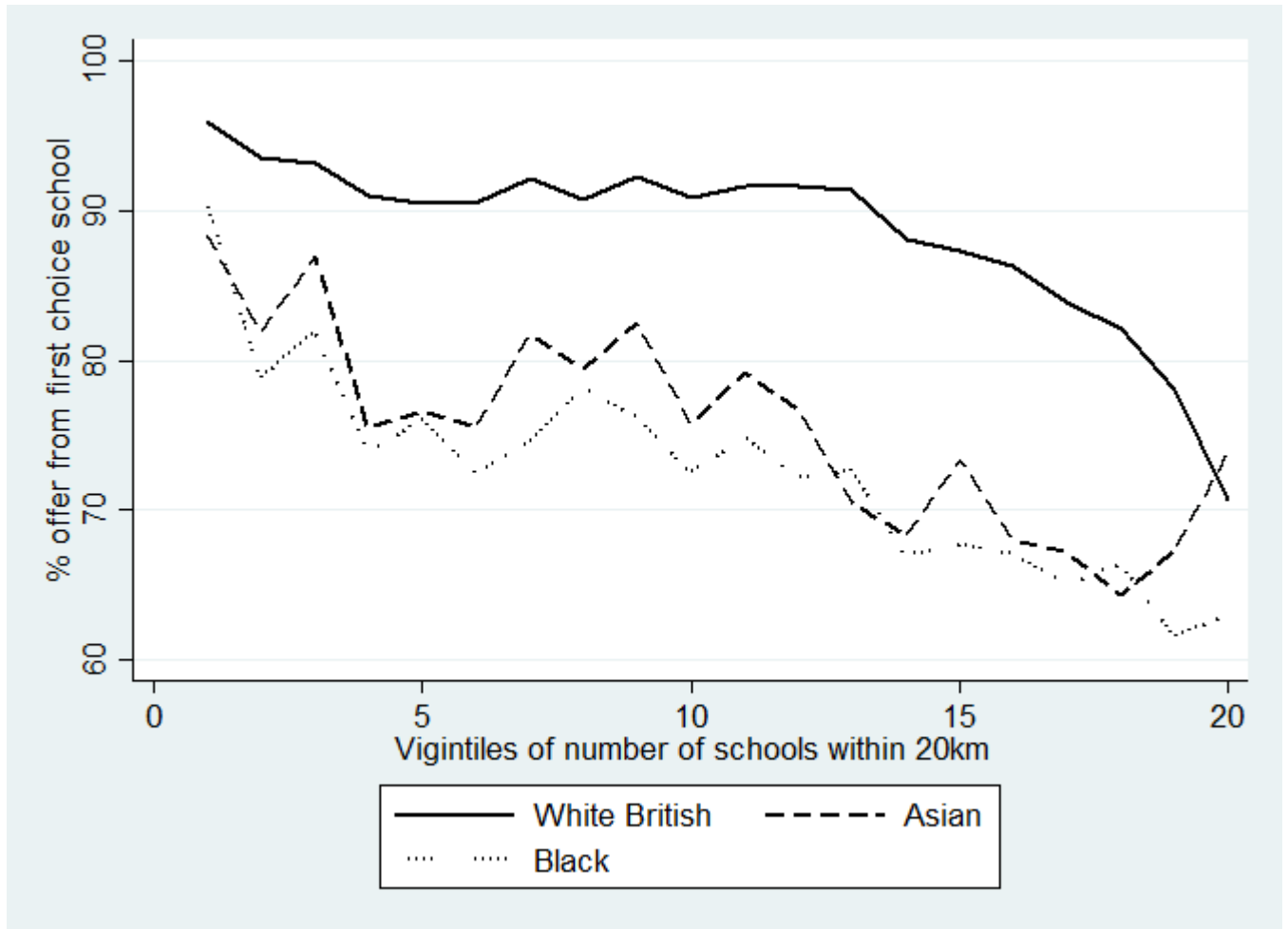
Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Figure 4: Offer from first-choice school, by number of schools within 20km (vigintiles) and school performance of first-choice school (measured by % 5A*-C) in quartiles

Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Figure 5: First choice is closest school, by number of schools within 20km (vigintiles) and free school meal (FSM) status

Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Figure 6: First choice is closest school, by number of schools within 20km (vigintiles) and ethnic group
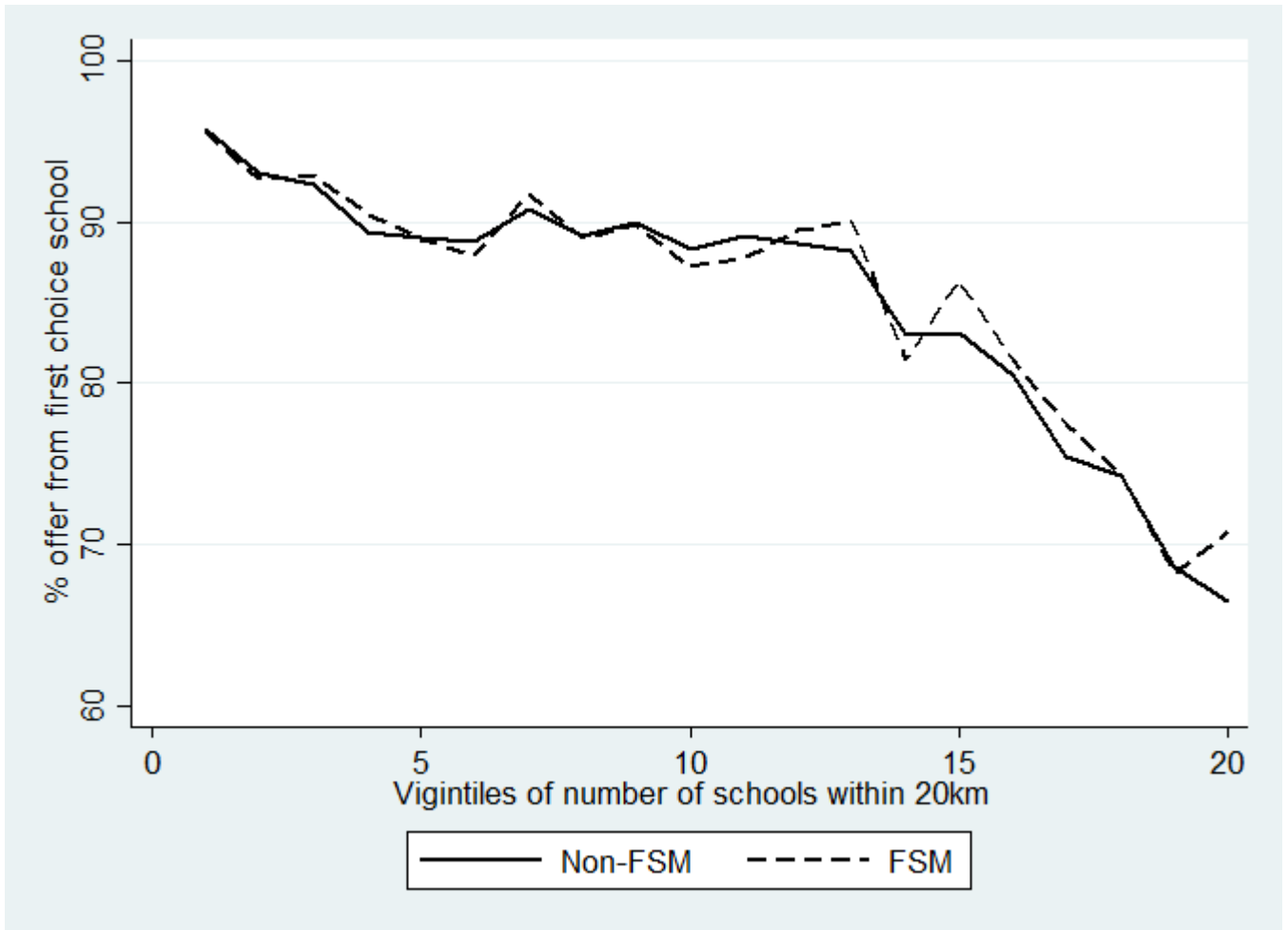

Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Figure 7: First choice is closest school, by number of schools within 20km (vigintiles) and school quality of closest school (measured by % 5A*-C) in quartiles
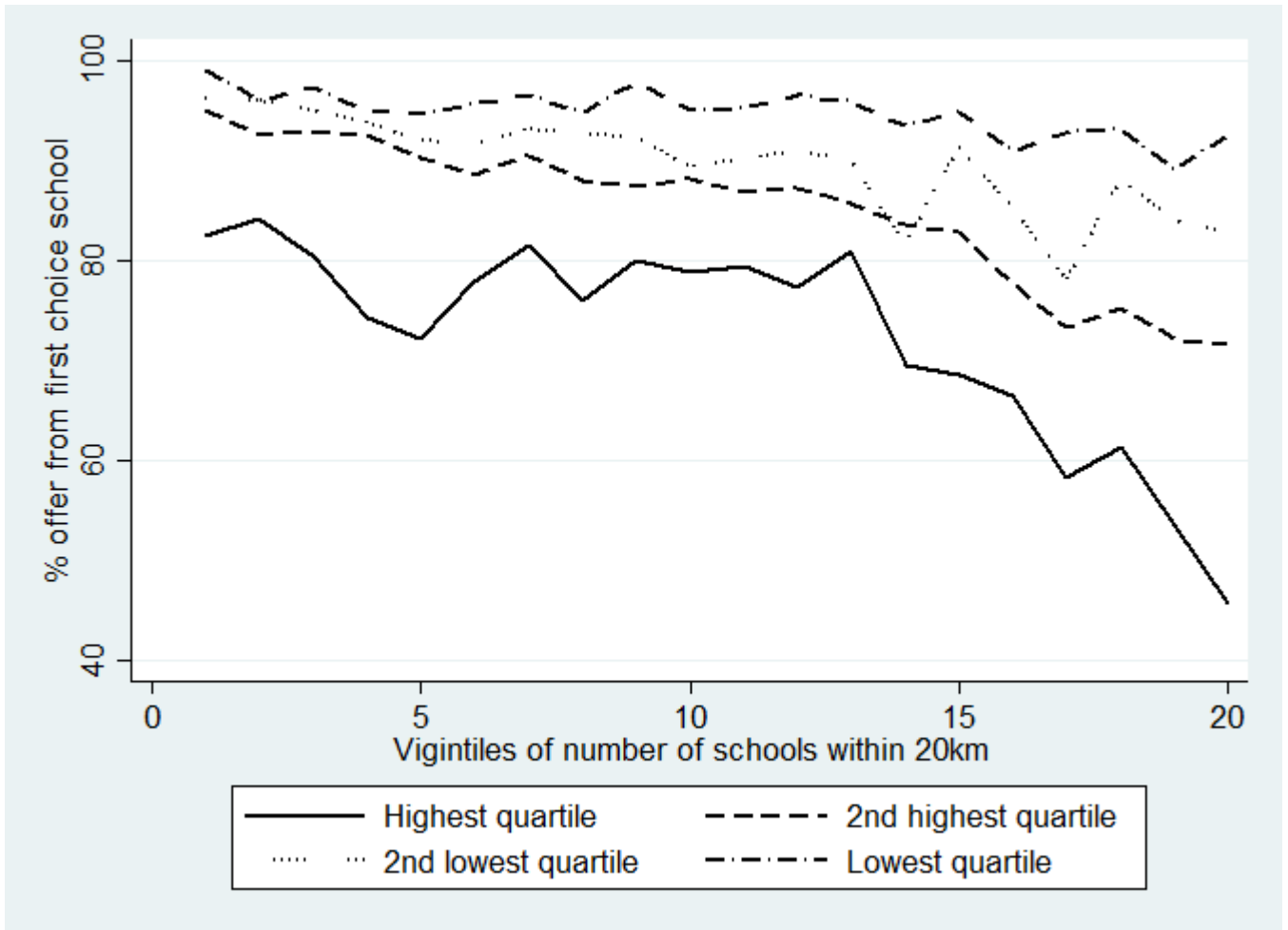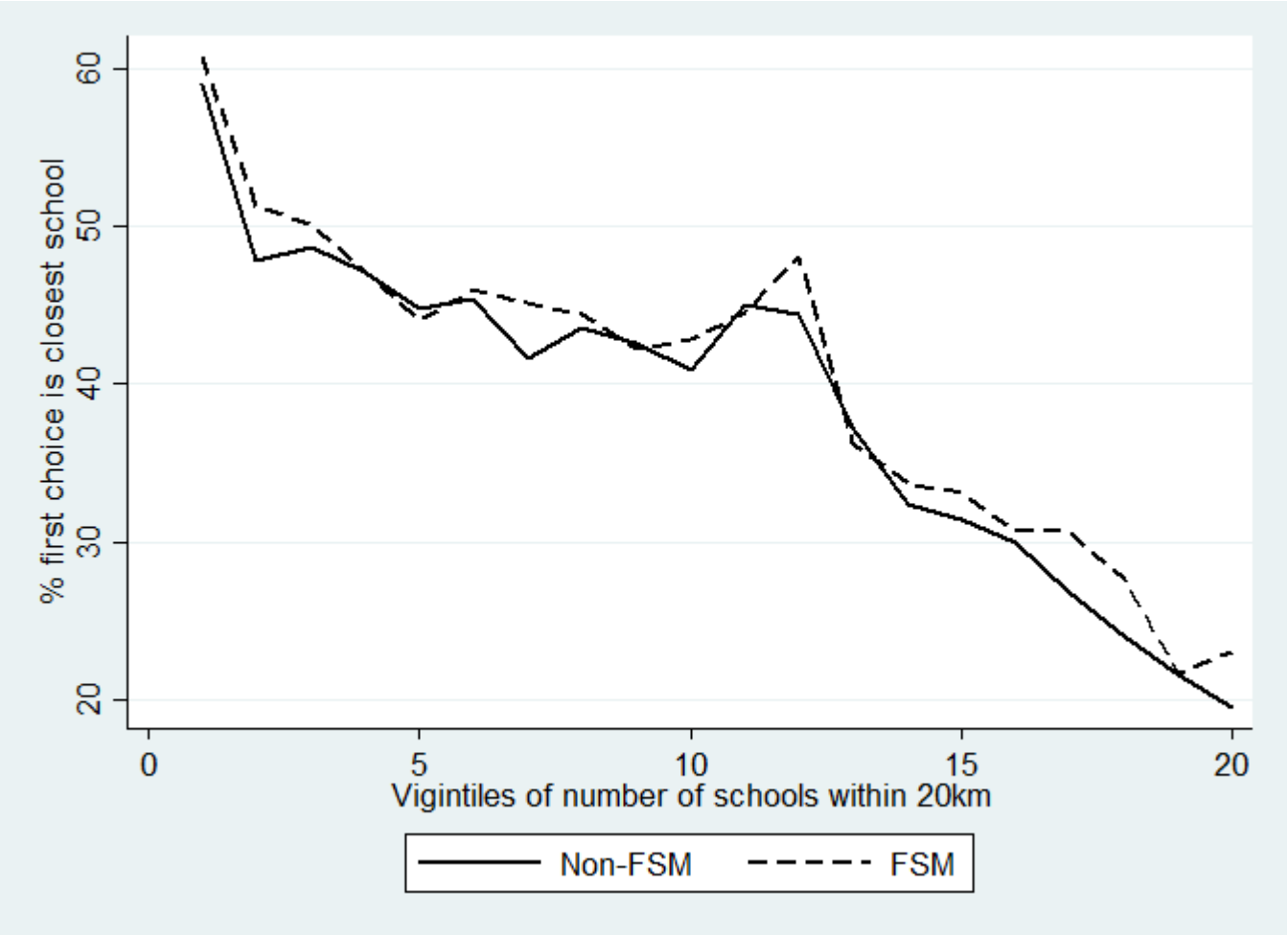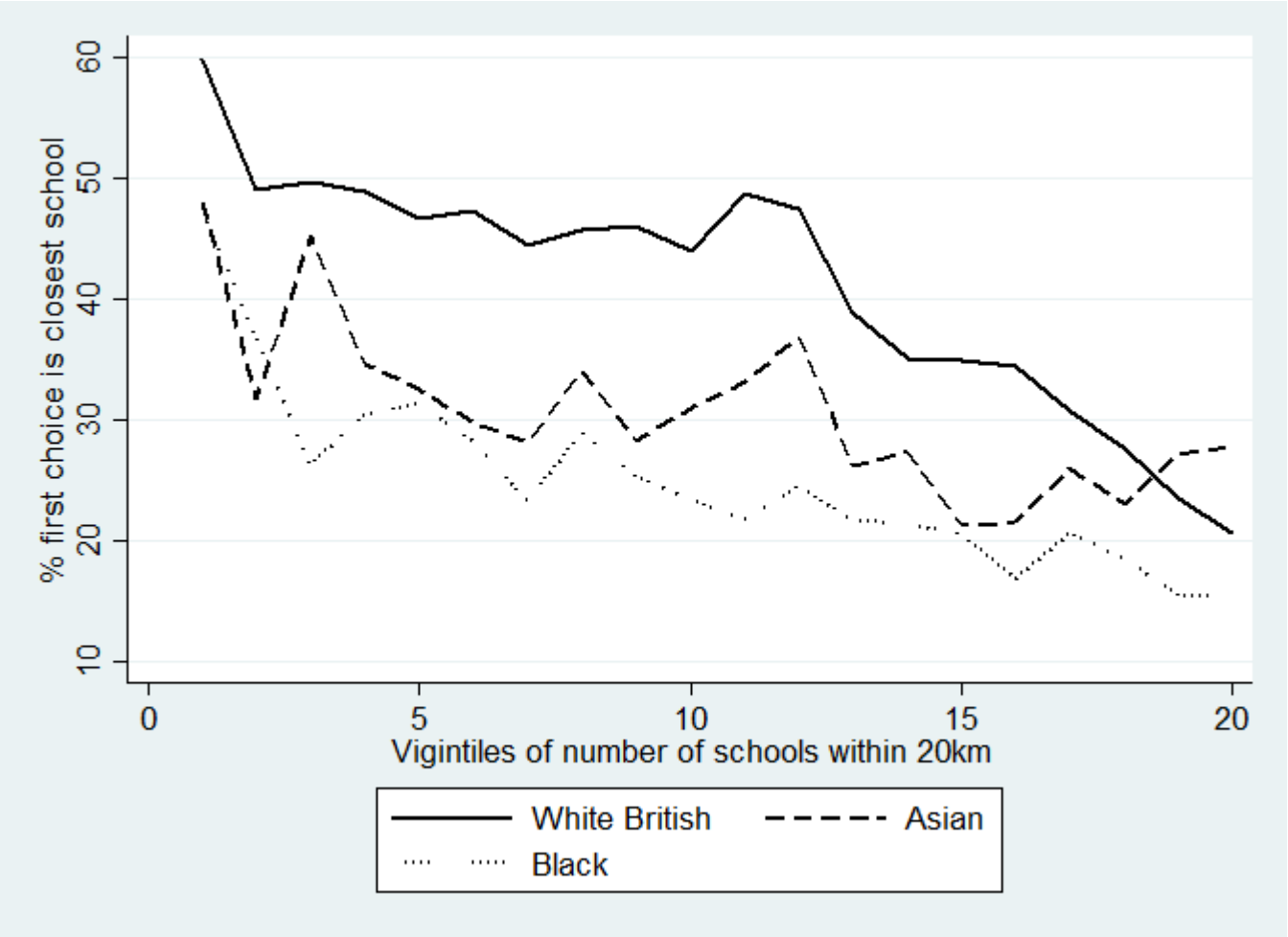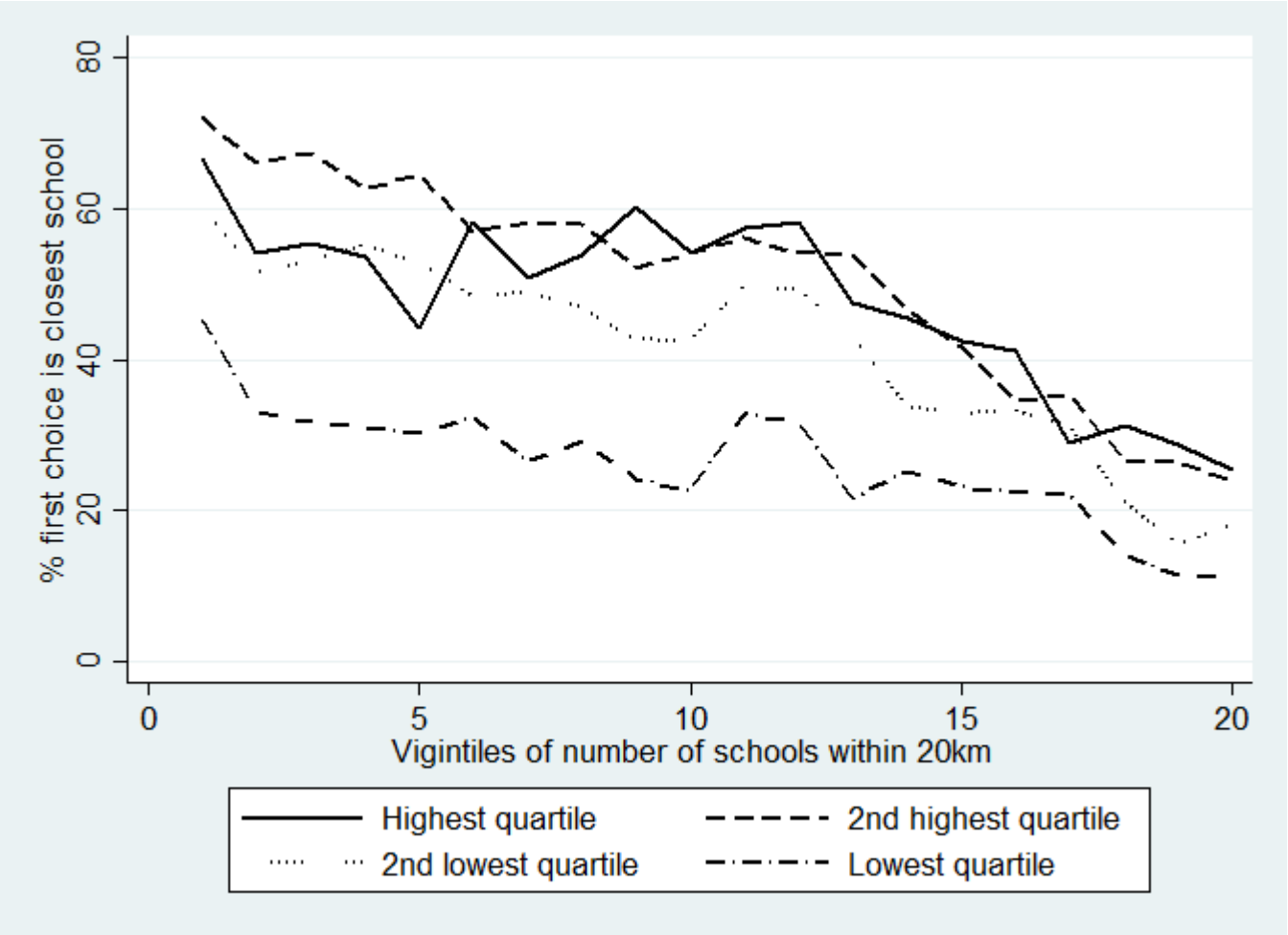

Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Figure 8: Destination after national offer day
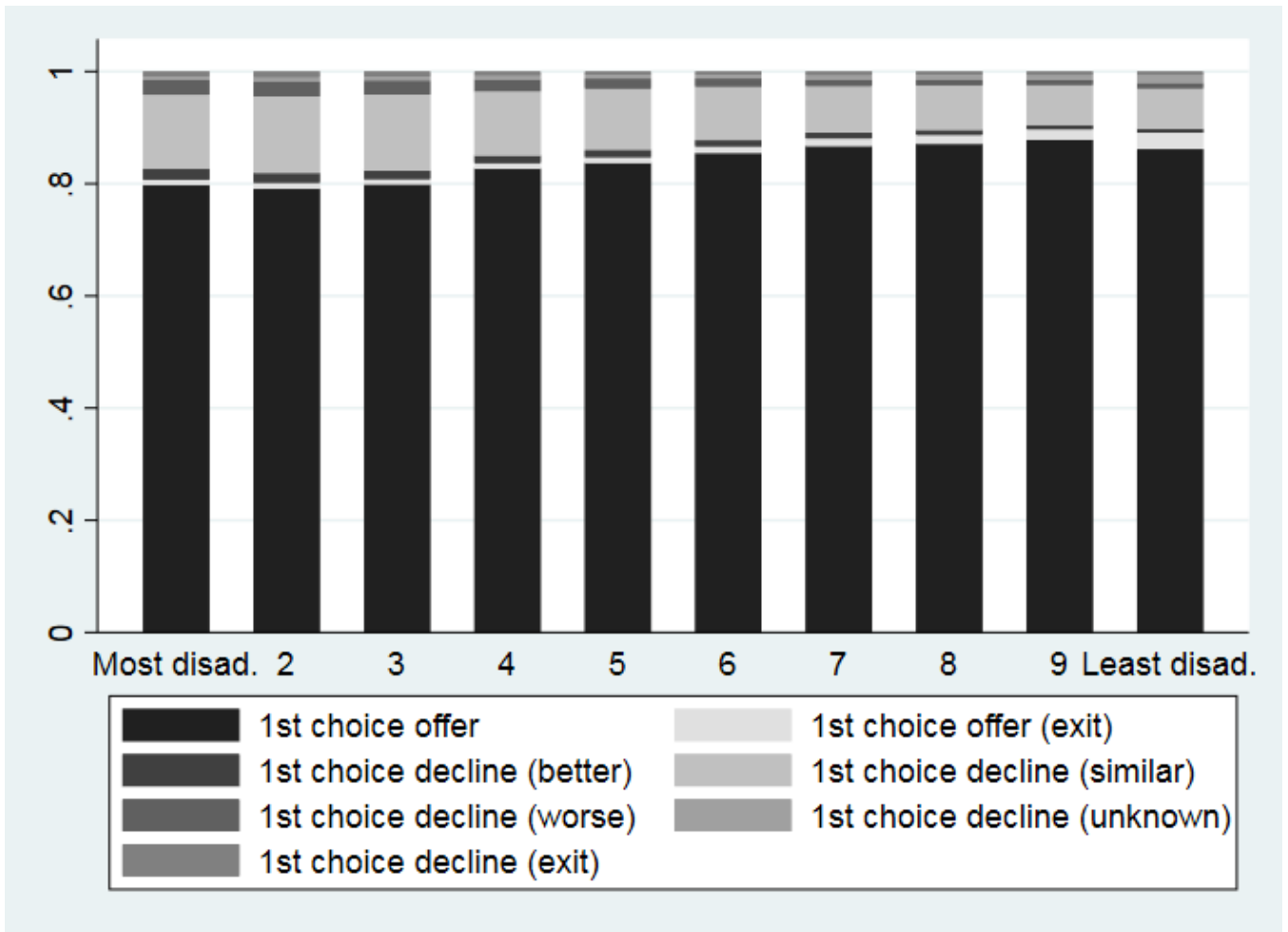
Source: National Pupil Database linked to national parents'
preferences data, made available by the Department for
Education.

Appendix

Appendix Table 1: Sample size by pupil and local area characteristics

	Number of observations
All	524,115
Pupil characteristics	
FSM	77,563
Non-FSM	446,552
EAL	96,393
Non-EAL	427,722
White British	369,635
Asian	56,209
Black	29,547
Above median SES (neighbourhood)	260,260
Below median SES (neighbourhood)	260,256
Local area characteristics	
Selective LA	87,320
Non-selective LA	436,640
Above median number of schools within 20km	264,598
Below median number of schools within 20km	259,517
3 choices allowed	275,225
More than 3 choices allowed	248,735

Note: Overall sample size is 526,329. "FSM" denotes free school meals, a binary indicator for pupil income disadvantage. "EAL" denotes English as an additional language. "Above median SES (neighbourhood)" denotes neighbourhood disadvantage (defined by the Income Deprivation Affecting Children Index) is the more affluent half in the sample.[29] "Selective LA" denotes a local authority (LA) where at least 10% of pupils attend a selective school. "Above median number of schools within 20km" denotes the number of schools within 20km above the median in the sample. "3 choices allowed" denotes the maximum number of choices parents are able to express is 3.
Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

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[29] Source: https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015

Appendix Table 2: Number of choices by LA

Local Authority of residence	Number of choices (%)					
	1	2	3	4	5	6
All	34.55	21.58	26.89	7.94	3.18	5.86
Barking and Dagenham	12.33	18.85	24.40	12.48	6.45	25.49
Barnet	17.97	16.69	21.54	12.32	9.19	22.29
Barnsley	48.14	23.87	27.99			
Bath and North East Somerset	46.77	33.76	19.47			
Bedford	52.93	30.01	15.31	1.75		
Bexley	8.39	16.90	24.99	17.13	9.89	22.69
Birmingham	16.80	12.39	18.70	9.78	6.98	35.35
Blackburn with Darwen	23.17	29.30	47.53			
Blackpool	26.96	24.55	48.49			
Bolton	27.94	19.17	52.86	0.03		
Bournemouth	14.42	21.12	64.24	0.22		
Bracknell Forest	21.48	19.84	58.61	0.08		
Bradford	16.86	16.48	23.77	11.87	31.03	
Brent	13.70	14.85	22.61	14.82	9.94	24.08
Brighton and Hove	14.20	14.74	71.06			
Bristol City of	24.41	18.97	56.35	0.21	0.05	
Bromley	16.95	18.19	23.53	15.01	8.40	17.92
Buckinghamshire	24.39	26.75	22.80	11.56	5.58	8.91
Bury	42.13	22.26	35.21	0.35	0.05	
Calderdale	38.55	22.26	22.56	6.05	10.59	
Cambridgeshire	55.15	23.98	20.85	0.02		
Camden	12.12	19.90	28.38	17.66	8.13	13.81
Central Bedfordshire	76.81	18.40	4.69	0.09		
Cheshire East	56.58	25.78	17.61	0.03		
Cheshire West and Chester	43.33	26.47	30.17	0.03		
City of London	22.22	16.67	11.11	16.67	33.33	
Cornwall	77.23	17.71	5.07			
Coventry	24.67	26.17	49.05	0.06	0.03	0.03
Croydon	13.30	14.61	17.85	15.17	10.82	28.24
Cumbria	47.02	23.38	29.61			
Darlington	39.06	28.57	32.37			
Derby	47.29	23.78	25.05	3.89		
Derbyshire	46.56	21.82	31.61	0.01		
Devon	64.97	21.17	13.83	0.01	0.01	
Doncaster	65.36	17.98	16.66			
Dorset	57.97	25.30	16.65	0.04	0.04	
Dudley	26.04	40.33	22.68	5.96	2.68	2.31
Durham	65.25	20.42	14.31	0.02		
Ealing	8.55	10.77	20.57	14.07	10.06	35.98
East Riding of Yorkshire	74.02	19.11	6.87			
East Sussex	60.99	20.99	17.91	0.09	0.02	
Enfield	8.69	10.30	20.22	15.27	11.63	33.90
Essex	28.36	23.78	20.23	11.18	5.82	10.63
Gateshead	46.89	27.45	25.67			
Gloucestershire	43.85	23.15	18.04	8.37	6.59	
Greenwich	12.71	15.52	21.04	14.06	9.50	27.17
Hackney	8.94	10.00	23.64	19.58	10.64	27.20
Halton	32.03	35.36	32.60			
Hammersmith and Fulham	6.59	11.75	18.61	17.28	13.18	32.59
Hampshire	49.69	29.42	20.87	0.02		
Haringey	11.09	13.06	21.74	17.40	9.73	26.97
Harrow	12.92	16.80	20.81	13.94	7.77	27.76
Hartlepool	28.97	23.05	47.98			
Havering	14.94	20.09	26.78	14.68	7.73	15.78
Herefordshire	76.56	17.06	6.38			
Hertfordshire	9.45	10.99	18.08	61.32	0.05	0.11
Hillingdon	10.63	12.43	21.22	15.86	10.32	29.54
Hounslow	9.96	12.45	20.44	12.20	8.90	36.04
Isle of Wight	45.48	35.53	18.81	0.09	0.09	

Islington	13.06	17.16	25.66	15.22	8.66	20.25
Kensington and Chelsea	10.32	18.44	25.07	15.78	11.50	18.88
Kent	13.19	16.10	21.30	49.38	0.02	0.01
Kingston upon Hull City of	23.60	25.63	50.62	0.14		
Kingston upon Thames	9.22	16.85	25.62	15.13	9.22	23.97
Kirklees	29.30	31.38	39.26	0.04	0.02	
Knowsley	29.46	26.38	44.16			
Lambeth	6.38	9.57	19.90	22.84	14.44	26.87
Lancashire	13.57	17.06	69.37	0.01		
Leeds	34.22	27.18	25.74	6.00	6.85	0.01
Leicester	32.61	23.62	43.77			
Leicestershire	67.58	23.08	9.34			
Lewisham	9.01	11.66	17.66	15.25	13.86	32.57
Lincolnshire	42.70	31.52	25.76	0.01		
Liverpool	31.45	18.61	49.92	0.02		
Luton	25.19	19.63	55.11	0.07		
Manchester	28.91	19.32	41.91	5.39	2.41	2.06
Medway	29.96	27.61	22.28	10.04	3.50	6.61
Merton	8.93	13.05	20.03	17.34	11.15	29.49
Middlesbrough	27.59	22.59	49.82			
Milton Keynes	27.79	16.10	56.02	0.03	0.06	
Newcastle upon Tyne	47.30	27.36	17.10	8.24		
Newham	10.57	15.42	23.63	15.16	8.01	27.22
Norfolk	67.78	20.05	12.15	0.03		
North East Lincolnshire	44.09	28.78	27.13			
North Lincolnshire	59.28	25.21	15.51			
North Somerset	54.75	25.92	19.33			
North Tyneside	58.18	27.18	14.49	0.15		
North Yorkshire	64.10	22.06	9.61	2.17	2.05	
Northamptonshire	30.21	18.28	51.50	0.01		
Northumberland	80.38	13.06	6.56			
Nottingham	37.50	21.24	18.80	22.41	0.03	
Nottinghamshire	50.90	25.29	12.61	11.21		
Oldham	37.48	23.29	28.98	7.31	1.55	1.40
Oxfordshire	48.52	24.42	27.02	0.02	0.02	
Peterborough	33.41	24.03	42.56			
Plymouth	31.75	26.85	41.40			
Poole	37.93	29.86	32.21			
Portsmouth	42.56	29.16	28.28			
Reading	18.32	27.57	23.20	30.85	0.06	
Redbridge	11.39	16.34	21.02	14.40	9.54	27.32
Redcar and Cleveland	57.18	22.11	20.63	0.07		
Richmond upon Thames	14.58	14.58	22.49	16.64	9.97	21.74
Rochdale	45.50	24.65	20.34	9.47	0.04	
Rotherham	51.85	25.56	22.59			
Rutland	47.77	33.12	19.11			
Salford	57.79	23.15	13.16	4.09	0.84	0.97
Sandwell	37.33	22.28	20.18	8.23	4.99	6.98
Sefton	28.96	29.23	41.81			
Sheffield	47.20	24.33	28.47			
Shropshire	62.16	24.62	13.18	0.04		
Slough	16.55	15.64	18.85	12.44	9.40	27.12
Solihull	37.12	24.26	19.31	6.63	12.33	0.35
Somerset	57.71	23.43	18.79	0.02	0.05	
South Gloucestershire	37.47	27.28	35.25			
South Tyneside	44.65	33.66	21.69			
Southampton	22.67	22.91	54.38	0.05		
Southend-on-Sea	28.74	20.49	23.85	10.99	15.49	0.44
Southwark	8.85	11.53	19.54	17.49	11.53	31.06
St Helens	35.36	24.80	39.84			
Staffordshire	54.30	25.47	19.86	0.22	0.05	0.11
Stockport	45.21	24.73	19.60	6.15	1.79	2.53
Stockton-on-Tees	33.35	22.81	43.84			
Stoke-on-Trent	36.57	23.60	39.80	0.04		

Suffolk	48.95	30.33	20.68	0.02	0.02	
Sunderland	48.10	24.15	27.71	0.04		
Surrey	27.96	28.17	26.58	8.91	3.11	5.27
Sutton	9.62	13.29	20.02	17.44	12.20	27.43
Swindon	42.27	24.36	33.36			
Tameside	27.40	23.21	35.65	6.75	2.36	4.63
Telford and Wrekin	22.61	23.33	23.95	27.78	2.17	0.16
Thurrock	34.74	18.60	19.69	7.19	7.53	12.25
Torbay	42.17	26.25	31.50	0.08		
Tower Hamlets	8.57	17.80	32.11	16.66	7.71	17.14
Trafford	14.14	20.89	26.49	15.55	8.46	14.47
Wakefield	57.05	24.09	18.87			
Walsall	36.01	23.78	19.76	8.15	12.17	0.14
Waltham Forest	16.48	18.55	27.87	13.67	6.69	16.73
Wandsworth	5.85	10.13	20.71	23.61	14.76	24.94
Warrington	25.22	27.92	46.73	0.09	0.04	
Warwickshire	51.50	26.00	14.45	4.89	2.01	1.15
West Berkshire	56.60	24.57	18.46	0.18	0.12	0.06
West Sussex	22.53	17.32	60.12	0.01	0.01	
Westminster	8.26	13.59	23.23	20.57	9.83	24.52
Wigan	32.27	23.72	44.01			
Wiltshire	55.50	22.27	22.23			
Windsor and Maidenhead	39.15	26.87	18.19	6.83	3.14	5.82
Wirral	23.80	26.03	50.17			
Wokingham	22.45	21.55	27.38	28.62		
Wolverhampton	30.31	25.86	22.38	8.35	13.10	
Worcestershire	47.54	26.31	26.02	0.03	0.10	
York	52.92	26.12	13.80	4.12	3.04	

Appendix Table 3: Regression estimates

|	One school choice		Maximum number of choices		Attend first choice school		Offer from first choice school		First-choice school is closest school		Quality of first choice school	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FSM	0.06***	0.06***	-0.04***	-0.04***	0.01***	0.01**	-0.02***	-0.03***	0.03***	0.03***	-4.68***	-4.60***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.30)	(0.30)
EAL	-0.02***	-0.13***	0.01	0.12***	-0.01*	-0.11***	-0.02***	-0.11***	0.00	-0.08***	-1.60***	3.09***
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.31)	(0.44)
Asian	-0.15***		0.17***		-0.13***		-0.10***		-0.10***		7.13***	
	(0.01)		(0.02)		(0.01)		(0.01)		(0.01)		(0.53)	
Black	-0.20***		0.20***		-0.18***		-0.17***		-0.19***		5.89***	
	(0.02)		(0.02)		(0.01)		(0.01)		(0.01)		(0.59)	
Below median SES (neighbourhood)	0.00	-0.01	0.00	0.02	-0.02***	-0.03***	-0.03***	-0.04***	-0.04***	-0.05***	-7.91***	-7.55***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.35)	(0.34)
Selective LA	-0.07*	-0.07*	0.08	0.08	-0.03**	-0.02*	-0.03***	-0.02*	-0.12***	-0.11***	0.70	0.58
	(0.04)	(0.03)	(0.06)	(0.06)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.82)	(0.81)
Above median number of schools within 20km	-0.09***	-0.10***	0.05*	0.06*	-0.03***	-0.04***	-0.03***	-0.03***	-0.09***	-0.10***	1.24*	1.64***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.48)	(0.48)
More than 3 choices allowed	-0.11***	-0.13***	-0.19***	-0.17***	-0.06***	-0.08***	-0.05***	-0.06***	-0.03	-0.04*	1.71**	2.20***
	(0.03)	(0.03)	(0.04)	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.64)	(0.62)
School quality in local area											0.35***	0.35***
											(0.02)	(0.02)
Ethnic group excluded	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y
Number of observations	520,499	520,499	520,499	520,499	516,871	516,871	504,583	504,598	515,662	515,662	458,510	458,510

Appendix Table 4: Any choice is closest school

	% Any choice is closest school	% Any choice is closest school % (within 20% tolerance)	% Any choice is closest school in LA
All	55.08	62.85	56.01
Pupil characteristics			
FSM	52.40	60.24	53.30
Non-FSM	55.54	63.31	56.47
EAL	46.85	54.79	47.72
Non-EAL	56.94	64.68	57.88
White British	58.78	66.56	59.74
Asian	48.71	57.19	49.24
Black	36.96	44.07	37.95
Above median SES (neighbourhood)	60.22	68.09	61.32
Below median SES (neighbourhood)	50.02	57.69	50.77
One choice	55.43	62.89	56.53
Two choices	58.26	66.02	59.23
Three choices	56.33	64.37	57.00
At least four choices	48.36	56.35	49.26
Maximum number of choices	55.40	63.45	55.97
Local area characteristics			
Selective LA	46.13	55.10	46.21
Non-selective LA	56.86	64.39	57.95
Above median number of schools within 20km	49.39	57.03	50.63
Below median number of schools within 20km	60.87	68.78	61.47
3 choices allowed	59.17	66.84	60.03
More than 3 choices allowed	50.56	58.45	51.55

Note: See Table 1.
Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Appendix Figure 1: Maximum number of choices possible
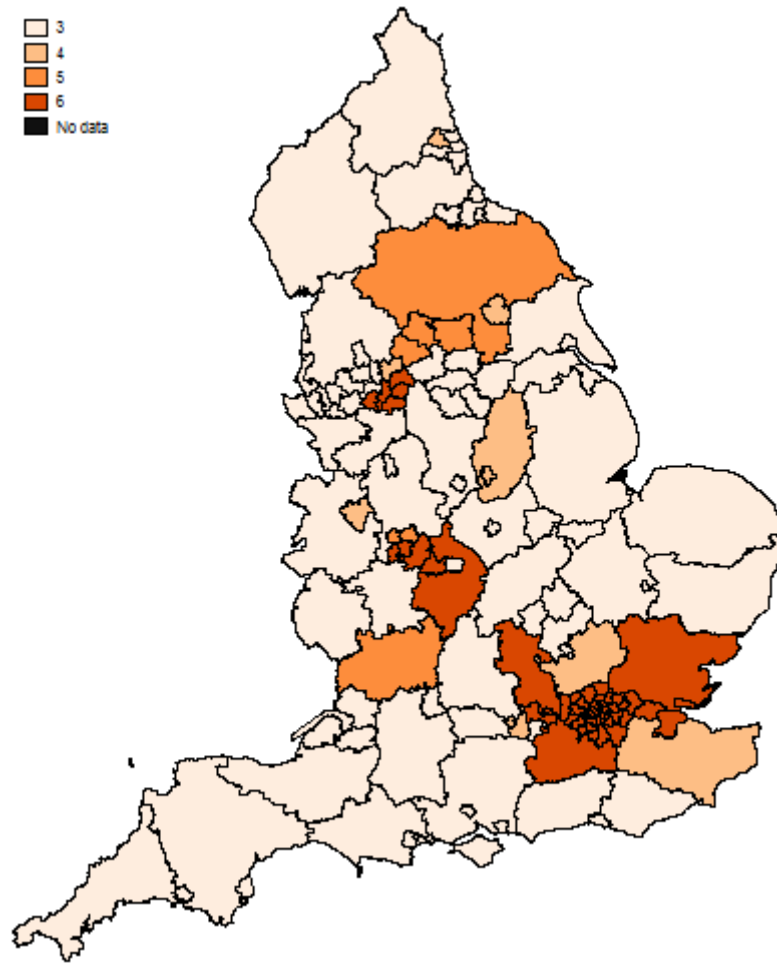
Note: Borders shown are local authority (LA) boundaries.
Source: National Pupil Database linked to national parents'
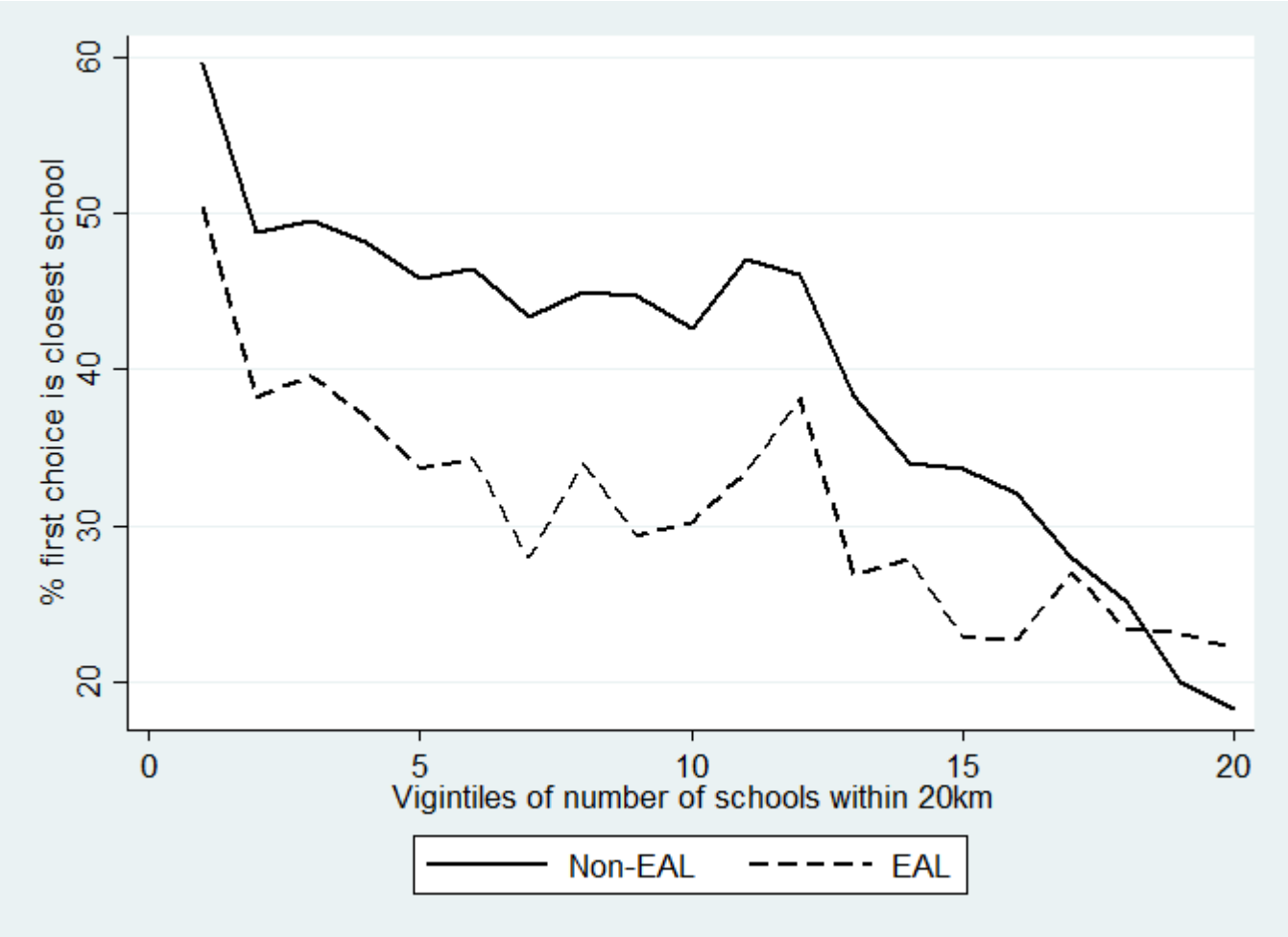preferences data, made available by the Department for
Education.

Appendix Figure 2: Offer from first-choice school, by number of schools within 20km (vigintiles) and English as an Additional Language (EAL) status
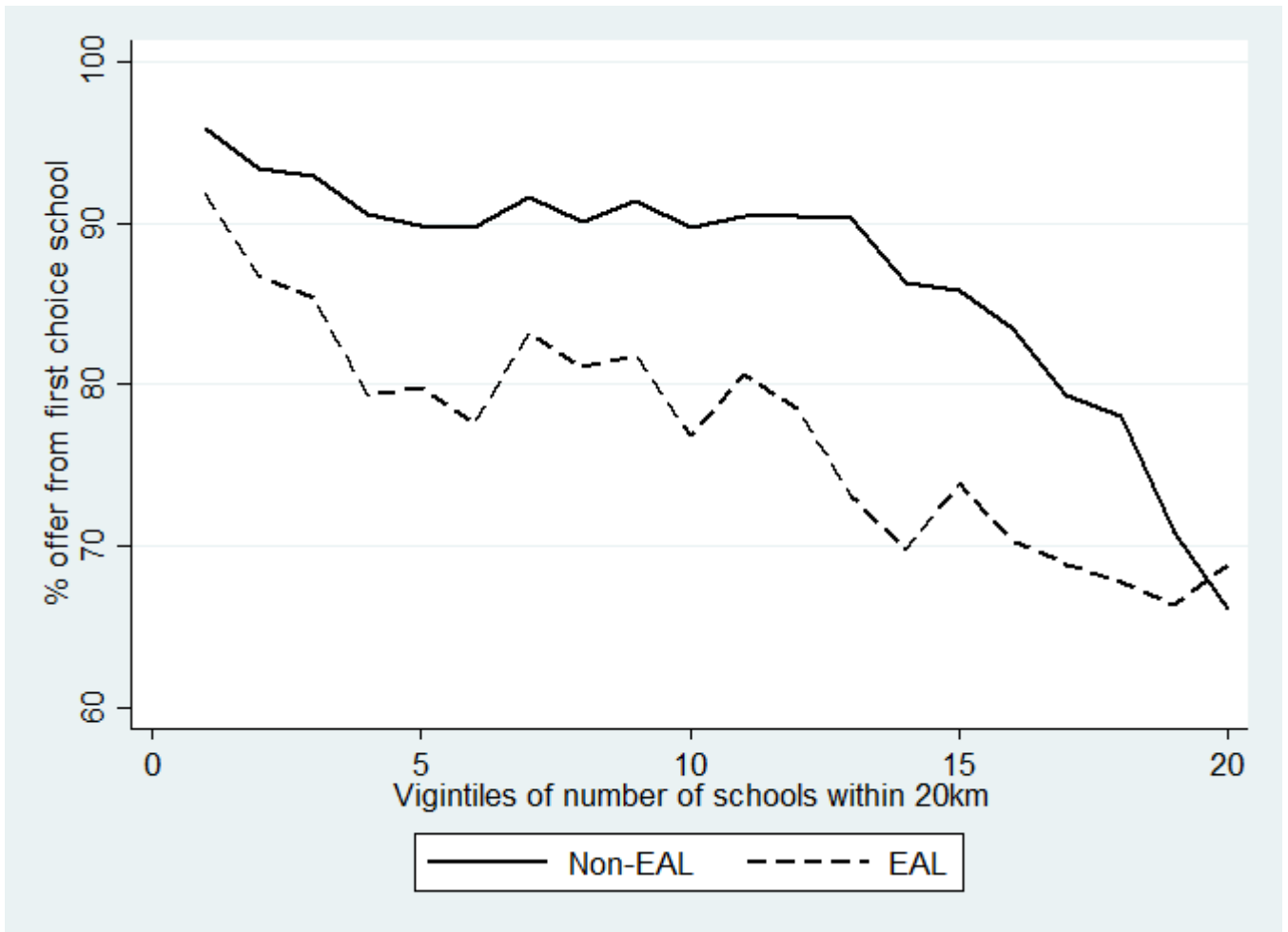
Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.

Appendix Figure 3: First choice is closest school, by number of schools within 20km (vigintiles) and English as an Additional Language (EAL) status

Source: National Pupil Database linked to national parents' preferences data, made available by the Department for Education.