THE DEMAND FOR AUTONOMOUS SCHOOLS

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Abstract:

Advocates of reforms aimed at increasing school autonomy and parental choice in education argue that market-based incentives have the potential to improve standards. However, one potential concern with such settings is that students with different backgrounds might end up segregated in different schools if parental preferences over school attributes are heterogeneous. In this paper, we study parents' demand for autonomous schooling using English administrative data about school applications for three cohorts of children choosing secondary schools. We focus on parental preference for public schools that convert to 'academy' status. Academies are state-funded schools that change their institutional settings to gain independence from the control of the local education authority in terms of taught curriculum, length of the school day and staff management practices (among other things). In order to partial out the effect of time-invariant student and school unobservables, we control for school and pupil fixed-effects. We also conduct a number of checks that deal with time-varying confounders at the school, neighbourhood and student level. Our findings reveal that on average parents express higher demand for autonomous school, although this effect is not very sizeable. However, there is substantial heterogeneity in parental preferences for autonomous education. Parents of high-achieving pupils and better-off households show much stronger preferences for autonomous schools than families with more disadvantaged backgrounds. This finding highlights a potential equity/efficiency trade-off of education systems centred on parental choice and autonomous schooling.

Keywords: school choice and autonomy; parental preferences; segregation.
JEL Classification: I21; J24, H75; C23.

1. Introduction

School autonomy is increasingly held as decisive in improving school standards and a number of countries have embarked in reforms that give state-funded schools more control over budgets, personnel and teaching methods. In the US, policy changes that started in the 1990s led to the creation of independent 'charter' schools. Similar reforms have occurred in Europe, with the birth of 'free schools' in Sweden in the 1990s and 'academies' in the UK in recent years.[1] The notion that autonomy from state control can improve education is predicated on two potential mechanisms. First, autonomous schools can differentiate their teaching offer – e.g. by adjusting the taught curriculum or extending school days – thus catering for different pedagogical needs. Better matching between pupils' needs and differentiated school provision should raise standards. Second, autonomous schools have more scope for changing management, teaching and recruitment practices in ways that promote student achievement. These channels can, in principle, raise standards when coupled with incentives generated through quasi-market mechanisms in the process of school choice. This in turn creates competitive pressure on other schools to improve or leave the market (i.e. close) – further increasing standards on average.[2]

The overall effectiveness of these two channels – and ultimately of reforms aimed at introducing autonomy and competition to improve educational standards – rests on the notion that parents actively exercise school choice and value the advantages that more autonomous arrangements bring. One important concern is that any benefits from such systems of school provision may come at the cost of increased segregation and that gains may not be equally distributed in society. This would be the case if, for example, better-off parents are more effective at exploiting school choice and gain access to high-quality education, while segregating students with the most disadvantaged backgrounds into 'sink-schools'. Previous research has mainly focussed parental valuation of school test scores and school quality information provision.[3] No evidence has been collected on parental preferences for school autonomy and its interplay with family background.

In this paper, we fill this gap by studying parents' preferences for school autonomy at the time of vast scale expansion of the academy programme in the England. Academies are largely autonomous schools that – despite being part of the state sector, non-selective and non-fee-charging – fall outside the control of the Local Authority (LA) in terms of key strategic decisions and day-to-day management. Academies were

[1] Clark (2009) studies the effects of a previous generation of partly autonomous schools in the UK – Grant Maintained schools. Abdulkadiroglu et al. (2011) and Bohlmark and Lindahl (2012) discuss the characteristics and effects of autonomous schools in the US and Sweden, respectively.

[2] See among others Hoxby (2000) and (2004) and Gibbons et al. (2008) for a discussion of these mechanisms and their effects on educational attainments in the US and UK, respectively. See also Brunello and Rocco (2008) and McMillan (2004) for some counterarguments on the possible pitfalls of choice and competition in education.

[3] Among others, see Figlio and Lucas (2004); Hastings and Weinstein (2008); Mizala and Urquiola (2013), Burgess et al. (2014); Hussain (2015) and Imberman and Lovenheim (2015).

initially introduced by the Labour Government from September 2002 with the aim of replacing failing schools. These were converted into academies as part of a remedial intervention strategy and attached to a Government-approved 'sponsor' (e.g. a charity) appointed to help addressing underperformance. However, starting from 2010, the new Conservative-Liberal Democrat Coalition Government dramatically changed the nature of academies. Whereas 'sponsored' academies have continued to exist, new 'converter' academies are institutions with high performance table results and outstanding rating by the school inspectorate (OFSTED). These schools change their institutional arrangements to acquire more autonomy in terms of budgeting; hiring of staff; pay and working condition negotiations; pupil discipline and performance management; taught curriculum (except for English, Maths, Science and IT); and length of the school day. To put things in perspective and grasp the swift expansion of the programme, at present there are approximately 1800 secondary academies out of around 3200 secondary schools (data from March 2015). Of these, only around 500 are sponsored academies – with 290 already created between 2002 and 2010 during the Labour Government period. Around 1300 converter academies have instead been created between 2010 and 2015 only. These represent approximately 40% of all secondary schools and almost 80% of the expansion of the academy sector in the past five years.

To carry out our analysis, we use data from three cohorts of pupils living in Birmingham and applying for secondary schools in 2009, 2010 and 2011 with the aim of being admitted for the academic years 2010/2011, 2011/2012 and 2012/2013. Birmingham is the second biggest metropolitan area in England with approximately 1.1 million inhabitants. The LA adopts a centralised clearing house for secondary school applications so that families requesting schools in other LAs still apply through the Birmingham centralised system. This means that we observe all preferences expressed by Birmingham pupils for state secondary schools – even if these are located in other school jurisdictions.[4] Moreover, Birmingham uses a constrained student-optimal stable allocation mechanism in which families can express up to six preferences. Pathak and Sonmez (2013) show that this system is less open to manipulation than alternative arrangements and likely to elicit true parental ordering of schools.

Our empirical investigation covers approximately 40,000 pupils, evenly distributed across the three cohorts, expressing preferences over 127 schools – of which 75 are in Birmingham and the others in seven proximate LAs (Dudley, Sandwell, Solihull, Staffordshire, Walsall, Warwickshire and Worcestershire). Of these schools, 15 (12%) are operating as sponsored academies at the beginning of the academic year 2012/2013 (with only 4 new ones added between 2010 and 2012) and 32 as converters (25%, all created between 2010 and 2012). Using various administrative datasets, we collate a host of information on students and schools. At the pupil level, we gather data on prior attainment (measured at the end of primary school); background characteristics; and detailed information on place of residence for the year in which

[4] We do not observe preferences for private schools. Official data published by the DfE show that for the academic year 2010/2011 less than 5% of secondary school pupils are privately educated in Birmingham.

pupils apply for secondary schools as well as three years before and one year after (i.e. the year in which they start school). This information is important in the English setting since oversubscribed school can prioritise admission on the basis of proximity and parents might engage in strategic mobility to grant access to their preferred school. At the school level, we collect information on composition; distance from a pupil's home; pupil-teacher ratio; and attainments measured as both test scores at national examinations taken by all pupils at the end of secondary school and test-score value added between the end of primary and the end of secondary education. The latter two measures – as well as most school characteristics – are made available to parents every year through performance tables that are considered highly 'salient' in informing school choice. We use information for the academic year prior to the period in which parents apply for school, so that we capture the information that would have been available to parents at the time of their choice. We also merge information on the most recent ratings by the school inspectorate (OFSTED). Inspection results are an important determinant of conversion to academies – with schools rated outstanding fast-tracked for change to converter academy status and failing schools recommended for a sponsored academy restructuring. Finally, we gather information on: *(a)* the time when a school is approved for conversion to academy by the Department for Education (DfE); *(b)* the time when the school actually opens as an academy[5]; and *(c)* the time when the school starts being advertised as an academy in the admissions booklets sent out by LAs to parents to guide their school choices. A priori, it is difficult to establish what information about school academisation would have been available to parents at the time of their choice. We use differences in the timing of these academisation 'milestones' to understand which event is more relevant for parental choices.

We deploy this complex set of information coupled with the rapid expansion of the academy sector to study whether parents value school autonomy. In most of our investigation, we exploit the exploded structure of our data in which each pupil can choose any of the 127 schools that by revealed preference belong to the choice set of Birmingham residents (i.e. those that have been consistently chosen in the three years of our analysis)[6]. This set-up allows us to control for school fixed-effects and pupil fixed-effects, thus partialling out school time-fixed unobservables as well as student, family and place-of-residence specific unobservables that might affect preferences for autonomy and their interplay with school characteristics. Furthermore, we control for an extensive set of time-varying school information to isolate the effect of a school becoming an academy on parental choice.

Our first set of results shows that *on average* parents value school autonomy – although this effect is not very sizeable. Focussing on the timing of approval for conversion, we find that academies are

[5] Note that there are no school closures in our data. So 'opening' as an academy refers to starting to operate under the new institutional regime.

[6] Note that we respectively exclude female- only and male- only schools for males and females. As a result, the complete choice set counts 112 schools for boys and 117 schools for girls. Furthermore, in some robustness checks, we experiment with 'trimmed' choice sets by excluding the farthest schools or including only the closest ones.

approximately 6% more likely to be ranked by parents as the most preferred school. This effect is statistically significant at the 10%. When we differentiate our analysis by considering converter and sponsored academies, we find that this result is driven by parental preferences for converter academies. Given that these schools are highly performing institutions that convert to academy in order to set themselves free from the control of the LA, the effect that we identify captures the value that parents attach to more autonomous arrangements – over and above current school quality.

To assess the robustness of our findings against time varying unobservables and other sources of endogeneity, we carry out an extensive number of checks. First, we provide evidence showing that – conditional on school fixed-effects – time-varying school and neighbourhood characteristics are uncorrelated to the probability that a school becomes an academy in a given year. Stated different, the timing of conversion is balanced with respect to observables. Second, we note that our choice set includes schools that convert to academy within the observation period, schools that convert soon afterwards, and schools that do not convert at even later stages (i.e. all the way up to March 2015 – when available data ends). Schools in the latter group may differ substantially from the others along unobservable dimensions – possibly valued by parents – that are correlated with the choice to *ever* convert to academy. To rule out the possibility that the inclusion of these schools drives our findings, we restrict our sample to consider only schools that convert to academy *within* our data period (i.e. our 'treatment group') and schools that will convert *after* our observation period (i.e. a '*narrow* control group', formed of future converters). This approach confirms our previous results. Third, it could be the case that time-varying school unobservables that positively correlate with school quality – and thus with parental demand – also correlate with the timing of conversion to academy, thereby confounding our interpretation of the effect of autonomy. To deal with this issue, we devise an instrumental variable strategy that predicts the timing of conversion of our schools using the number of application for conversion to academy received by the Department for Education (DfE) from LAs other than those in our sample in the same year and same month in which our schools apply for conversion. The number of applications that the DfE receives every month from other parts of the country is hardly predictable by schools and parents, and thus likely to be uncorrelated with parental preferences for unobservable school attributes. Consistently, we show that the characteristics of the converters in our sample are uncorrelated with the number of applications received by the DfE at the time when they apply. Nevertheless, we find that this variable is strongly associated with the time it takes to the DfE to approve the conversion request, thereby shifting exogenously the timing of conversion. Even in this case, results confirm our previous conclusions.

One further concern is that, as schools convert to academies, parents change their preferences, leading to different patterns of sorting across schools and making *future* school composition endogenous to the academy status. This would imply that estimates of the impact of autonomy on parental preferences are confounded by parental expectations about school composition changes (and the value attached to it). In order to deal with this possibility, we follow the approach of Ferreyra and Kosenok (2015) and control for the *actual* school composition that pupils will experience once enrolled at the school – more than a year

after they apply. Under the assumption of rational expectations about sorting, this approach controls for the effect of potential changes in school composition and isolates the impact of autonomy on parental demand. Furthermore, we exploit information on households' mobility and school admissions patterns to identify 'static' schools, where composition can be expected to be predominantly a reflection of a stable and geographically bound residential area. Focussing on this subset of schools further mitigates concerns that school conversion overlaps with endogenous changes to school composition. Irrespective of the approach taken, expected composition changes do not drive our findings.

Having established the robustness of our average autonomy effect, we then investigate whether our headline results mask substantial heterogeneity along several dimensions of family background. Our analysis reveals striking patterns. We find that parents of high achieving children (i.e. those with above-median end of primary school attainments) and families with higher level of income (i.e. not eligible for FSM) are significantly more likely to give their first preference to schools that become autonomous. Converter academies are between 25% and 45% more likely to be chosen by these types of parents; conversely, families with lower attaining children and lower levels of income express no preference for autonomous schools or are less likely to choose these schools following institutional change.[7] We also explore whether preferences for autonomous schools depend on home-school distance, and find that parental preferences for autonomous schools decline steadily with home-school distance. If preferences for more autonomous arrangements are related to parents' ability to get involved in their children's school, this result may depend on the expectation that this involvement is less likely if the school is located far away. This pattern is also highly heterogeneous by pupils' background and only applies to high achieving pupils and to pupils not eligible for FSM, whose parents may indeed be more responsive to the possibility of getting involved in the management and activities of the school that autonomous arrangements allow for.

We test the robustness of these results along a number of dimensions. First, we focus once again on the 'narrow sample' that excludes schools that do not convert to academy during our time window or at some point up to March 2015. Second, we drop pupils that change address in the four years leading up to secondary school admission and the year after starting secondary school. These 'strategic movers' might be endogenously changing their place of residence to grant admission to an over-subscribed academy (when applications are ranked by home-to-school distance) biasing our results on the interplay between distance and autonomy. Finally, we only consider pupils residing in neighbourhoods that give access to at least one school converting to academy to dispel concerns that our results mirror a preference for close-by schools combined with the fact that well-off children are more likely to live closer to an academy. All these checks confirm our conclusions.

[7] We also investigate whether our results are heterogeneous along pupils' gender and ethnicity, but find no evidence of any significant pattern.

These markedly heterogeneous findings have important policy implications. Autonomous schools in England are likely to embody some of the management features that have been shown to be closely associated with effectiveness for US charter schools (Angrist et al., 2013).[8] Differently from the US charters, converter academies are already existing schools rated outstanding by the school inspectorate. It is therefore hard to assess whether changes to these autonomous arrangements will correspond to substantial improvements in students' attainments over the short run (at the moment, no evidence has been collected on this issue). Nevertheless, the aspects of autonomous schooling embodied by academies are likely to be associated to broader notions of 'school quality', such as the ability to raise aspiration, coach life skills, improve behaviour and enrich the school experience, that should be valued by parents. Moreover, these schools' autonomous arrangements make them more likely to respond to quasi-market incentives in education by raising students' achievement (see Gibbons et al., 2008). Our results thus suggest that reforms that promote autonomy and choice could segregate pupils of different background in different schools and concentrate the benefits of more autonomous arrangements on students who are already better off.

Our work contributes to a small but growing literature that studies differences in educational choices according to family background. The study closest to ours is Walters (2014), who uses a structural model to study charter school choice in Boston (MA). His work shows that poor parents – whose low attaining children stand to benefit the most from charter school attendance – are less likely to choose a charter school than better-off families. Similarly, Butler et al. (2013) provide evidence that richer students are more likely to choose charter schools using nationally-representative data from the Early Childhood Longitudinal Studies. Further, Hastings et al. (2005) document that better off parents are more likely to choose high test score schools and willing to travel more to secure their pupils' attendance to a better school than worse-off families. These patterns are echoed in the research by Burgess et al. (2014) who use the Millennium Cohort Survey to study primary school choice in England, and Calsamiglia et al. (2015) who use a structural model to study parental preferences in Barcelona. At the higher education level, Hoxby and Avery (2012) find that potentially suitable American students from poor background are unlikely to apply to selective colleges, while Arcidiacono et al. (2013) present marked differences in college selection between minority and non-minority students. Our findings are consistent with previous evidence: disadvantaged students are unlikely to choose schools that have the potential to improve their attainment. Unlike previous research, however, we focus on parental preferences for school autonomous arrangements. Given a growing trend towards more decentralised systems centred on school choice and autonomy, our work holds general lessons.

The rest of the paper is organized as follows. In Section 2, we discuss the institutional context while in Section 3 we describe the data that we use. Section 4 presents our empirical model. Section 5 discusses

[8] These include: emphasis on ethos, discipline and traditional subjects; flexibility in terms of taught curriculum and offered subjects; length and flexibility in the arrangement of the teaching day and school year; responsive managerial structures and accountable teachers; and full financial responsibility and management of their own budget.

results that do not consider heterogeneity, while Section 6 presents the results that contrast preferences for better and worse off families. Finally, Section 7 presents some concluding remarks.

2. Institutional context

2.1 Main features of the school system

Compulsory education in England is organised into five stages referred to as Key Stages (KS). In the primary phase, pupils usually enter school at age 4-5 in the Foundation Stage and then move on to KS1, spanning ages 5-6 and 6-7. At age 7-8, pupils progress to KS2, and at age 10-11 they complete the primary phase and move on to secondary school where they progress through KS3 to age 13-14, and KS4, up to age 15-16, which marks the end of compulsory education. Throughout their education, pupils are assessed on the basis of standardized national tests. At KS1, pupils sit exams in English and Mathematics only, whereas at KS2 students take tests in English, Mathematics and Science. While KS1 tests are internally marked, KS2 exams are externally assessed. Finally at the end of KS4, pupils sit academic (GCSEs) and/or vocational (NVQ) tests in a range of subjects, although English, Mathematics and Science are compulsory for every student at this stage. These tests are externally assessed. For each of the Key Stages the central government sets learning targets (levels). School average attainments at the various Key Stages and measures of school average value-added are then published alongside other school characteristics (such as size and composition) in performance tables. These are highly salient in the media, education and policy debate, and routinely used by parents to inform their school choice.

Admission to state schools at both the primary and secondary phase is based on principles of parental choice, although in practice parents' 'freedom to choose' is constrained by the fact that popular schools become over-subscribed. When this occurs, various criteria are used to prioritise students, usually favouring those who live nearby, those with special educational needs or in care of the local authority, and those with siblings in the school. Certain types of schools can prioritise students according to other criteria – e.g. religion (faith-schools) or specific aptitudes (music and other specialist schools). Finally, a small proportion of state secondary schools select on prior achievement or admission tests (Grammar schools).

In our analysis, we consider preferences expressed by pupils living in Birmingham for schools in the Birmingham Local Authority (LA) as well as seven proximate LAs – namely Dudley, Sandwell, Solihull, Staffordshire, Walsall, Warwickshire and Worcestershire. Birmingham is the second largest English city with approximately 1.1 million inhabitants. Its population is ethnically very diverse: less than 55% of its inhabitants are of White British origins (compared to approximately 80% in England overall), with the second biggest ethnic group composed of Asians (in particular Indian and Pakistani). Birmingham adopts a centralised clearing house for secondary school applications collecting parental preferences for all state schools – inside and outside the LA. This means we observe all preferences expressed for state secondary schools – even if these are located in other school jurisdictions.

Regarding the details of school application process, Birmingham contacts parents in late Spring of the academic year before students are expected to enrol in secondary education (e.g. April/May 2009 for secondary school admissions to the academic year 2010/2011) and provides detailed information booklets about school types, school characteristics, admissions criteria and links to information about school in other LAs. The booklets also explain the timeline of the admissions procedures and stress the fact that schools will hold open events during September of the current year (e.g. September 2009 for admissions to the academic year 2010/2011) and parents are expected to apply to their preferred schools by the beginning of October – even though applications close at the end of the month. After this, parents receive school offers the following March (e.g. March 2010 if they applied in October 2009) with the aim of starting secondary school in September of the same year (e.g. September 2010 for the academic 2010/2011). Families can apply to up to six secondary schools. In order to allocate pupils to their preferred schools the LA uses a constrained student-optimal stable mechanism (also known as Deferred Admission approach, or DA). Pathak and Sonmez (2013) have studied the details of the English admissions system and have shown that this mechanism is less open to manipulation than alternative arrangements and likely to elicit true parental ordering of schools.[9]

2.2 School types and academies

When applying for places, parents observe the institutional arrangements of schools. Secondary schools in the state-sector in England can take one of the following alternative structures: community schools, voluntary controlled schools, foundation schools, voluntary aided schools, city technology colleges (CTCs) and – since their introduction in the early 2000s – academy schools.[10] Academies – which enjoy the most autonomous structures within the state-school system – are the focus of our analysis. However, we briefly discuss the structures of other school types for comparison.

Starting with community and voluntary controlled (VC) schools, these are mainly organized and managed through the local education authority (i.e., the LA) and their governing body is predominantly composed by members of the staff and representative of the LA. Since the majority of VC schools are religiously denominated, their governing body also includes members of the foundation supporting the school. Responsibility for recruiting, human resources decisions and admissions is in the hands of the LA. As a result, these schools are characterised by very little autonomy.

Voluntary-aided (VA) and foundation schools enjoy more autonomy than VC and community schools and are similarly structured, although VA schools are mainly religiously denominated. These two types of schools are run as a partnership between the state and the voluntary sector, and the governing body of the

[9] The other LAs in our analysis have very similar procedures to inform parents, gather preferences and allocate students to schools. More generally, the Admission Act of 2007 banned the use of 'first preference first' algorithms.
[10] Note that any of these school types can be selective and admit pupils on the basis of performance at an entry test (historically labelled the 'eleven plus'). Academically selective schools are referred to as 'Grammar' schools.

school is responsible for hiring and firing decisions, personnel management and admissions. Note also that the governing body of these schools has a smaller proportion of members of the LA and a significant representation of members of the associated foundations. Similarly, CTCs enjoy relative autonomy from the LA. In particular, the majority of their governing body is filled with representatives of the sponsor (usually a business or voluntary group) and the school has control over staffing decisions. However, CTCs follow the national curriculum and are characterised by a strong emphasis on technological, scientific and practical subjects.

Lastly, academy schools enjoy a much larger degree of autonomy than any other school types in the state system. Academies were gradually introduced by the Labour Government starting from September 2002 with the aim of replacing failing schools. In its original nature, the academy programme was a targeted and remedial intervention aimed at addressing underperformance by changing organizational structure, providing the school with more autonomy and linking it to a Government-approved sponsor – usually an educational charity or a business group – enlisted to drive through educational improvements. As a matter of fact, sponsors were often seen crucial in bringing to the school a new, more entrepreneurial ethos required to turn the school around. As a result, this type of academies has commonly been referred to as sponsored academies. It is important to notice that sponsored academies were *not* seen as the basis for a wholesale transformation in school governance across English state education.

This perspective dramatically changed in May 2010 with the appointment of the new Conservative-Liberal Democrat Coalition Government. The aim of the Academies Act 2010 (swiftly proposed by the Conservative education secretary Michael Gove and passed in June 2010) was to allow as many schools as possible to convert to academies and thereby drive transformational changes to the organization and governance of English state school sector. Consistently with this logic, in the new regime the process of conversion to academy is initiated by the schools themselves – in marked contrast with the process characterising 'sponsored' academies where institutional change is imposed onto schools as a remedial tool.

In particular, the DfE provides the following guidelines for the governing body of would-be converters: (i) discuss the possibility of converting to academy with parents, members of staff, pupils and the interested community at large; (ii) obtain consent from the foundation or religious body backing the school (if any); (iii) register with the DfE the intention to apply; (iv) prepare and send to the Department information about school attainment, pupil progress and school finances for the past three years; (v) provide the most recent school report prepared by the school inspectorate (OFSTED). After receiving this information, the DfE starts considering the application and initiates a set of discussions about funding arrangements, teaching matters and transfer of assets (such as the school building) or liabilities from the LA to the school. This process can take between three and five months, though the time lapse can expand and the exact timing depends on both specific aspects of the proposed conversion as well as the volume of new applications.

It is worth noting that the performance on the OFSTED inspection is an important determinant of approval for converter academies. OFSTED visits schools every three to five years (although this frequency depends on school performance with poor performers visited more regularly) and inspections result in

publicly available school reports rating schools from 'Outstanding' to 'Inadequate' on their overall quality as well as on specific aspects such as teaching, management and pupil behaviour. Initially, outstanding schools were essentially pre-approved by DfE for conversion to academy, although more recently schools with 'Good, with Outstanding Features' rating are also considered. As a result of the different pathways leading to conversion, the characteristics of converters are dramatically different from those of sponsored academies (see Eyles et al., 2015), and converter schools tend to be high performers with fairly advantageous pupils' intakes.

Despite these differences, both sponsored and converter academies enjoy similarly wide margins of autonomy. Although they remain part of the state sector and are non-selective, non-fee-charging state-funded schools, they broadly fall outside the control of the LA in terms of key strategic decisions and day-to-day management – which is administered by the head-teacher and a self-appointed board of governors (with a limited number of representatives from the LA). This body has responsibility (shared with the head-teacher) for hiring the staff, negotiating pay and working conditions, managing the school budget, and deciding on matters such as career development, discipline and performance assessment and management. Furthermore, academies enjoy more autonomy in terms of the majority of the taught curriculum (except for English, Maths, Science and IT), as well as of the structure and length of the school day.

3. Data construction

In order to carry out our investigation, we combine information from several administrative datasets. In the next sections, we describe these data and the sample selection criteria we apply.

3.1 Applications and school choice set

Information of parental preferences for schools comes from administrative records from the Birmingham LA. We have been granted access to full information about the preferences expressed by parents residing in Birmingham and applying for a seat in a secondary school for their kids for the academic years beginning in September 2010, 2011 and 2012.

These data contain the ordered list of preferences expressed by parents; whether any special criteria for admission (i.e. having siblings in the school; being looked after by the LA; having special educational needs) applies for a given pupil; the postcode at the time of the application; the pupil's gender; and a unique pupil identification number that allows us to match students with the other data sources. The data also contains details about the school(s) where the pupil was offered a place and the school finally attended.

We observe applications for a total of 40,924 pupils over the three cohorts (13,836 for admission in 2010, 13,536 for 2011, and 13,552 for 2012). As discussed, the Birmingham LA acts as a centralized hub coordinating parents' applications for schools within the LA as well as schools in other LAs. Hence, in our data we initially observe preference for nearly 300 different schools – i.e. schools that received at least one preference in one of the three years – of which approximately one third is located in Birmingham and two thirds in other 42 LAs.

Out of these, however, around 130 receive just one preference in one given year and are clearly not part of a consistently defined and stable choice set. Similarly, other schools receive more preferences – but only in one of the three years and non in the other two. In order to avoid including outliers within the set of schools commonly chosen by pupils residing in Birmingham, we define our choice set to include only: *(a)* all Birmingham schools; *(b)* schools located in LAs other than Birmingham that receive at least 30 preferences from pupils residing in Birmingham in each of the three years of data; and *(c)* schools within these LAs that received preferences from Birmingham pupils in each of the three years of data. The LAs selected for our analysis are all adjacent to Birmingham, and include: Dudley; Sandwell; Solihull; Staffordshire; Walsall; Warwickshire; and Worcestershire. After dropping one school in Birmingham because of missing school-level data, we end up considering a balanced choice set of 127 schools, 75 of which located in Birmingham.

3.2 Background data on pupils' characteristics and attainments

To obtain information on pupils' background, we merge our data on school preferences to the National Pupil Database (NPD) and the Pupil Level Annual School Census (PLASC). To link the different datasets, we use a unique pupil identifier devised by the DfE to track pupils across various data sources. This is available only for 39,318 pupils out of the original 40,924. The missing pupils are either enrolled in private schools[11] – and are therefore are not present in the NPD – or are lost because of tracking problems with the Birmingham's LA – possibly because they move to another LA or another country before the start of secondary school. From this sample, we also drop: 34 pupils who did not express any preference; 86 pupils that expressed the same preference ranking for different schools, thus preventing us from correctly sorting their choices; and 4 pupils that applied only to schools outside of the choice set that we consider for the analysis (described above)

We match this set of pupils to information on their demographic background and previous attainments. Using the NPD, we gather information about pupils' test score records at the Key Stage 2 (age 11) national assessments. More specifically, we consider the average level obtained across the three compulsory subjects tested at the end of primary education – i.e. English, Mathematics and Science. We also gathered data on their attainments in English and Maths at the KS1 (age 7) tests. Using PLASC, we gather information on each pupil's eligibility for free school meals (FSM; a commonly used proxy for poverty), special educational needs (SEN) status; information on ethnicity and language spoken at home; and records on school absences. We also gather information about postcodes of residence for each pupil in every year from grade 2 (at KS1/age 7, when pupils are in the middle of primary education) to grade 7 (age 12, when pupils have just started secondary schooling). In the UK, postcodes typically correspond to 15-17

[11] Statistics published by the DfE show that less than 5% of secondary school pupils are privately educated in Birmingham.

contiguous housing units on one side of a street. This detail allows us to assign students to residential neighbourhoods with very high precision, and compute home-to-school straight line distance. Moreover, this information allows us to track individuals who change address over time and possibly engage in strategic mobility to grant admission to over-subscribed schools (when applications are ranked by home-to-school distance).

Approximately 1,400 pupils have missing values in some of these variables – mainly due to non-reported ethnicity and missing Key Stage data.[12] After dropping these observations, our final sample consists of 37,812 pupils (12,710 in 2010, 12,579 in 2011 and 12,523 in 2012) or approximately 93% of the original set of pupils.

3.3 School level data

We have collected a wealth of information on each of the 127 schools in our data, merging data from several administrative sources.

To start with, we use Edubase to gather institutional details for the schools in our sample. Edubase is a constantly updated English school registry providing information about each school's exaction location (the postcode), type (we include only community schools, foundation schools, voluntary aided schools, sponsor-led or converter academies; there are not voluntary controlled schools in our set), religious orientation, gender composition, and admission procedure (selective or comprehensive). This data also contains information on the date at which schools start operating as academies – i.e. the academy 'opening date'. Note that the vast majority of sponsored academies open at the beginning of the academic years, i.e. in September. However, the open date for converter academies is more spread out across the months. In our sample, approximately 60% of the converters open between July and September, with the other opening dates clustered in October, January, April and July (i.e. during the academic year). For our analysis, we assign schools to be open as academies if they convert soon enough for parents to observe them as open before the application deadline, i.e. October of the year before the beginning of secondary school. However, a priori, it is difficult to gauge whether the official Edubase opening date of an academy is the most salient information that guide parental application at the time of their choices. In fact, families can gather information about the process of academisation (and other relevant school details) through other means – e.g., during school open-days, from admissions booklets that the LA send to its residents, through word-of-mouth and by browsing the internet. We therefore collect additional information about schools' academy status using electronic and paper copies of the admission booklets sent out to parents by the LAs included in our analysis in 2009, 2010 and 2011; and using data gathered by the DfE which collects information on the key stages of the process of conversion for all academies that have opened up till March 2015 (at the

[12] Missing values in national tests are usually explained by the fact that students have been privately educated for their primary education (few cases) or have recently moved to the country from abroad (the majority of instances).

time of assembling our data), or are in the process of doing so. Using these additional data, we identify: *(a)* the time when a school's application to become an academy is approved by the the DfE; and *(b)* the time when the school starts being advertised as an academy in the admissions booklets sent out by LAs to parents. Once again, we assign academies as 'approved' or 'in booklet' if the date of these events takes place soon enough for parents to consider them as academies before October of the year prior to starting secondary education – i.e. prior the deadline to submit school applications). We use differences in the timing of these conversion 'milestones' to understand which event is more relevant for parental choices.[13]

Next, we use publicly available data from OFSTED to gather information on the date and outcome of the most recent OFSTED inspection available prior to the applications' deadline. As discussed, inspection results are an important determinant of conversion to academies – with schools rated outstanding or good with outstanding features (e.g. in teacher management or students' progress) fast-tracked for change to converter academy status.

Furthermore, we aggregate pupil-level information contained in the PLASC at the school-by-year level, considering all pupils in the secondary school (age 12 to age 16), to obtain data on schools' composition in terms of gender, share of pupils eligible for FSM, share of pupils with SEN, ethnic composition, and share of non-native English speakers. We also use pupil-level data from the NPD to construct the mean Key Stage 2 scores (averaged across English, Mathematics and Science) of pupils enrolled in a given secondary school in 7th grade (the first year of secondary education) and the school's mean scores at the Key Stage 4 (again average across English, Mathematics and Science). While the former is a measure of schools' 'intake quality', the latter is a proxy for the measures of 'academic quality' advertised in school league tables. Using this information, we also compute each school's KS2-to-KS4 value-added, by aggregating up the difference between KS2 and KS4 attainments for each pupil in the school. Finally, we combine PLASC data with information from the School Level Annual School Census to measure total roll, total number of teachers, the pupil-to-teacher ratio and the number of support teachers that assist SEN students.

We line up details on school inspections, attainment and composition with our data on parental preferences in a way that reflects the information that would have been available at the time of their choice. In particular, for parents of pupils starting secondary school in September 20XX and expressing their preference between May and October of 20XX-1, we match school level data that refer to the academic year 20XX-3/20XX-2. These would have been the most recent ones available to parents – mainly via league tables – at the time they submitted their application forms. Note however that OFSTED inspections

[13] We also collect information on the time when a school applies to the DfE to become an academy. This detail is only available for converters – sponsored do not apply as the process is forced onto them as a remedial tool. Therefore, we don't consider the time of application as a 'milestone' in our analysis.

are not carried out every year. We therefore match to inspection results to parental preferences using the most recent OFSTED data prior to the time-window during which parents choose their schools.[14]

4. Empirical approach

The aim of our analysis is to identify parental preferences for school autonomy while holding constant other school, pupil and neighbourhood level characteristics. In order to do so, we estimate the following model:

$$Pref_{ist} = \alpha_i + \sigma_s + \theta_t + \beta Academy_{st} + \delta dist_{ist} + X'_{it}\Gamma + Z_{st}'\Delta + \varepsilon_{ist} \quad (1)$$

Where $Pref_{ist}$ measures the preference of pupil i for school s at time t; α_i, σ_s and θ_t capture respectively pupil, school and time specific unobservables; $Academy_{st}$ is a dummy identifying whether school s has converted to (sponsor or converter) academy by time t when pupils/parents in our three cohorts express their preferences; $dist_{ist}$ measures logarithm of the (straight-line) distance between the residence of pupil i at time t and school s; X'_{it} is a set of pupils characteristics measured at the time t when pupils/parents choose their school; and Z_{st} is a time-varying set of school characteristics that would have been observed by parents at time t. Finally, ε_{ist} is an error term assumed to be uncorrelated with the other regressors in Equation (1). However, we allow unobserved shocks to be correlated across cohorts and across students applying to the same school and cluster standard errors at the school level.

The main variables of interest in our analysis are $Pref_{ist}$ and $Academy_{st}$. The first variable captures parental preferences for schools. For most of our analysis, we create a dummy variable equal to one if the school was rated as the most preferred school and zero for all other schools. However, in some extensions we experiment with two alternatives: *(a)* a dummy variable taking value one for the three most preferred schools and zero otherwise; and *(b)* a variable that captures the ordered nature of parents' preferences by assigning schools listed by parents on the application form (up to six) the inverse of their rank (that is value 6 to the 1st ranked school down to value 1 for the 6th ranked school) and zero for all other schools.

The second variable, $Academy_{st}$, identifies whether school s at time t is operating as an academy. As already discussed, pinning down the exact timing of conversion – and more importantly the information available to and relevant for parents at the time of their choices – is not straight forward. We therefore experiment with different dates to identify which 'milestone' is more relevant for parental preferences (see details in Section 3.3). Further, in our analysis we initially pool both converter and sponsor-led academies but then consider the two types separately. As explained above, sponsored academies are failing and heavily undersubscribed schools taken over by a private sponsor with the aim of improving standards. Throughout this process, the school management, teaching methods and teaching body undergo substantial

[14] We have also gathered yearly Consistent Financial Reporting (CFR) information about each school's total expenditure per pupil and about total expenditure on teaching staff per pupil. This information is missing for most sponsor-led academies, which do not have the same financial reporting obligations as other state-maintained schools. We therefore only use this information in some robustness check.

restructuring. Further, these schools generally reopen in new or completely refurbished buildings (mostly on the same premises). As such, conversion to sponsored status identifies a host of changes that cannot be interpreted as identifying the impact of autonomy only. On the other hand, converters are highly performing institutions that mainly change institutional status in order to set free from the control of the LA. Among these schools, the impact of becoming an academy is likely to neatly identify parents' demand for more autonomous school arrangements. Given the aim of our work, most of our analysis focusses on the results that we obtain by focussing on these schools. Needless to say, with the data at hand we are not able to shed light about the precise channels through which conversion to academy captures parental demand (e.g. curriculum and teaching flexibility vs. having accountable teachers and school leaders). Therefore, our estimates only capture the overall 'reduced-form' effect of academisation.

We estimate the model in Equation (1) using fully exploded data where each of our pupils can choose any of the schools in the choice set (discussed in Section 3.1).[15] This set up allows us to include in our specification both pupil and school fixed-effects. Pupil fixed-effects take into account unobservable characteristics of both pupils and their place of residence (α_i in our model) that make them more likely to prefer a given set of schools. Note that including pupil fixed-effects partials out the impact of all pupils attributes – observables or not – so that the impact of pupil characteristics X'_{it} is not actually estimated (but accounted for). Moreover, pupil fixed-effects effectively control for cohort/time specific unobserved shocks that are common to all pupils and all school at a given time (θ_t in Equation 1). School fixed-effects partial out the effect of unobservable time-fixed school characteristics that make them more likely to become an academy and at the same time affect parental preferences. In the case of 'converter' academies, these could include persistent dimensions of 'quality' – such as the managerial talent of the head teacher or the dynamism of the school governing body. For sponsored academies, these unobservables could instead include high teacher turnover and disenfranchised staff. In order to account for the effect of school time-varying features on their propensity to become academies and on their likelihood to attract high parental preferences, our analysis also controls for an extensive set of school characteristics. Crucially, these include school average KS4 attainments; the incidence of pupils on FSM; and the latest rating by the school inspectorate OFSTED. As detailed, these variables are institutionally linked to a school's propensity to become an academy. Furthermore, Eyles et al. (2015) provide evidence on the associations between these variables and the probability of academy conversion – either through the converter or the sponsored route.

The identifying assumption underlying our analysis is that the timing of conversion to academy is as 'good as random' and unrelated to school unobserved shocks that might affect parental preferences and the propensity to become an academy. To support this assumption, we provide extensive evidence that – conditional on school fixed-effects – school attributes and characteristics of the neighbourhoods in which

[15] We estimate our model using OLS irrespective of the binary nature of our dependent variable. However, in some robustness check, we also use a maximum-likelihood approach and estimate conditional logit specifications.

the schools are located are not related to the probability of becoming an academy. Stated differently, the timing of conversion is balanced with respect to a large set of observable characteristics. Even then, it might be possible that our analysis is biased by time varying unobservables and other sources of endogeneity – even conditional on pupil and school fixed-effects and a wide ranging set of time-varying school controls. We next discuss some potential threats to our identification strategy and how we deal with these concerns.

First, our choice set includes schools that convert to academy within the observation period, schools that convert soon afterwards, and schools that do not convert at even later stages (up to March 2015 – when our observation window ends). The group of schools that never convert may differ substantially from the other schools along dimensions unobserved to us – but possibly observed and (de-)valued by parents – that are correlated with the choice to *ever* convert to academy. Including these schools in our control group may bias our estimates of the effect of autonomy on parental preferences. To rule out this possibility, we test the robustness of our findings by narrowing down our analysis to consider only schools that convert to academy *within* our data period (i.e. our 'treatment' group) and schools that convert *after* our observation period (i.e. a ' control' group formed of future converters). This approach controls for parental preferences for unobserved school features that correlate with the propensity to become an academy *at some point* and isolate the effect of actual conversion.

Second, it could be the case that time-varying school unobservables that correlate with school quality – and thus with parental demand – could also be related to the timing of conversion to academy (despite the evidence of balancing on observables), thereby confounding our interpretation of the effect of autonomy. To deal with this issue, we devise an instrumental variable strategy that predicts the timing of conversion of our schools using the number of application for conversion to academy received by the DfE from LAs other than those include in our sample in the same year and same month in which our schools apply for conversion. The number of applications that the DfE receives every month from other parts of the country is hardly predictable by schools and parents in our set, and thus likely to be uncorrelated with parental preferences for unobservable school attributes. To back this intuition, we show that the characteristics of the converters in our sample are uncorrelated with the number of applications received by the DfE at the time when they apply. Nevertheless, we find that this variable is strongly associated with the time it takes to the DfE to approve the request, thereby shifting exogenously the timing of conversion. We provide more details about the DfE approval process and the workings of our instrument in Section 5.3, where we present the related results.

One further concern is that parents with different backgrounds could differentially change preferences for schools that become academies, leading to different patterns of sorting across schools and making school composition endogenous to the academy change. Under the assumptions that parents anticipate this and that they value school composition (see Gibbons et al., 2014 for some evidence on the latter), this could imply that our estimates of the impact of autonomy are confounded by parental expectations about school composition changes and the value attached to it. We perform two checks that deal with this possibility.

First, we follow the approach of Ferreyra and Kosenok (2015) and control for the *actual* school composition that pupils will experience once enrolled at the school – more than a year after they apply. Under the assumption of rational expectations about sorting, this approach controls for the effect of changes in school composition and isolates the impact of autonomy on parental demand. Second, we exploit detailed information on households' mobility and school admissions patterns to identify 'static' schools where composition predominantly reflects a relatively stable and geographically bound residential area. In order to do so, we proceed as follows: *(a)* we use information on pupils aged 12 to 16 (grade 7 to 11) attending the secondary schools in our sample in the academic years 2006/2007, 2007/2008 and 2008/2009 (prior to our observation window) to calculate home-school travel distances, and identify the 75th percentile of the school-specific travel distance. We use this threshold to delineate the stretch of a school's *de-facto* catchment area; *(b)* we identify all postcodes that fall within a school's catchment area and are inhabited by pupils of all schooling ages (from 5 to 18, corresponding to the beginning of primary school till the end of secondary education) tracked by the PLASC administrative data. Using this information, we calculate for each school the average year-on-year pupil mobility and the average year-on-year change in the characteristics of the pupils residing in its *de facto* catchment area; and finally *(c)* we focus on schools where average year-on-year mobility is below the median, changes in KS2 attainments are above/below -0.4/0.4, and changes in the percentage of FSM eligible pupils are above/below -1.5/1.5 percentage points (these thresholds trim approximately the top/bottom 10% of the distributions of the changes in KS2 attainments and FSM eligibility). Focussing on this subset of 'static' schools minimises the likelihood that substantial changes to composition take place after schools become academies and further mitigates concerns that school institutional conversion overlaps with endogenous school composition changes.

Lastly, we confront the possibility that two features of the school admissions system bias our findings, namely the priority given to children with siblings at the school and the distance-based thresholds for admitting students to over-subscribed schools. Considering the first issue, it might be the possible that parents of pupils with a sibling already enrolled in a school act as a driving force (e.g. by leading consultations) for a school's decision to convert to an academy. This would generate something akin to a reverse causal link between parental preferences and conversion, distorting the interpretation of our findings. In order to deal with this possibility, we identify and exclude from our analysis all pupils who express preferences for schools where they have siblings and are admitted on the basis of this criterion. In relation to the second issue, it might be possible that a household's location is endogenously determined as parents relocate in order to grant admission to an over-subscribed academy when applications are ranked by home-to-school distance. Although this issue would not necessarily bias our interpretation of the effect of academy conversion on parental demand, it would bias our analysis of the effect of autonomy and its interplay with pupil home-to school distance (as well as the interpretation of the effect of $dist_{ist}$). In order to deal with this problem, we verify that our results hold if we exclude pupils that change address in the four years leading up to secondary school admission and the year after starting secondary school. This allows us to identify 'strategic movers' and test the robustness of our findings to their exclusion.

In conclusion, the institutional and geographical detail available in our data, coupled with a rich set of information on schools, pupils and neighbourhoods and the possibility of tracking students over time allows us to perform an extensive set of identification checks and robustness tests, and pin down the causal effect of autonomy on parental demand for schools.

5. Results

5.1 Descriptive facts

Table 1 presents descriptive statistics for our sample. Panel A tabulates information on pupils' background. KS2 attainments averaged across English, Mathematics and Science have a mean of approximately 27.7. This is in line with the national average and corresponds to the expected level of attainment for pupils at this age. However, the statistics also reveal that pupils in our sample are much more likely to be on FSM (33% against a national average of approximately 16%) and less likely to be White British (40% against a national average of nearly 80%). This reflects the overall ethnic make of Birmingham, the second largest city in England, which is inhabited by a very diverse and relatively deprived population. Further, the data show that on average parents in our sample expressed preferences for 3.8 schools (out of the 6 they are allowed to rank on the application form), and that only 3% of them only chose schools outside the LA.

Panel B of Table 1 reports descriptive statistics for the 127 schools included in our sample. On average over the three years, approximately 19% of the schools are open as academies – 10% sponsored and 9% converters. However, this static picture masks a very dynamic and diverse evolution of the sector, as documented in Table 2. The various columns tabulate the percentages (and numbers) of schools that are academies at the time when parents express their preferences in 2009, 2010 and 2011. The first three columns identify schools as academies if they are open, while the next three columns consider whether schools are listed as academies in the LA admission booklets, and finally the last three columns use the time of approval to identify the timing of institutional change.[16] The data show that overall the academy sector expanded from accounting for approximately 8% of the schools to 36%-43% – depending on the variable used to identify the timing of conversion. The overwhelming majority most of this rapid expansion is accounted for by converter academies. While sponsored increased only marginally – by between 2 and 4 schools depending on the variable used to identify the time of their change – converters went from being non-existent to accounting for 25%-33% of the schools in our sample. We exploit this swift increase to identify parental demand for school autonomous arrangements.

Panel B of Table 1 presents more information on the schools in our sample. Approximately 41% of them are located outside the Birmingham LA and 9% admit pupils on the basis of academic ability (i.e. they

[16] Note that discrepancies between the information in the booklets and the picture portrayed by the opening date in part emerge because some schools are labelled as 'opening as academies in the near future' in the booklets even though this might not actually happen before October of that year when school applications close.

are selective). Furthermore, we find that the KS2 average attainments of their intake (i.e. the end of primary school achievement of pupils just starting secondary school) and the average KS4 (end of secondary school) attainment are relatively close to the national average. In addition, schools in our sample enrol more FSM eligible and non-White pupils than in the national average. The skew towards more disadvantaged pupils is less pronounced than in the pupil-level descriptive statistics because the sample of schools includes institutions outside the Birmingham LA – predominantly attended by pupils with more affluent background. We also find that the average pupil-to-teacher ratio is 15 and the share of schools rated outstanding is 28%. While the latter is slightly above the national average, the former is somewhat below. This captures the fact that most sponsored academies are heavily undersubscribed at the time of conversion, and that it takes these schools a number of years before they manage to address this situation.

The last panel of Table 1 reports choice-level information. These refers to the exploded dataset in which the parents of the 37,812 pupils retained in our sample can any of the 127 schools retained in our analysis (see Section 3.1 for a discussion) with the exception of: *(a)* 15 female-only school excluded from the choice set of male pupils; and *(b)* 10 male-only schools excluded from the choice set of female students. This gives rise to a total of 4,327,959 observations that we will use to estimate empirical models that control for pupil and school fixed-effects. The probability that one of these schools is listed as the top preference is approximately 0.009, while the probability of a school being listed among the top-three preferences is 0.0225. The inverse rank of the schools is 0.14 – where this variable is obtained by assigning the value of 6 to the 1st ranked school down to value 1 for the 6th ranked school (and zero for all other schools). Finally, the average home-to-school distance is approximately 11.3km with a 6.7 standard deviation and a median value of 10.1km. However, the median home-to-school distance among the schools listed by the parents on the application is much shorter, at 2.5km.

5.2 Regressions results

We present our first set of results in Table 3. These come from the model laid out in Equation (1) and include both pupil and school fixed-effects. Across all columns, the outcome is a dummy variable identifying whether the school was ranked as the most preferred one by parents. Columns (1) to (3) do not include school controls, whereas Columns (4) to (6) include the school characteristics described in Table 1. Columns (1) and (4) use the time of opening to identify whether a school is operating as an academy at the time when parents express their preferences, while Columns (2) and (5) use the information contained in the LA admission booklets, and Columns (3) and (6) focus on the time of approval. The coefficients (and standard errors) on schools' academy status have been multiplied by 100, and the implied academy effects have been obtained by rescaling the coefficients by the probability that a school is top-ranked by parents (0.009). Note finally that standard errors are clustered at the school level.[17]

[17] We experimented with two-way clustering at the pupil and school level. This alternative did not affect our findings.

Panel A tabulates the results from regressions that pool sponsored and converter academies. We find some limited evidence of parents responding to school institutional change. Although the point estimates are all positive and imply that schools becoming academies are 4%-6% more likely to be top ranked, only two of the six estimates are statistically significant.

A more interesting picture emerges in Panel B where we separate converters from sponsor-led academies. Columns (1)-(2) and (4)-(5) show that, when we identify academies by their opening date and by their status in the LA booklets, we find no evidence of a positive converter effect, but a very large positive impact of conversion to sponsored academy of up to 28%. Conversely, when we focus on the date of approval to identify the timing of institutional change, we find no evidence of a significant sponsored academy effect, but a positive and significant effect for converters. This represents approximately a 6% increase in the probability that a school is ranked as the most preferred one, and close to findings presented in Panel A.

How can we interpret this pattern? Figure 1 sheds some light on this issue by showing the number of months it takes for converters and sponsored academies to open following approval. The data reveal that for converters this time lag is relatively short: it takes on average 4.5 months for a converter academy to open following approval, with a median of 4 months. On the other hand, the time lag for sponsored academies is much longer: the average delay is 10.7 months and the median 10 months. These differences are highly significant and explained by institutional factors. Whereas converters are essentially well-run, highly performing schools that simply opt out of the control of the LA, sponsored academies are undersubscribed and failing schools that need complete overhaul in order to address long-standing underperformance and poor-management issues. Prior to opening as academies, these schools go through a long process of restructuring – often coinciding with heavy refurbishment of the facilities and construction of a new school building (usually on the same premises) – before finally opening as academies and launching a relatively aggressive marketing campaign. This is usually driven by the associated sponsor and meant to raise the school profile in the local community and substantially increase student roll. In the English context, the latter aspect is paramount for schools' sustainability since school funding is predominantly dictated by pupil on roll (with some adjustment for the disadvantage of schools' intake).

These details help interpreting the evidence we see in Panel B of Table 3. For converter academies, the most relevant 'milestone' is approval: parents know that opening will soon follow, irrespective of the information available in the LA booklets and of whether the school starts the new academic year actually open as an academy. Similarly to sponsored academies, converters advertise their institutional change and the benefits academisation will bring. Moreover, as part of their application process for conversion to the DfE, they hold consultation with parents and the local community. In short, it is very likely that parents are well informed about the schools' plans to convert to academy and see the approval date as the official 'green light' for the school to start operating autonomously. Conversely, for sponsored academies, the approval and the open milestones represent markedly different events. Given that the time lag between these two dates is almost a full academic year, it is likely that being approved for sponsored conversion

crystallises the notion that the school is failing and in need of restructuring; conversely, at the time of opening, being a sponsored academies identifies the impact of having being linked to a sponsor meant to bring improvement in standards and address heavy under-subscription issues.

In short, the impact of sponsor-led academisation on parental preferences is unlikely to solely identify parents' demand for more autonomous schooling – as a host of other changes takes place at the same time. On the other hand, parental response to converters' transformation neatly identifies the value that parents attach to more autonomous arrangements – over and above current school quality. Given the aim of our work, for the rest of the paper we focus our discussion on this group of schools and consider the approval date as the relevant 'milestone' for parental choice.

In this respect, our findings show that following approval for change to autonomous arrangements a school is 5%-6% more likely to be listed by parents as their top preference. To benchmark this result, note that a 1% increase in the home-to-school distance reduces the likelihood of a school being top-ranked by approximately 5%. While the latter effects is very sizeable (e.g., approximately 2-2.5 times the size documented in Hastings et al., 2005 for the US), this can be in part explained by the English institutional context in which oversubscribed schools can use proximity to prioritise students for admissions. We return to this issue below where we assess the robustness of this result to parental strategic mobility, and investigate the interplay between school proximity and parental preferences for autonomous arrangements.

5.3 Assessing our identification strategy

In this section, we present a number of robustness checks to rule out the possibility that our results are biased by endogeneity issues. To start with, Table 4 presents evidence on the association between the timing of approval for change to academy and lagged school and neighbourhood characteristics (measured in the previous academic year). The table reports the coefficients and standard errors of school-level regressions of a dummy identifying whether a school is an academy one of the characteristics listed in the first column. Columns (1) and (3) only include time dummies, whereas Columns (2) and (4) include school fixed-effects. Note that the first two columns focus on converter academies and therefore contain the results that are most relevant for our analysis. However, in the last two columns we also present some evidence for sponsored academies so that their nature can be compared to converters' attributes.

In Panel A, we focus on school characteristics. Column (1) shows that in the cross-section converters have higher KS2 and KS4 attainments than other schools; are less likely to have a high share of FSM eligible pupils; are popular schools with a higher pupil-teacher ratio; and are more likely to be rated outstanding by OFSTED. A test for the joint significance of these variables clearly rejects the null of no effect (coefficients not tabulated for space reason). The opposite pattern is evident for sponsored academies. Column (3) shows that – prior to conversion – these schools are likely to have low Key Stages and a high incidence of FSM pupils, and have fewer pupils per teacher – which can be ascribed to their heavy under-subscription. These findings are similar to those in Eyles et al. (2015) who use all academies in the England to contrast the characteristics of sponsor-led and converter academies. However, all these associations disappear when we control for school fixed-effects and test whether the timing of conversion is balanced

with respect to school observables. Column (2) shows that the association between approval for converter and Key Stage results is now slightly negative and not significant. Further, the coefficients on the incidence of FSM eligible pupils and on the OFSTED outstanding rating shrink in size and become insignificant. The only coefficient that becomes slightly more sizeable after the inclusion of school fixed-effects is the one on the school pupil-to-teacher ratio. Even in this case, however, the association is now insignificant. Column (4) shows similar patterns for sponsored academies. Most of the coefficients shrink in size or change their sign, and none of the associations depicted in the table is significant at conventional levels.

Panel B provides further evidence by focussing on the characteristics of the neighbourhood around the schools. In order to identify geographical areas that represent a school's implicit catchment area, we proceed as follows. First, we identify secondary school pupils (year 7 to year 11) attending secondary schools in our sample in the three years prior to our observation window (i.e. in 2007 to 2009). We then compute the straight-line distance between their place of residence and the school premises and use this to identify the school-specific 75th percentile of the home-school distance distribution. We use this threshold to identify all postcodes that are within the *de fact* school catchment area (as in Gibbons et al., 2008) and calculate the characteristics of pupils aged 5 (reception year of primary schooling) to 18 (last year of secondary schooling, and two years after the end of compulsory education) living in these areas in the academic year prior to the one under investigation. Using this set up, we calculate the average KS2 attainments of residents around the school as well as the incidence of FSM eligible pupils in the residential neighbourhoods surrounding the schools. We also compute the year-on-year mobility of students as captured by changes in their residential address, and the average size (number of pupils) in the area.

In the cross-section, we find that smaller neighbourhoods with fewer FSM-eligible pupils and more high-KS2 achievers are more likely to be associated with the local school being a converter academy. There is also some evidence of a negative association between neighbourhood mobility and the likelihood that the school is a converter, though this is not significant. The opposite pattern emerges when focussing on sponsored academies. More importantly for our analysis, all these associations become insignificant when we control for school fixed-effects. In the case of converters, the coefficients substantially shrink in size or change sign, and lose statistical precision. This lends further support to our identification strategy that rests on the assumption that the timing of conversion is 'as good as random'.

In Table 5 we provide additional evidence that our estimates pin down the causal effect of school autonomy on parental preferences.[18] To being with, in Column (1) we confront the possibility that the schools that choose to convert to academy at some stage and those that decide not to do so differ in unobservable ways that are related to parental preferences. In order to deal with this issue, we create a 'narrow sample' that only compares schools operating as academies in a given academic year to school that become academies in future academic years (but excluding the academic year immediately adjacent to

[18] All regressions control for a dummy identifying sponsor-led academies, although the coefficients are not shown.

overcome possibly spill-over effects from current to future converters). In essence, this approach compares schools convert *within* our data period (i.e. our 'treatment' group) only with schools that convert *after* our observation period (i.e. a 'control' group formed of future converters) up to 2015 – while excluding schools that do not become academies. When we do this, we find a slightly larger effect of autonomy on parental preferences: schools approved to become converter academies are 10% more likely to be listed by parents as their top preference than future academies.

Even then, it could be the case that time-varying school unobservables that correlate with school quality – and thus with parental demand – also correlate with the timing of conversion to academy and bias our interpretation of the effect of autonomy. To deal with this issue, we combine the 'narrow sample' approach with an instrumental variable strategy that predicts the timing of approval to academy using the number of application for conversion received by the DfE from LAs other than those include in our sample in the same year and same month in which our schools apply for conversion.[19] Appendix Figure 1 shows the variation of the instrument over the months in which schools in our sample apply (including schools that will be approved for conversion after the end of our observation period). The figure clearly shows that – besides an initial peak in application number – there is within year fluctuation. Since our specifications control for pupil (and school) fixed-effects, this is essentially the variation that our analysis exploits. The assumption underlying this approach is that the number of applications that the Department receives every month from other parts of the country is hardly predictable by schools and parents, and thus uncorrelated with parental preferences for unobservable school attributes. To back this intuition, the right panel of Appendix Table 1 shows that there is no association between school characteristics and the number of applications received by the DfE at the time when the school itself applies for conversion. We find similar results if we focus on neighbourhood characteristics (results not tabulated).

Results using this approach are presented in Column (2) of Table 5. We find that our instrument has a strong predictive power on whether a school is approved for conversion in time for parents to observe it operating as an academy when stating their preferences. The relationship between the number of applications from other parts of the country and the probability of being approved is positively signed. Although this result might seem puzzling, it can be explained by the institutional details of the approval process. In simple terms, this takes place in two steps. First, a group of 'Lead Teams' is assigned to evaluate academies' proposals for conversion. The teams work independently from one another and are assigned to applications coming from schools grouped in broad geographical areas. Teams are given targets for the *percentage* of applications applied within a given amount of time (irrespective of the amount of applications received), and best performing teams are flagged and championed as 'best-practice examples' within the Academies Unit at the DfE. Although excellence at this task does not correspond to any

[19] We exclude from our instrument applications from within the LAs in our analysis to avoid strategic interactions between schools in terms of the timing of their application to the DfE.

immediate financial reward, it is likely that members of outstanding teams are considered for internal promotions and mobility within/across units at DfE. This generates a first incentive to process application faster when higher numbers are received. Note however that objective criteria for approval make it unlikely that faster turnover time is associated to less scrutiny and more leniency in the approval decision. The second step in the approval process involves an 'Academy Board' where senior civil servants, policy makers and education experts (external to the Department) meet to discuss and finally approve the cases put forward by the Lead Teams. The frequency of these meetings is not fixed and varies depending on the amount of applications in the pipeline. At times of high demand, Academy Boards meet more than once per week. Note that the number of academies' applications assessed at each gathering is not capped. Conversely, at times at low demand, board meetings instead get delayed. Although this is not institutionalised, the reason why delays happen is related to the fact that it becomes more difficult to coordinate the tightly scheduled diaries of the involved senior figures when a sense of urgency is lacking (because relatively few applications have to be looked at). This also generates an incentive for the system to process application faster when larger numbers are received. The right-hand side plot of Appendix Figure 1 provides some supportive evidence. The number of months of delay between application and approval varies between one and five. More importantly there is a downwards sloping relationship between the time it takes application to be processed and the number of applications received.

Our instrumental variable estimate (displayed in Column 2) supports our results so far. If anything, we find that parental valuation of school autonomy is slightly larger than when using OLS. Following approval, converter academies are 13% more likely to be ranked by parents as their first choice. The increase in the implied effect could be explained by some measurement error in the timing of academisation – which we proxy by the date of approval but on which parents might hold more information.

The next two columns of Table 5 deal with the possibility that our results pick up parental valuation of expected changes in school composition – as opposed to demand for school autonomy. In particular, our concern is that, if parents with different backgrounds differentially change preferences for schools that become academies and this leads to different sorting across schools, school composition will be endogenous to the academy change. If parents anticipate this and value school composition (see Gibbons et al., 2014 for some evidence on the latter), our estimates might be biased valuations of parental preferences for autonomy. To deal with this issue, we perform two checks. First, we follow the approach of Ferreyra and Kosenok (2015) and control for the *actual* school composition that pupils will experience once enrolled at the school – which we observe in PLASCs for later academic years. Under the assumption of rational expectations about sorting, this method controls for the effect of changes in school composition. Colum (3) presents the results from this approach and shows that parents are approximately 7% more likely to list a school as their top choice after it becomes a converter academy. Second, we exploit detailed information on households' mobility and school admissions patterns to identify 'static' schools where composition is likely to reflect a stable and geographically bound residential area. In order to define neighbourhoods around schools, we follow the approach described above and consider residential postcodes that are within the 75th

percentile of the home-to-school travel distance of pupils attending the secondary schools in our sample in the three years prior to our observation window. We then select schools surround by areas where: the average year-on-year mobility is below the median; the changes in KS2 attainments of resident pupils are above/below -0.4/0.4; and the changes in the percentage of FSM eligible pupils are above/below -1.5/1.5 percentage points. This leaves us with a subset of 'static' schools where it is unlikely that our estimates are confounded by changes to composition that take place after academisation. Column (4) presents our results and confirms our previous findings: autonomous schools are 10% more likely to be top ranked by parents.

The last two columns of Table 5 investigate whether institutional features of the English admission system introduce biases in our estimates. Column (5) focuses on the rule prioritizing children with siblings at the school for admission and considers the possibility that parents of these pupils act as a 'driving force' (e.g. by leading consultations) for a school's decision to convert to academy. This would generate a sort of 'reverse causal' link between parental preferences and conversion, biasing the interpretation of our results. To deal with this possibility, we exclude from our analysis all pupils who are admitted to schools on the basis of the sibling criterion. When we apply this restriction, we still find a positive effect of conversion on parental preference, with an implied effect of approximately 8%. Column (6) investigates whether our results are biased by the possibility that household endogenously change their place of residence to grant admission to over-subscribed academies when applications are ranked by home-to-school distance. In order to control for this possibility, we drop from our analysis all students that move their residential address between grade 3 (right after KS1, and at the beginning of the second primary school stage) and grade 7 (right after the beginning of secondary school). Dropping these potentially 'strategic movers' attenuates our results but does not affect our conclusions. We still find that converter academies are around 6.5% more likely to be top-ranked by parents.[20] Interestingly, we also find that among non-movers the effect of school-home distance is in line with our previous findings. This suggests that the pupil fixed-effects take (in part) care of the endogeneity of residential choice in relation to school access.

5.4 Additional robustness checks

In Table 6, we report an additional set of robustness checks on our results. To start with, we concentrate on assessing the validity of our broadly defined school choice-set. In Column (1), we only consider the schools that are within the 10th percentile of the pupil-specific home-to-school distance. Stated differently, for each pupil we select his/her 10% closest schools out of the 127 in our sample. This approach still shows that schools becoming converter academies are 8% more likely to be rated by parents are their top choice. Next, in Column (2) we append to our specification a dummy identifying the school closest to the pupil's

[20] To exclude strategic movers, we tried several alternative sub-sample selections. For example, we excluded pupils who change address between grade 5 and grade 6 – when parents express their preferences and thus location plays a role – only to revert to the grade 5 address in grade 7. This approach also leads to similar conclusions.

residence.[21] We find that the impact of academisation on preferences is reduced but remains statistically significant with an implied conversion effect of approximately 5.4%.

In Columns (3) and (4), we alter the way in which we measure parental preferences by changing our dependent variable. First, we consider the impact of academisation on the chances that a school is rated among the top-three preferences expressed by parents. Column (3) shows that this does not affect our conclusions. Converters are still significantly more likely to be among the most preferred schools – with an implied effect of approximately 5%. Next, in Column (4) we consider the inverse rank given by parents on their application form (and assign unchosen schools to zero; see Section 4 for more details) in order to maintain a sense of 'ordering' in parental preferences. We still find that a positive and significant effect of academisation on parental preferences. Although the implied effect is in the same ball-park region as previously documented – at around 4% – the nature of the dependent variable does not make a direct comparison with previous columns very meaningful. Nevertheless, the pattern clearly supports our results.

Finally, in Column (5) we drop pupils with Special Education Needs – since these also get preferential allocation to their preferred schools – while in Column (6) we include additional school controls – in particular the share of SEN pupils in the school and the ratio of pupil to SEN-support teaching staff (alongside a measure of absences at the school). We find that implied effects of parental demand for autonomous school become 8.4% and 5.6%, respectively. These estimates are very close to the results documented so far.[22]

In conclusion, these additional checks confirm that there is a positive and significant association between parental demand for schools and the autonomous nature of their institutional arrangements. In the next section, we study whether the average results documented so far hide substantial heterogeneity along a number of dimensions.

6. Patterns of heterogeneity

6.1 The interplay of family background and demand for autonomy

Table 7 present the first set of results that investigate the heterogeneity of parental demand for school autonomy. Columns (1) and (4) study whether our findings differ for FSM-eligible/non FSM-eligible pupils by interacting the dummy for converter schools with an indicator identifying whether the student is eligible for free meals. Following a similar approach, Column (2) and (5) focus on whether the student is a high/low KS2 achiever (defined as being above/below the median of the KS2 sample distribution), whereas Columns

[21] The coefficient attached to this variable is very large at 0.205 (s.e. 0.018). This preference is likely to pick up a reverse causal link and to be driven by the priority given to close-by pupils for admission to oversubscribed schools.

[22] In some further extensions, we controlled for school KS2-to-KS4 value-added or the school average KS2 achievement (a measure of quality intake) instead of KS4. This did not affect our results. We also experimented with including proxies for school expenditure. This second extension reduced the precision of our estimates, but not their size. This is partly due to the fact that school expenditure data are not consistently reported for academies and so we lose several schools from our analysis.

(3) and (6) study the interplay between demand for autonomy and home-to-school distance. The first three columns use the 'narrow sample' detailed above to address concerns with the endogeneity of academy conversion, while the last three columns focus on non-movers to deal with 'strategic' residential mobility. We find very similar results if we use the sample that includes all pupils and all schools in our analysis.[23]

Our findings show that the average results discussed so far mask substantial heterogeneity. Starting with Columns (1) and (4), we find that more affluent parents whose children are not eligible for FSM are approximately 25%-28% more likely to top-rank a school following conversion to academy. Conversely, families with pupils eligible for free lunches are between 21% and 28% less likely to rank a converter as their top preference – even though in the 'narrow sample' this estimate is only borderline significant. A very similar pattern emerges when considering high and low achieving pupils. Parents of students with above-median KS2 attainments are 44% to 46% more likely to rank a converter academy as their most preferred school. Families with below-median KS2 achievers instead either do not change their preference vis-à-vis school conversion to academy (with an insignificant coefficient at -0.0021) or are 30% less likely to rank the academy as their most preferred school.

Since these results are very stark, we check their robustness along a number of dimensions. In particular, we consider whether the geographical distribution of converting school is skewed in such a way that disadvantaged pupils – i.e. poor achievers, eligible for FSM – do not have a converter academy close enough to their place of residence. In order to deal with this possibility, we follow two alternative strategies. First, we drop pupils who do not have at least one academy within 2.5km from their home residence. This threshold is chosen as it represents the median of the home-to-school distance distribution among the schools listed by parents on their applications form. Second, we drop all pupils who do not have a converter academy among the 10% closest schools. Our results are reported in Appendix Table 2. The patterns displayed are close to those discussed above – and if anything the dichotomies between well-off/worse-off students are more pronounced. We also try excluding pupils that do not fall in the *de facto* catchment area of at least one converter. As detailed above, this is defined by computing the 75th percentile of the school-specific home-to-school travel distance for secondary school pupils in the three years prior to our analysis. This robustness check also confirms our findings (results not tabulated).

Next, in Columns (3) and (6) of Table 7 we study the interplay between parental preferences for academies and pupil home-to-school distance. We find a strong and negative relation between the probability that an academy is ranked as the most preferred school and the (logarithm) of the home-to-school distance. For instance, at the median of the home-to-school travel distance among the schools ranked by parents (at 2.5km), academies are 1.5-1.7 times more likely to be rated by parents as their most preferred schools than equally distant non-academy schools. This association is robust to the exclusion of 'strategic

[23] Note that in all regressions we include a dummy identifying whether the school becomes a sponsor-led academy and its interaction with the characteristic under consideration (not shown)..

movers' (see Column 6) and thus not driven by parents' endogenous residential mobility to facilitate access to over-subscribed academies. More insights can be gained from Figure 2. Irrespective of whether we focus on the 'narrow sample' or on the sample of stayers, parental preferences for converters remain positive and significant till the home-to-school distance is nearly 10km. Although the association becomes small in size at long distances, it remains sizeable for quite a long stretch. For example, at 5km this still corresponds to approximately a doubling in parental demand for autonomous school arrangements. At the opposite extreme, at around 1km, the implied effect of conversion corresponds to almost a tripling in the probability that the school is top ranked.[24]

In Table 8 we investigate whether the heterogeneity along the lines of family background documented above interacts with the varying degree of preference for academies over distance. In order to do so, we still interact the impact of becoming a converter academy with the (logarithm of) home-to-school travel distance, but estimate separate regressions for pupils with different backgrounds.[25] In particular, in Columns (1)-(2) and (5)-(6), we study how parental preferences for academies and their interaction with distance vary depending on whether the child is FSM eligible/non-FSM eligible. In Columns (3)-(4) and (7)-(8) instead, we focus on pupils with above/below median KS2 results. Note that the first four columns use the 'narrow sample', whereas the last four columns focus on the sample of non-movers.

We find that better-off parents of high achieving children still display a strong preference for converter schools and that this preference displays a marked decay with home-to-school distance. Schools that convert to academies and are located 2.5km away from the place of residence of non-FSM eligible pupils/high KS2 achievers are 2-2.3 times more likely to be top ranked on the school-choice form. On the other hand, we find no evidence that parents of children eligible for free lunches and with low levels of attainment react to academy conversion – irrespective of how proximate the school is to their home.[26] Figure 3 provides a graphical representation of our findings. The plots clearly show that better-off families display a strong preference for close-by converter academies. Although the decline in the demand for autonomy over distance is quite sharp, the effect of institutional change remains significant over a fairly long distance range. Conversely, parents of worse-off children do not react to conversion to academy even if this involves local and close-by schools. Once again, we check that these results are not driven by differential availability of converters near the place of residence of worse-off/better-off pupils. To do so, we investigate whether our results remain unaffected if we focus only on pupils who are within 2.5km of a

[24] Note also that controlling for whether the school is the closest in the students' choice set does not affect our results. We still find a positive effect of becoming an academy (at 0.0249, with a standard error of 0.0062) and a negative impact on the interaction between academy status and the log of distance (at -0.0106 with a standard error 0.0028).

[25] Regressions that included double and triple interactions between students' background characteristics, school academy status and home-to-school distance yield very similar results. However, these regressions are less straight forward to interpret and so these results are not tabulated.

[26] We also find that the preferences of parents of children eligible for FSM and with low KS2 attainments are more sensitive to the home-to-school distance that those of parents of high achievers/non-FSM eligible students. This is in line with previous evidence. See for example Hastings et al. (2005).

converter academy, or on pupils who have a converter academy among the 10% closest school in their choice set. We find that these restrictions do not affect our findings.

To further assess the robustness of our results, we consider whether additional school characteristics or school expected composition – and their differential valuation by parents with different backgrounds – can explain our findings. To investigate these issues, we start by adding to our specifications the additional school characteristics we considered in Column (6) of Table 6 (namely, the percentage of SEN pupils in the school, the ratio of pupil to SEN-support teaching staff and a measure of pupil absences). When we do this, we fully confirm the results presented in Table 8. Next, we follow the approach we used in Column (3), Table 5 and include in our specification variables that measure the 'future' expected composition of the school (i.e. the one that pupils will experience when they start secondary schooling). This extension also confirms our findings. This suggests that the heterogeneity we document in Table 8 cannot be attributed to parental differential preferences for changes in the expected school composition upon conversion.

What could explain the evidence that better-off parents' valuation of academies displays a strong spatial pattern? Although it is hard to provide a firm answer, we speculate that this might be related to the notion that one of the advantages of autonomous arrangements is the increased possibility of parental involvement and influence over the school activities – either through the Governing board of the school or directly in discussions with the head-teacher/members of the teaching staff. The possibility of these enhanced interactions between parents and the school is likely to be more highly valued by better-off parents when the school is close-by – because proximity allows them to get involved in the school's activities on more regular basis and with some knowledge of the local community. Lacking survey evidence on parental perceptions and their actual involvement with the school, this explanation can only remain speculative. However, in the next section, we present some supportive evidence.

6.2 Family background, neighbourhood characteristics and demand for autonomy

In this section, we investigate whether the heterogeneous patterns of demand for autonomous schooling presented above interact with the characteristics of the neighbourhood in which families reside. In order to identify neighbourhoods of residence, we use Output Areas (OAs). These are small geographical aggregates consisting of a group of postcodes and usually counting five to six children of the same age. In particular, we use the OAs designed by the UK authorities in 2001 to order to facilitate collection of information during the Census days. OAs can be considered as self-contained residential neighbourhoods and have been previously used to study neighbourhood effects (see Gibbons et al., 2013). Using this geographical detail, we calculate average neighbourhood characteristics by aggregating the student-level information contained in PLASC for the three academic years prior to our analysis and considering all pupils of school age.

To begin with, we study whether the size of the neighbourhood as measured by the number of school-age pupils residing in the OA affect parental preferences for converter academies. When we do this (results not tabulated), we find that the preference for autonomous school arrangements among better-off parents is particularly marked in smaller neighbourhood with pupil numbers below the median of the OA distribution in the sample. Furthermore, we investigate whether the year-on-year mobility of pupils in the residential

area is linked to parental preferences for converters. We find evidence that parents of high achieving children and families with pupils who are not FSM eligible are more likely to top-rank autonomous schools in neighbourhoods with low levels of mobility (below the median of the sample distribution). However, we still find no evidence that worse-off parents respond to academy conversion by changing their preferences – irrespective of the size and mobility of their neighbourhood of residence. Taken together, these pieces of evidence suggest that parental preferences for autonomous school arrangements are stronger in areas where better-off parents who decide to engage with the school activities are more likely to be part of a small and stable community that is well-known to them. This finding is in line with our previous evidence on the marked decay of preferences for academies over distance among parents of high achieving students/non-FSM eligible pupils.

Next, we study whether the composition of the neighbourhood in terms of students' eligibility for FSM and average KS2 attainments interacts with parental preferences for academies. Our evidence is presented in Appendix Table 3. Column (1) shows that on average converter academies are more likely to be top-ranked in areas with a low percentage of pupils eligible for free lunches (top panel) and high average KS2 attainments (bottom panel). This pattern of heterogeneity is highly significant. Column (2) and (3) further investigate whether these effects interact with family background characteristics. Colum (2) focuses on pupils eligible for FSM (top panel) or with below-median KS2 attainments (bottom panel). Within this group, we find that parents have no significant tendency to rank converter academies higher among their school choices irrespective of neighbourhood composition. This overall lack of demand for autonomous arrangements among worse-off families is in line with our previous findings. Conversely, the patterns of better-off parents reveal that preferences for academies interact significantly with the composition of the residential neighbourhoods. In particular, we find evidence of 'homophily' – i.e. 'liking of the same' – with parents of non-FSM eligible pupils expressing a clear preference for academies when the incidence of FSM-eligible pupils in the neighbourhood is low, and parents of high achieving students more likely to rank academies at the top of their preferences when average KS2 attainments in the place of residence are high. The evidence discussed above shows that this pattern cannot be fully explained by expected changes in school composition and parental differential valuation of school intake/school peer interactions. More likely, given the partial overlap between neighbourhood of residence and school intake, this reflects parental expectations about the involvement of other parents in the running of the school and their preferences for autonomous institutions that will be responsive to actively engaged parents.

To provide additional evidence of homophily in school preferences, we investigate whether demand for autonomy from families with different backgrounds interacts with school characteristics. To do so, we use school-level information for the three academic years prior to our analysis to calculate the incidence of pupils eligible for FSM and average school KS2 and KS4 attainments (respectively, a measure of intake composition and a proxy for end of compulsory schooling results). Our evidence shows that the preferences of parents with children eligible for FSM respond little to academy conversion. However, there is some evidence that an academy is more likely to be top-ranked by worse-off parents if the percentage of FSM-

eligible pupils at the school is high. The exact opposite is evident for better-off parents: they still exhibit a significant preference for autonomous arrangements, but this is clearly stronger in schools with few FSM-eligible students. Unfortunately, in terms of school KS2 and KS4 attainments, we do not find any meaningful patterns. This is most likely due to the fact that converter academies are amongst the highest performing schools by institutional design. There is therefore very little 'data support' to investigate whether academies with low level of attainments attract a different response in terms of parental preferences than highly achieving converters.

7. Concluding remarks

In this paper, we have exploited pupil level information about school preferences coupled with the rapid expansion of the academy sector in the England to uncover parental demand for autonomous school arrangements. Our results show that – on average – parents have a small, but significant preference for schools that opt-out of the control of the local education authorities. However, this average result masks some substantial heterogeneity along the dimensions of family background. On the one hand, better-off parents with high achieving children substantially respond to conversion to autonomous school arrangements and are significantly more likely to rate converter academies as their most preferred school. On the other hand, poorer families with low achieving students eligible for FSM behave in a diametrically opposed way: they either show no interest in schools converting to academy status, or rate these schools lower on their application form following conversion.

Although it is hard to explain this pattern and the processes influencing parental application decisions, our findings have clear policy implications. To being with, there is evidence – from the UK, Sweden and the US – suggesting that more autonomous schools tend to have more advantageous pupil intakes relative to other comparable schools. These findings have often been taken as suggesting that these institutions operate selective admission practices – either openly or 'by the back door' when the code of practice regulating school admissions does not allow selection (as in the English case). Our results suggest that irrespective of school practices there is a more fundamental problem at the heart of this evidence: parental preferences for autonomous schooling are highly heterogeneous along the dimensions of family background. School intake composition is therefore more likely to reflect heterogeneous parental demand for autonomous schooling. 'Supply-side' policies that focus on school admissions practices are unlikely to address the real underlying issue. 'Demand-side' policies aimed at raising awareness of the benefits of autonomous school and – more generally – awareness of the value of a good education among worse-off parents are more likely to have significant effects in terms of counterbalancing schools' tendency to become stratified along the dimensions of family background.

More generally, our markedly heterogeneous findings carry a note of warning for policies centred on parental choice, autonomy and school competition. Although at present there is no evidence on the effectiveness of converter academies at improving their students' achievements, the autonomous arrangements of these schools are likely to skew them towards incorporating some of the features closely

associated with the effectiveness of US charters. These include an emphasis on ethos, discipline and traditional teaching methods; flexibility in terms of taught curriculum and length of the teaching day; responsive managerial structures and accountable teachers; close relationship between parents and staff; and full financial control of the school budget. Furthermore, these schools' autonomous arrangements make them more likely to respond to competition-like incentives in education by raising students' achievement (see Gibbons et al., 2008). Given the English context – with its strong emphasis on quasi-market reforms in education and a share of autonomous secondary schools quickly climbing above 60% – these features make these school better positioned at excelling in educating children and thriving in the education arena. Seen from this perspective, our results imply that reforms aimed at promoting autonomy and choice to improve standards for everyone might not actually be a 'tide that lists all boats'. Conversely, they could have the unintended consequence of segregating pupils of different background in different schools and concentrating the likely benefits of more autonomous school arrangements on students who are already better off.

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Tables and Figures

Table 1: Key descriptive statistics

	Mean	Std. Dev.
Panel A: Pupil level information		
KS2 attainment	27.75	4.134
Pupil is FSM eligible	0.333	0.471
Pupil is female	0.492	0.500
Pupil is White British	0.401	0.490
Number of preferences expressed	3.826	1.856
Pupil has only preferences outside LA of residence	0.032	0.176
Panel B: School level information		
School open as an academy	0.186	0.390
School open as an academy – sponsored	0.097	0.297
School open as an academy – converter	0.089	0.285
School is outside LA of residence	0.409	0.492
School is selective	0.094	0.293
KS2 attainment (lagged)	27.53	2.081
KS4 attainment (lagged)	38.01	6.245
Share of FSM eligible pupils (lagged)	0.241	0.188
Share of female pupils (lagged)	0.497	0.223
Share of White British pupils (lagged)	0.552	0.323
Pupil/teacher ratio (lagged)	15.17	1.661
School rated 'Outstanding' by OFSTED (most recent)	0.286	0.453
Panel C: Choice level information		
Probability school is highest preference	0.0087	0.0931
Probability school is in top three preference	0.0225	0.1485
School 'inverse rank' preference	0.1380	0.7999
Pupil-school straight-line distance (in km)	11.328	6.7571

Note: Number of observations: 37,812 pupils; 127 schools over three years (i.e. 381 school-by-year observations); 4,327,959 pupil-school possible choice combinations. Schools in the choice set exclude 15 female-only and 10 male-only schools for male and female respectively. LA of residence is Birmingham. Other LAs include Dudley, Sandwell, Solihull, Staffordshire, Walsall, Warwickshire and Worcestershire. KS2 attainment refers to level attained on average in English, Maths and Science (average point scores). KS4 attainment refers to level attained on average in English, Maths and Science (average point scores). KS2 at the school level refers to primary school test scores (KS2, taken in Grade 6) of pupils starting secondary school (in grade 7). Lagged school characteristics refer to the academic year prior to the one in which pupils express their preference (e.g. for preferences expressed between May 2009 and October 2009, school characteristics refer to the academic year 2007/2008). OFSTED is the English school inspectorate. OFSTED inspections are not carried out every year. The rating refers to the most recent inspection available at the time when parents were making their school choice. School 'inverse rank' preference is obtained by assigning the value of 6 to the 1st ranked school down to value 1 for the 6th ranked school, and zero for all other schools not ranked on the parental application form.

Table 2: Percentages (and numbers) of schools operating as academies and pupils' preferences for academies – by year

	School is open as:			School in booklet as:			School approved as:		
	Academy	*Converter Academy*	*Spons. Academy*	*Academy*	*Converter Academy*	*Spons. Academy*	*Academy*	*Converter Academy*	*Spons. Academy*
Year up to October 2009	7.87 (10)	0.00 (0)	7.87 (10)	9.45 (12)	0.00 (0)	9.45 (12)	8.13 (10)	0.00 (0)	8.13 (10)
Year up to October 2010	11.81 (15)	1.57 (2)	10.24 (13)	11.02 (14)	0.79 (1)	10.24 (13)	10.57 (13)	2.44 (3)	8.13 (10)
Year up to October 2011	36.22 (46)	25.20 (32)	11.02 (14)	37.01 (47)	25.98 (33)	11.02 (14)	43.09 (53)	33.3 (41)	9.76 (12)

Note: Year up to October 2009, 2010 and 2011 refer to pupils' preferences expressed up to October in those years for admissions to secondary schooling in the subsequent academic years (2010/2011, 2011/2012 and 2012/2013). Information on approval date/decision missing for 3.1% of the schools (4 academies).

Table 3: The impact of conversion to academy on preferences

	Timing is based on academy:					
	Opening	In booklet	Approved	Opening	In booklet	Approved
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: All academy types						
School is an Academy (× 100)	0.0515 (0.0353)	0.0336 (0.0356)	0.0554 (0.0301)*	0.0526 (0.03423)	0.0342 (0.0344)	0.0500 (0.0284)*
Log of pupil-school distance	-0.0480 (0.0028)***	-0.0480 (0.0028)***	-0.0485 (0.0028)***	-0.0480 (0.0028)***	-0.0480 (0.0028)***	-0.0485 (0.0028)***
Implied academy effect	*5.89%*	*3.84%*	*6.34%*	*6.02%*	*3.92%*	*5.73%*
Panel B: Converters vs. Sponsored						
School is Converter Academy (× 100)	0.0199 (0.0334)	0.0201 (0.0369)	0.0554 (0.0312)*	0.0285 (0.0342)	0.0228 (0.0354)	0.0516 (0.0290)*
School is Sponsored Academy (× 100)	0.2438 (0.0723)***	0.2059 (0.0722)***	0.0558 (0.0712)	0.1999 (0.0726)***	0.1882 (0.0849)**	0.0238 (0.1175)
Log of pupil-school distance	-0.0480 (0.0028)***	-0.0480 (0.0028)***	-0.0485 (0.0028)***	-0.0480 (0.0028)***	-0.0480 (0.0028)***	-0.0485 (0.0028)***
Implied converter academy effect	*2.79%*	*2.30%*	*6.34%*	*3.26%*	*2.61%*	*5.90%*
Implied sponsored academy effect	*27.9%*	*23.6%*	*6.39%*	*22.9%*	*21.5%*	*2.72%*
Controls	No	No	No	Yes	Yes	Yes
Pupil & school effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table reports coefficients and standard error in parenthesis (clustered at the school level). The dependent variable is a binary outcome denoting the students' highest preference. Number of observations in Columns (1), (2), (4) and (5): 4,327,959 (127 schools and 37,812 pupils). Number of observations in Column (3) and (6): 4,176,711 (123 schools and 37,812 pupils). Implied academy effect obtained by rescaling the coefficient by the probability of a school being the highest preference (0.00874). School-level, time-varying controls are: KS4 attainment; share of FSM eligible pupils; share of female pupils; share of White British pupils; pupil-teacher ratio; and school rated 'Outstanding' by OFSTED. ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Table 4: Approval for conversion to academy and selected characteristics – balancing evidence

	(1)	(2)	(3)	(4)
	School is a converter academy		*School is a sponsored academy*	
Panel A: School characteristics				
KS2 attainment	0.040	-0.019	-0.025	-0.002
	(0.005)***	(0.056)	(0.012)**	(0.008)
KS4 attainment	0.014	-0.015	-0.009	0.005
	(0.001)***	(0.017)	(0.003)***	(0.006)
High share FSM	-0.128	-0.030	0.059	-0.077
eligible pupils	(0.029)***	(0.178)	(0.048)	(0.091)
Pupil/teacher	0.026	0.042	-0.041	0.000
ratio	(0.009)***	(0.026)	(0.017)**	(0.008)
School rated	0.154	0.080	0.033	-0.006
'Outstanding'	(0.039)***	(0.157)	(0.049)	(0.007)
F-Test joint signif.	19.47	0.79	2.79	0.31
(p-value)	(0.000)	(0.556)	(0.020)	(0.909)
Panel B: neighbourhood characteristics				
KS2 attainment	0.068	-0.075	-0.065	0.014
	(0.021)***	(0.083)	(0.026)**	(0.013)
High share FSM	-0.094	-0.055	0.103	0.023
eligible pupils	(0.032)***	(0.094)	(0.048)**	(0.035)
High year-on-year	-0.052	0.019	0.016	0.005
mobility rate	(0.030)	(0.062)	(0.037)	(0.005)
N'hood size	-0.010	-0.006	0.001	0.023
(number of pupils)	(0.004)**	(0.156)	(0.006)	(0.022)
F-Test joint signif.	2.95	0.31	2.20	0.31
(p-value)	(0.023)	(0.869)	(0.073)	(0.874)
Year effects	Yes	Yes	Yes	Yes
School effects	No	Yes	No	Yes

Note: The table reports coefficients and standard error in parenthesis (clustered at the school level) of a binary indicator indicating whether a school is an academy (sponsored or converter) in a given year on one of the lagged school predictors in the first column. Each cell corresponds to a different regression. F-test (and p-values) at the bottom of the table come from regressions where all characteristics are instead entered simultaneously. The corresponding regression coefficients are not tabulated for space reasons. High share of FSM eligible in Panels A identifies a school with a share of FSM pupils above the median across the three years of observation (2009 to 2011). Neighbourhoods in Panel B are time-fixed and defined as postcodes that fall within the 75th percentiles of the school-specific home-to-school straight line distance for secondary school pupils (year 7 to year 11) attending the secondary school in the three years prior to our observation window (2007 to 2009). Neighbourhood characteristics are time varying and calculated using all pupils in primary and secondary education (reception to year 13) residing in these neighbourhoods in the year prior to the current observation. Year-on-year mobility rate measures the percentage of pupils in the neighbourhood who changes the postcode of residence across n two adjacent years. High share of FSM eligible and high year-on-year mobility rate identify neighbourhoods with a share of FSM pupils and mobility rate are above the median across the three years of observation (2009 to 2011). Number of year-by-school observations: 369 (for 123 schools; two sponsored academies have missing approval date). ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Table 5: The impact of conversion to academy on preferences – dealing with identification threats

	Timing is based on academy approval					
	Narrow sample comparison	Instrumental Variable approach	Control for expected school composition	Stable n'hoods only	Drop pupils with preference for sibling school	Non-movers sample
	(1)	(2)	(3)	(4)	(5)	(6)
School is Converter Academy (× 100)	0.0954 (0.0482)**	0.1268 (0.0629)**	0.0588 (0.0290)**	0.0699 (0.0407)*	0.0692 (0.0310)**	0.0581 (0.0343)*
Log of pupil-school distance	-0.0507 (0.0034)***	-0.0507 (0.0034)***	-0.0490 (0.0029)***	-0.0471 (0.0045)***	-0.0456 (0.0030)***	-0.0496 (0.3038)***
Implied converter Academy effect	*10.5%*	*13.9%*	*6.73%*	*10.1%*	*7.86%*	*6.61%*
First stage coeff. *(s.e.)*		*0.0023* *(0.0002)***				
K-P F-Test		*120.99*				
School controls	Yes	Yes	Yes	Yes	Yes	Yes
Pupil & school effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table reports coefficients and standard error in parenthesis (clustered at the school level). All regressions control for a variable identifying whether schools become 'sponsored' academies. The dependent variable is a binary outcome denoting the students' highest preference. Column (1) and (2) restrict pupils' choice to consider only schools that are already academies at the time when pupils choose (i.e. prior to October of year *t*) and schools that will become academies in the future (but excluding the immediately adjacent year, i.e. the one starting from November of year *t* and finishing in October of year *t+1*). This gives a sample of 1,828,428 observations over 71 schools (for 37,812 pupils). Column (2) further instruments the binary indicator capturing whether the school is a converter academy at that time. The instrument is the total number of applications received by the DfE from LAs other than the ones used in the analysis in the month and year in which the academy has submitted its application for conversion. Summary statistics of instrument: mean=25.02; std.dev.=79.83. See more details in Appendix Figure 1. Column (3) control for expected composition by appending to the specification the following school variables measured in the year in which the pupil *starts* secondary school (i.e. when he/she is in grade 7): Average KS4 test scores; average KS2 test scores of seventh graders; percentages of FSM eligible pupils, White British pupils and female students among seventh graders. Number of observations: 4,088,564 (121 schools and 37812 pupils; two schools drop because of missing information about expected composition). Stable neighbourhoods in Column (4) defined are neighbourhoods where the year-on-year mobility rate averaged over the three years prior to our observation window is below the median of the mobility rate distribution; the year-on-year change in the percentage of FSM eligible pupils is above/below -1.5/1.5 percentage points; and the year-on-year change in KS2 attainments averaged across English, Math and Science is above/below -0.4/0.4 points. Number of observations: 2,004,642 (56 schools) and 37,812 pupils. Column (5) excludes pupils who express their highest preference for the school attended by their siblings and to which they are admitted on the basis of this criteria. Number of observations: 2,994,682 (122 schools and 27,114 pupils). Column (6) only considers pupils who do not change postcode of residence at any point between grade 3 (right after their Key Stage 1 test in the third year of primary education) and grade 7 (right after they have entered secondary education). Number of observations: 2,612,544 (123 schools and 23,653 pupils). ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Table 6: The impact of conversion to academy on preferences – additional robustness checks

	Timing is based on academy approval					
	Keep 10% closest schools	Controls for closest school	Top three preferences	Ordered school Prefer's	Drop SEN pupils	Extra school controls
	(1)	(2)	(3)	(4)	(5)	(6)
School is Converter Academy (× 100)	0.5380 (0.2887)*	0.0469 (0.0286)*	0.1105 (0.0444)**	0.5783 (0.2398)**	0.0730 (0.0350)**	0.0489 (0.0289)*
Log of pupil-school distance	-0.1531 (0.0106)***	-0.0333 (0.0021)***	-0.1040 (0.0053)***	-0.6240 (0.0315)***	-0.0471 (0.0029)***	-0.0485 (0.2850)***
Implied converter academy effect	*7.93%*	*5.37%*	*4.91%*	*4.19%*	*8.37%*	*5.60%*
School controls	Yes	Yes	Yes	Yes	Yes	Yes
Pupil & school effects	Yes	Yes	Yes	Yes	Yes	Yes

Note: The table reports coefficients and standard clustered at the school level error in parenthesis. All regressions control for a variable identifying whether schools become 'sponsored' academies. The dependent variable is a binary outcome denoting the students' highest preference, except for: Column (3), where it is coded to one for any of the top three preferences; and Column (4), where it corresponds to the rank of the preferences up to the sixth and is zero otherwise. Number of observations: 4,176,711 (123 schools and 37,812 pupils), except for Colum (1) where observations are 435,143 (104 schools and 37,812 pupils), and Column (5) where they are 3,272,481 (123 schools and 29,577 pupils). Average pupil-specific 10^{th} percentile of pupil-school distance: 1.36km, respectively. Additional school controls in Column (7) include: school share of pupils with SEN; ratio of pupil to SEN-support teachers; school percentage of sessions missed because of absences (authorized and unauthorized). Implied academy effect obtained by rescaling the coefficient by the probability of a school being the highest preference except for probability of a school being reported in the top three preferences (Column 3) and average rank (Column 4). ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Table 7: The impact of conversion to academy on preferences – heterogeneity

	Timing is based on academy approval					
	Narrow sample comparison			Narrow sample comparison		
	Pupil is FSM Eligible	Pupil is high KS2	Pupil-school distance	Pupil is FSM Eligible	Pupil is high KS2	Pupil-school distance
	(1)	(2)	(3)	(4)	(5)	(6)
School is Converter Academy	0.0025 (0.0006)***	-0.0021 (.0014)	0.0245 (0.0073)***	0.0022 (0.0006)***	-0.0027 (0.0014)*	0.0236 (0.0074)***
Converter academy × heading characteristic	-0.0046 (0.0015)***	0.0062 (0.0025)**	-0.0103 (0.0033)***	-0.0049 (0.0015)***	0.0065 (0.0025)**	-0.0100 (0.0033)***
Log of pupil-school distance	-0.0507 (0.0034)***	-0.0507 (0.0034)***	-0.0485 (0.0033)***	-0.0509 (0.0032)***	-0.0509 (0.0032)***	-0.0499 (0.0031)***
Implied interaction effect – converters	*-0.0021 (0.0012)**	*0.0040 (0.0012)****	*0.0149 (0.0043)****	*-0.0026 (0.0011)***	*0.0038 (0.0012)****	*0.0144 (0.0044)****
School controls	Yes	Yes	Yes	Yes	Yes	Yes
Pupil & school effects	Yes	Yes	Yes	Yes	Yes	Yes

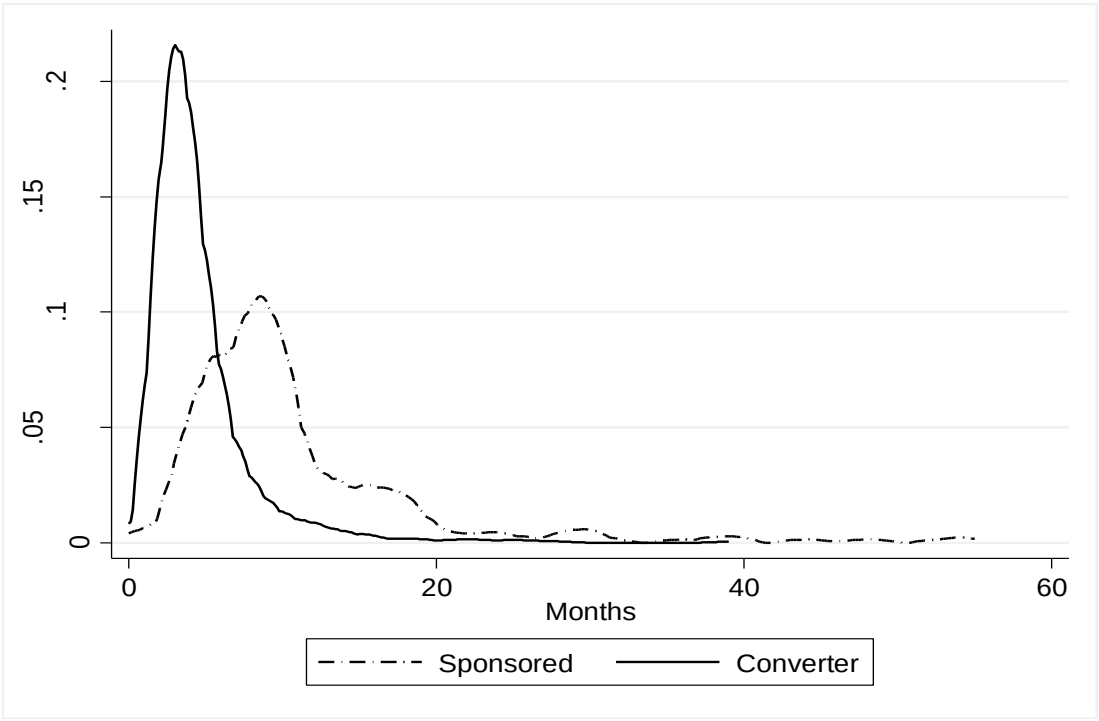
Note: The table reports coefficients and standard error in parenthesis (clustered at the school level). All regressions control for a variable identifying whether schools become 'sponsored' academies. The dependent variable is a binary outcome denoting the students' highest preference. Sample excludes schools that star as academy (only retains new sponsored and new converters). Number of observations in Column (1) to (3): 1,828,428 (71 schools and 37,812 pupils). Narrow sample defined in Table 7. Number of observations in Column (4) to (6): 2,376,014(113 schools and 23,653 pupils). Non-movers sample defined in Table 7. Implied interaction effects estimated for the heading value equal to one, except for Columns (3) and (6) where the log of distance is set to the at 0.92 or approx.2.5km. This corresponds to the median pupil-school distance considering the schools for which the pupils have expressed a preference. High KS2 pupils defined as those with KS2 (age-11) attainment above the median of the KS2 distribution. ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Table 8: The impact of conversion to academy on preferences – the effect of distance by pupil background

	Timing is based on academy approval							
	Narrow sample comparison				Non-movers sample			
	Pupil is FSM Eligible	Pupil is not FSM Eligible	Pupil is low KS2	Pupil is high KS2	Pupil is FSME Eligible	Pupil is not FSM Eligible	Pupil is low KS2	Pupil is high KS2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
School is Converter Academy	0.0078	0.0331	0.0175	0.0301	0.0040	0.0319	0.0124	0.0331
	(0.0104)	(0.0084)***	(0.0108)	(0.0090)***	(0.0097)	(0.0086)***	(0.0101)	(0.0089)***
Conv. academy × Log distance	-0.0032	-0.0139	-0.0072	-0.0133	-0.0018	-0.0134	-0.0052	-0.0145
	(0.0046)	(0.0038)***	(0.0047)	(0.0041)***	(0.0042)	(0.0038)***	(0.0044)	(0.0040)***
Log distance	-0.0495	-0.0478	-0.0504	-0.0463	-0.0556	-0.0477	-0.0555	-0.0443
	(0.0038)***	(0.0035)***	(0.0036)***	(0.0039)***	(0.0038)***	(0.0033)***	(0.0036)***	(0.0034)***
Implied interaction effect – converters	*0.0049*	*0.0203*	*0.0109*	*0.0179*	*0.0023*	*0.0196*	*0.0077*	*0.0198*
	(0.0062)	*(0.0050)***	*(0.0065)**	*(0.0054)***	*(0.0058)*	*(0.0052)***	*(0.0061)*	*(0.0053)***
School controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pupil & school effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

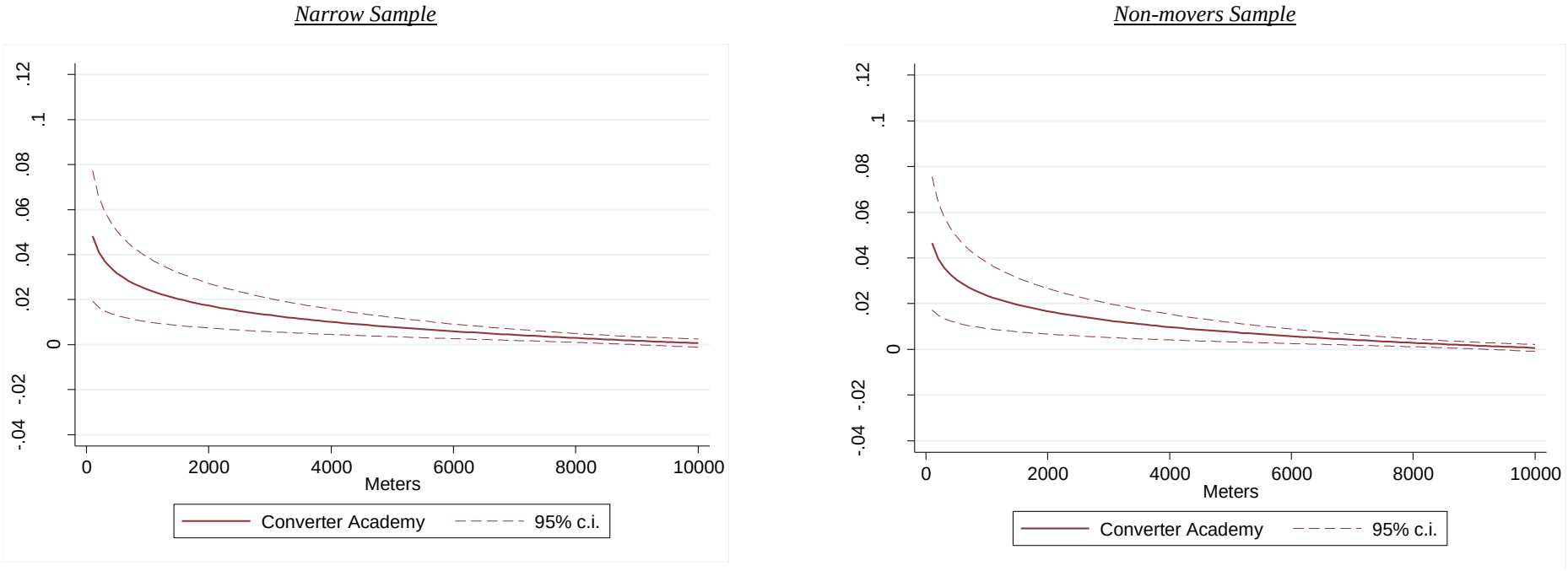
Note: The table reports coefficients and standard error in parenthesis (clustered at the school level). All regressions control for a variable identifying whether schools become 'sponsored' academies. The dependent variable is a binary outcome denoting the students' highest preference. Narrow sample and non-movers sample as defined in Table 6. Number of observations in Columns (1) and (2): 767,463 and 1,300,734, respectively. Number of observations in Column (3) and (4): 1,081,945 and 986,252, respectively. Number of observations in Columns (5) and (6): 705,274 and 1,670,740, respectively. Number of observations in Column (7) and (8): 1,208,950 and 1,167,064, respectively. Implied interaction effects estimated for log of distance set to the at 0.92 or approx.2.5km. This corresponds to the median pupil-school distance considering the schools for which the pupils have expressed a preference. High KS2 pupils defined as those with KS2 (age-11) attainment above the median of the KS2 distribution. ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Figure 1: Months of delay between academy approval and opening –
Sponsored vs. converter academies



Note: The figure presents kernel densities of the distribution of the number of months of delay between academy approval and opening by sponsored and converter academy status. The data include only secondary schools and covers the whole of England. Figures based on the authors' manipulation of information collected by the Department for Education (DfE) and referring to academies registered as open up to March 2015.

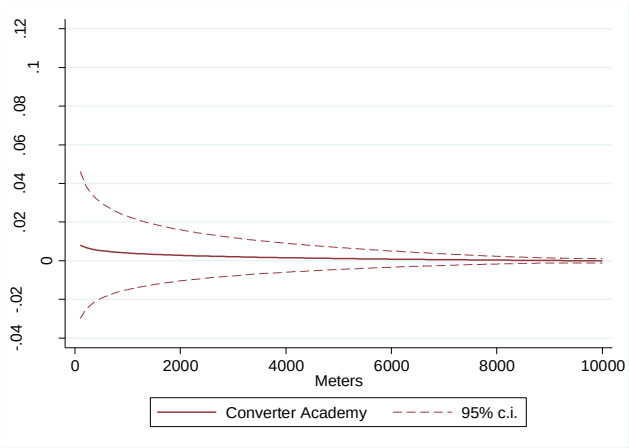
Figure 2: Variation in the effect of academisation over distance – converter and sponsored academies



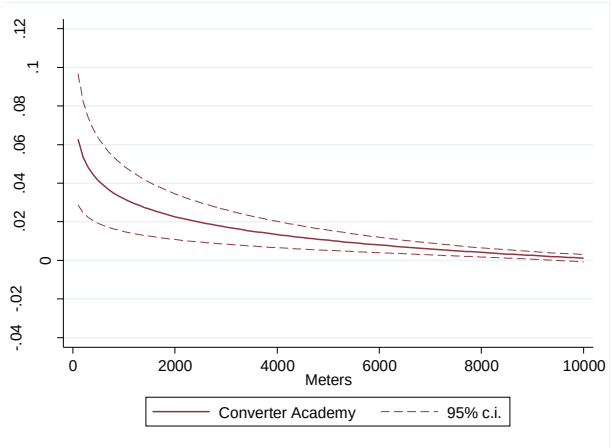
Note: The figure shows the effect of converter and sponsored academies at varying pupil-to-school distances. Figures obtained using the estimates in Table 7, Column (3) for the narrow sample and Column (6) for the non-movers sample. 95% Confidence intervals come from standard errors clustered at the school level.

Figure 3: Variation in the effect of autonomy over distance – by pupil background

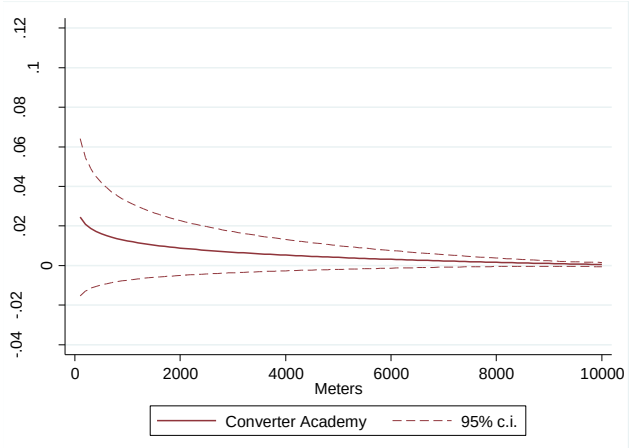
FSM Eligible Pupils



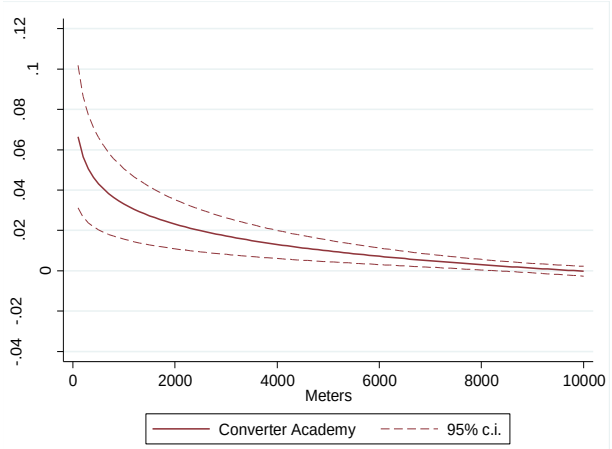
Non-FSM Eligible Pupils



Low KS2 Pupils



High KS2 Pupils



Note: The figure shows the effect of converter academies at varying pupil-to-school distances and for pupils with different background characteristics. Figures obtained using the estimates in Table 8, Column (5) (top left panel), Column (6) (top right panel), Column (7) (bottom left panel), and Colum (8) (bottom right panel). Estimation sample only includes non-movers. 95% Confidence intervals come from standard errors clustered at the school level.

Appendix Tables and Figures

Appendix Table 1: Association between number of application received and school characteristics

	One characteristic At the time		*All characteristics Simultaneously*	
KS2 attainment	-0.114	(0.134)	-0.227	(0.707)
KS4 attainment	-0.062	(0.147)	0.121	(0.819)
Share of FSM eligible pupils	-0.071	(0.157)	-0.033	(0.413)
Share of female pupils	0.133	(0.096)	0.132	(0.093)
Share of White British pupils	0.194	(0.150)	0.224	(0.255)
Pupil/teacher ratio	0.038	(0.163)	-0.099	(0.169)
School rated 'Outstanding'	-0.052	(0.139)	-0.020	(0.171)
P-value, F-test for joint significance		--	*0.4400*	

Note: Table reports standardized coefficients and robust standard errors in parenthesis of the number of applications received by the Department for Education in the month and year in which the school is applying on school characteristics. Number of applications only includes applications from LAs other than those used in our analysis. Regressions control for year effects. Number of observations: 42 schools. This only includes schools that are approved for conversion during our period of observations. School characteristics measured in the academic year prior application for conversion.

Appendix Table 2: The impact of conversion to academy on preferences – heterogeneity

	Timing is based on academy approval			
	Converter within 2.5km from home		Converter within 10% closest schools	
	Pupil is FSM Eligible	Pupil is high KS2	Pupil is FSM Eligible	Pupil is high KS2
	(1)	(2)	(3)	(4)
School is Converter Academy	0.0022	-0.0028	0.0024	-0.0027
	(0.0006)***	(0.0015)*	(0.0005)***	(0.0014)*
Converter academy × heading characteristic	-0.0052	0.0065	-0.0052	0.0068
	(0.0017)***	(0.0028)**	(0.0015)***	(0.0026)***
Log of pupil-school distance	-0.0505	-0.0505	-0.0499	-0.0499
	(0.0037)***	(0.0037)***	(0.0030)***	(0.0030)***
Implied interaction effect – converters	*-0.0029*	*0.0037*	*-0.0028*	*0.0040*
	*(0.0012)***	*(0.0013)****	*(0.0011)***	*(0.0012)****
School controls	Yes	Yes	Yes	Yes
Pupil & school effects	Yes	Yes	Yes	Yes

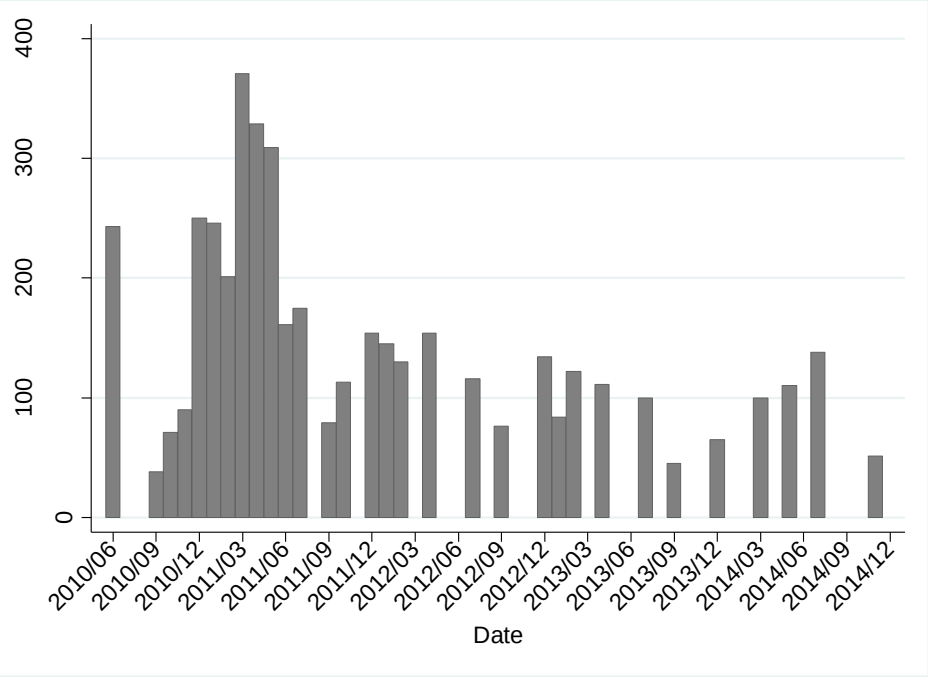
Note: The table reports coefficients and standard error in parenthesis (clustered at the school level). All regressions control for a variable identifying whether schools become 'sponsored' academies. The dependent variable is a binary outcome denoting the students' highest preference. Sample excludes schools that start as academy (only retains new sponsored and new converters). Columns (1) and (2) drop pupils who do not have at least a converter within 2.5km from their home address (2.5km is the median of the home-to-school travel distance among the schools listed by parents on the admission form). Number of observations: 2,666,382 (113 schools and 26,513 pupils). Columns (3) and (4) drop pupils who do not have at least one converter among the 10% closest schools. Number of observations: 3,637,394 (113 schools and 36,218 pupils). Non-movers sample defined in Table 7. Implied interaction effects estimated for the heading value equal to one, except for Columns (3) and (6) where the log of distance is set to the at 0.92 or approx.2.5km. This corresponds to the median pupil-school distance considering the schools for which the pupils have expressed a preference. High KS2 pupils defined as those with KS2 (age-11) attainment above the median of the KS2 distribution. ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

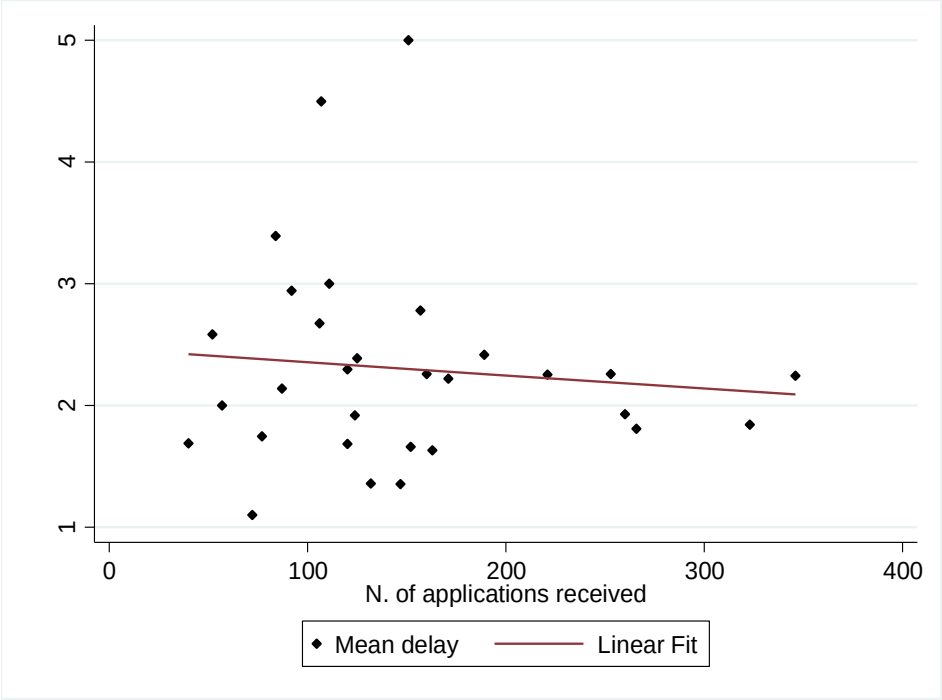
Appendix Table 3: The impact of conversion to academy on preferences – heterogeneity by neighbourhood characteristics and pupil background

	Timing is based on academy approval		
	(1)	(2)	(3)
	All pupils	Pupil is FSM/ Low KS2	Pupil is not FSM/ High KS2
Panel A: % FSM eligible pupils at school			
School is Converter Academy	0.0062	0.0020	0.0059
	(0.0017)***	(0.0015)	(0.0017)***
Converter academy × n'hood % FSM eligible	-0.0167	-0.0051	-0.0169
	(0.0052)***	(0.0038)	(0.0055)***
School is Sponsored Academy	-0.0003	-0.0063	0.0018
	(0.0040)	(0.0036)*	(0.0038)
Sponsored academy × n'hood % FSM eligible	0.0016	0.0120	-0.0030
	(0.0091)	(0.0050)**	(0.0110)
Log of pupil-school Distance	-0.0502	-0.0535	-0.0487
	(0.0030)***	(0.0033)***	(0.0033)***
Panel B: Average KS2 attainment at school			
School is Converter Academy	-0.0341	-0.0141	-0.0386
	(0.0125)***	(0.0100)	(0.0147)***
Converter academy × n'hood average KS2	0.0013	0.0005	0.0014
	(0.0005)***	(0.0004)	(0.0005)***
School is Sponsored Academy	0.0143	0.0108	0.0138
	(0.0210)	(0.0242)	(0.0188)
Sponsored academy × n'hood average KS2	-0.0005	-0.0004	-0.0005
	(0.0008)	(0.0009)	(0.0007)
Log of pupil-school distance	-0.0502	-0.0548	-0.0451
	(0.0030)***	(0.0035)***	(0.0035)***
School controls	Yes	Yes	Yes
Pupil & school effects	Yes	Yes	Yes

Note: The table reports coefficients and standard error in parenthesis (clustered at the school level). The dependent variable is a binary outcome denoting the students' highest preference. Sample excludes schools that star as academy (only retains new sponsored and new converters). Neighbourhood of residence defined as the Output Area (OA) where the student resides at the time of applying for schools. Panel A considers the percentage of pupils aged 5 to 18 eligible for FSM in the OA of residence on average between 2007 and 2009. Panel B considers the KS2 attainments of age-11 pupils in the OA of residence on average between 2007 and 2009. High KS2 pupils defined as those with KS2 (age-11) attainment above the median of the KS2 distribution. Sample excludes neighbourhoods with pupil population in the bottom 1% of the distribution. Sample sizes as follows. Panel A, Columns (1), (2) and (3) respectively: 3,621,650 (113 schools and 36,050 pupils); 1,218,150 (113 schools and 12,125 pupils); and 2,403,500 (113 schools and 23,925 pupils). Panel B, Columns (1), (2) and (3) respectively: 3,620,140 (113 schools and 36035 pupils); 1,949,434 (113 schools and 19,413 pupils); and 1,670,706 (113 schools and 16,622 pupils). ***: significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Appendix Figure 1: Number of applications for the dates included in our sample and its link to months of delay between application and approval





Note: The right-hand side figure presents number of applications for converter academies received by the Department for Education for dates in which converter academies in our sample have applied to the Department for Education (DfE). Numbers only include applications from outside the LAs considered in our analysis. The left-hand side plot presents a scatter plot (with linear fit) of the relationship between number of applications received and average months of delay between application and approval. The data only includes the dates used in the right-hand side plot and only considers applications from outside the LAs in our sample. Figures based on the authors' manipulation of information collected by the DfE.