

Neri, Lorenzo; Pasini, Elisabetta

Working Paper

Heterogeneous effects of mass academisation in England

Working Paper, No. 847

Provided in Cooperation with:

School of Economics and Finance, Queen Mary University of London

Suggested Citation: Neri, Lorenzo; Pasini, Elisabetta (2018) : Heterogeneous effects of mass academisation in England, Working Paper, No. 847, Queen Mary University of London, School of Economics and Finance, London

This Version is available at:

<https://hdl.handle.net/10419/184798>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

= ZiZgd\ZcZdj h: [[ZXih'd[B Vhh'6XVYZb hVi'dc'c': c\ā/cY

AdgZcod'cZg'/: ahWZiiV'EVh'c^

L dg' c'\EVeZgCd#-), ~

'?Vcj Vgn' %&-

≠HC'&), (!% , -

School of Economics and Finance



Heterogeneous Effects of Mass Academisation in England*

Lorenzo Neri[†]

Elisabetta Pasini[†]

Queen Mary University of London

January 10, 2018

Abstract

The 2010 primary school reform in the UK aimed at giving schools more autonomy and freedom from local council's control, by giving them the option to become academies. Once converted, schools need to choose between remaining a standalone academy or joining an academy chain. However, the majority of studies have focused solely on the impact of school conversion on children outcomes, disregarding the heterogeneity in the conversion models. In this paper we therefore evaluate the impact of the two different models of school governance on students' achievement. We exploit an instrumental variable strategy that compares the educational attainment of students before school conversion with that of students after conversion that were already enrolled when the conversion took place. We then allow for heterogeneous effects stemming from different governance models. We find that students enrolled in chains have higher test scores at the end of their primary school education. Survey data on academies suggest that schools belonging to chains are more likely to change leadership and entrust the governing body with purely managerial functions, while educational functions are carried out by the schools themselves.

JEL Classification: I20, I21, I28

Keywords: Academies, School governance, School performance

*A special thanks to Erich Battistin and Barbara Petrongolo for their invaluable support and guidance. Our thanks to Sebastian Axbar, Francesco Fasani, Andrea Ichino, Marco Manacorda, Sandra McNally, Olmo Silva, Andrea Tesei, and participants at the Queen Mary Applied Microeconomics reading group for helpful discussions and comments. Special thanks go to Robert Cirin for advice in interpreting the results from the Department for Education surveys on academies. The views expressed here are those of the authors alone.

[†]School of Economics and Finance, Queen Mary University of London.

1 Introduction

In most countries, local or central governments manage primary and secondary schools, with the exception of private institutions, and there is little room for schools' autonomy. As recently documented by Eyles et al. (2016), over the last ten years in the majority of the OECD countries school systems have remained unchanged. Indeed, PISA data shows that between 2000 and 2012, most of the countries did not experience significant changes in their autonomy index nor did they introduce new type of schools.

Despite the average trend, there are few exceptions. Over the past decades, Sweden, the US and England have reformed the school system and increased school autonomy. By providing schools with more independence, the ultimate goal of such reforms is to improve pupils' achievement and reduce the educational gap between advantaged and disadvantaged students.

In this paper we focus on England, where since 2000 the central government has been targeting the lowest performing schools by forcing them to convert into academies. The term 'academy' refers to publicly funded but privately managed schools that take over roles and duties from their Local Authority, thereby becoming directly responsible for the day-to-day running of the school. Indeed, compared to the other state-funded schools, traditionally managed by the Local Authority, they have full autonomy in every organisational and managerial aspect, such as hiring and paying teachers, national curriculum, or length of school time.

While under the Labour Government (2000 – 2010) only secondary poor performing schools were subject to the conversion, from July 2010 the Conservative/Liberal Democrats coalition government, which replaced the Labour party, extended the possibility of converting to all primary and secondary schools. Compared to countries experiencing similar reforms, England represents a unique case study for two main reasons: first, the government expanded the reform to all primary and secondary schools, independent of their performance. Second, and most importantly, in the White Paper *Educational Excellence Everywhere* published in 2016, the Department for Education announced that by 2022 all schools, primary and secondary, are expected to become academies (Bolton and Long, 2016). Therefore, in few years the entire education system will move from a centralised system in which Local Authorities are responsible for schools to a fully decentralised system in which each school is independent and autonomous from any local or central government.

In particular, the mass academisation that started in 2010 gave rise to two categories of academies: Sponsor Led and Converter. Sponsor Led academies are schools performing below

the standard and therefore forced to convert; Converter academies are schools that voluntarily decide to convert. The latter are usually high or good performing schools aiming to increase their autonomy from Local Authorities and independently managing their financial resources. An important change introduced by the 2010 reform is that Converter academies can decide whether to convert to a stand-alone academy, also called single-academy trust (SAT), or join a multi-academy trust (MAT).¹

Such distinction is crucial because the decision of becoming a SAT or joining a MAT determines the governing body of the school. Before the reform, schools were governed by a local governing body made up of school staff, parents, and representatives from the Local Authority. After converting, the composition of governing bodies of single academies remains mostly unchanged, while Converter academies that decide to join a MAT are managed by a sole governing body that is responsible for all the schools in the chain. In other words, the existence of SAT and MAT results in two distinct models of governance with different degrees of centralisation. One model is a decentralised system with single and independent stand-alone academies, each one responsible of all governance functions. Another model is a centralised system in which there is a clear separation of roles between head-teachers and directors, with the former focusing on running the schools while the latter carries out all the managerial activities.

As the program developed, policymakers have increasingly argued how chains represent the most efficient way to foster schools' collaboration and consequently reduce the gap between advantaged and disadvantaged students (Francis et al., 2016). Indeed, in the White Paper *Educational Excellence Everywhere* (Department for Education, 2016d), MAT is the preferred model as it allows schools to benefit from the most successful leaders and their expertise. Those in favour of chains argue, in fact, that head-teachers running successful schools do not necessarily have the capability of running successful businesses (Grotberg and Lobb, 2015).

Over the recent years, most of the academic and public discourse has been devoted to testing the efficiency of autonomous schools relative to non-autonomous schools, but very little has been said on the role played by managerial practices and governance structures. However, the increased autonomy of schools has in practice transformed them to small businesses, and therefore understanding what are the most beneficial practices for schools' success takes priority. Indeed, the academy reform in England provides a unique opportunity to evaluate different managerial models for academies, specifically chains versus stand-alone academies.

¹Before the reform, it was more common for Sponsor Led academies to be affiliated to other schools whose role was to act as sponsors.

In this paper we investigate the heterogeneous effects of academisation on pupils' achievement. Specifically, the research question we aim to address is whether and how different governance structures - chain and stand-alone academies - affect pupils' performance. The public debate on school governance has focused on potential risks faced by stand-alone academies, as the lack of capabilities of local governing bodies in managing all the governance functions of the new academies might have a negative impact on schools' performance and pupils' achievement. Similarly, a formal collaboration between schools would require a body of expertise in different (possibly managerial) fields that traditional representatives of local governing bodies might not be endowed with. However, in the latter case, managerial functions may be taken up by the chain's governing body, with each school's local governing body then able to focus just on running the school. Additionally, the collaboration between schools could ease the spread of knowledge and best practices also among schools geographically distant from one another, that otherwise would not have the possibility of collaborating (Department for Education, 2016c)

Our study represents the first empirical contribution focusing on models of governance in autonomous schools. Since school governance might play a key role in determining schools' success, as well as reducing the gap among students, we believe the research question is of great importance in England, where educational inequality between advantage and disadvantaged students is a primary issue (Department for Education, 2016b), and where the introduction of academies represents an attempt to close such gap.

For the purpose of our study we will focus on early Converter primary academies, defined as those schools converted in 2011 – 2012. At that time, schools were not yet aware that the whole system was to be shifted towards mass academisation. One of the issues when comparing outcomes before and after the treatment is that students might join, as well as leave, academies after the conversion. In order to deal with the potential endogeneity of pupils' self-selection into academies, we adopt an Instrumental Variable (IV) approach, using as predictor for the number of years students spend in academies the enrolment date. In particular, we exploit the fact that some students were already enrolled at the time of the conversion and claim that, in the absence of anticipation effects, such presence is an exogenous predictor of the number of years students would spend into academies after the conversion. Our sample of pupils will have 1 to 3 years of treatment for pupils in academies converted in 2012 and 1 to 4 years for those converted in 2011. We exploit within schools and across cohorts variation in test scores and compare test scores of students before the conversion to those after the conversion within the same school

and between schools that joined a MAT and schools that remained stand-alone academies.

Results show that schools belonging to chains improve pupils' performance more than stand-alone academies. We find that on average one extra year of exposure to MATs increases math and English test scores by 0.9 and 0.4 respectively. We then look separately at different years of exposure, showing that the gain seems to increase with the number of years. In other words, the longer the exposure, the larger the improvement in test scores. A further investigation reveals heterogeneous effects by year of conversion. In particular, schools belonging to MATs and converted in 2011 experience a significant improvement in pupils' achievement over the first three years of exposure, while in the fourth year the difference between MATs and SATs disappears. The opposite occurs to schools belonging to MATs and converted in 2012: while in the first year of exposure there is no difference between MATs and SATs, from the second year onwards pupils enrolled perform significantly better and the improvement is increasing in the years of exposure. In particular, after 3 years from conversion pupils improve math and English scores by 3.3 and 1.3 points (which correspond to about 0.16 and 0.14 standard deviation respectively) compared to those exposed to SATs. When we restrict the sample to disadvantaged students we find that after three years from conversion those enrolled in MATs improve their math and English test scores by 5 and 2 points, which correspond to about 0.23 and 0.21 standard deviation respectively.

The paper is organised as follows: Section 2 presents the relevant literature; Section 3 presents the academy reform and discusses the different models of governance; Section 4 shows data and sample selection; sections 5 and 6 present OLS and 2SLS estimates of exposure to MATs respectively; Section 7 addresses the issue of endogeneity in the school's decision of conversion; in Section 8 we evaluate possible mechanisms behind our results; finally, Section 9 concludes the paper with final remarks.

2 Previous literature

The recent literature in education has mostly focused on the effects of new types of schools on pupils' achievement. A significant number of studies have been conducted in the US, where, since the late 1990s, the government targeted low performing schools in deprived areas and forced them to become autonomous with the aim of implementing ad hoc policies to boost pupils' results, and consequently reducing the gap among students. Similar to English

academies, these new ‘charter schools’ are publicly funded but autonomous from local and central government. The majority of the literature on charter schools finds positive effects on pupils’ achievements, especially for disadvantaged students (Abdulkadiroglu et al., 2011; Angrist et al., 2010; Angrist et al., 2013; Dobbie and Fryer, 2011; Dobbie and Fryer, 2013; Hoxby and Murarka, 2009). More recent works also look at long term effects, such as college attendance, and find a positive effects on students who attended charter schools compared to those who did not (Angrist et al., 2016,; Dobbie and Fryer, 2015). In order to deal with the endogenous sorting of students in charter schools, the aforementioned studies exploit the presence of lotteries that randomly assign students to charter schools (e.g. Angrist et al., 2010; Angrist et al., 2013), or IV approaches that exploit the presence of students in charter schools before they became charter schools (e.g. Abdulkadiroglu et al., 2011).

In the Swedish context, Bohlmark and Lindahl (2015) investigate the 1992 voucher reform that encouraged the expansion of independent schools. Like US charter schools and English academies, Swedish independent schools are autonomous, but publicly funded schools. The study finds positive effects on students’ performance. However, according to the authors, the results are due to an increase in school competition rather than the implementation of managerial practices in independent schools.

A number of studies have been conducted on English academies, and most of them look at the effect of conversion on secondary schools, those targeted first by the reform. By exploiting the presence of pupils in academies enrolled before the conversion took place, Eyles and Machin (2015) compare test scores of pupils attending academies with those of pupils enrolled in future academies, used as control group for early converters. The assumption is that schools that decide to convert are more likely to be similar in their observables and unobservable characteristics. The study focuses on the first batch of academies, those converting at the beginning of 2000, and finds positive effects on pupils’ performance. Additionally a more recent study (Eyles et al., 2016a) shows that the effects persist in the medium term on compulsory schooling outcomes.

The study most closely related to our work is a paper by Eyles and co-authors (2016b) that investigates the effect of conversion on primary schools. Similar to our approach, the study only looks at early converted primary schools but without distinguishing between Sponsor Led and Converter academies. Their identification strategy follows Eyles and Machin (2015), and the paper does not find effects on pupils’ achievement.

The current literature has, in our opinion, two main gaps: first, most of the studies on En-

English academies focus on secondary schools. In line with recent findings (Chetty et al., 2011; Heckman, 2006) we highlight the importance of early stage education on adult outcomes and we thus focus on primary academies. Second, while the existing literature has tried to causally identify the effects of attending an autonomous school and deal with the endogenous selection of pupils into schools, much less has been said on the factors that make these schools more successful than traditional ones. The lack of data on school practices makes it difficult to identify the most successful practices introduced by schools. This paper tries to move towards a better understanding of these practices by studying different types of school governance.

In the US, the success of charter schools has encouraged the study of mechanisms behind the results, and a recent work by Dobbie and Fryer (2013) sheds light on the practices that most contribute to these schools' success. They find that traditional resources such as class size or teachers' qualification are not positively correlated with school effectiveness. Instead, factors such as teachers' feedback, tutoring, longer school time, and *ad hoc* practices targeting disadvantaged pupils² are the most successful practices in charter schools. In the US, as well as in England, the main source of information on academies' practices is represented by survey data. Such surveys help indeed to shed light on school practices and changes introduced by schools after becoming autonomous. Similar to Dobbie and Fryer (2013), Eyles and Machin (2015) find that changes in management structure, together with changes in the curriculum, are the main factors underpinning pupils' improvement in secondary academies. Recently, Bloom et al. (2015) explore the determinants of schools' success focusing on management practices (operations, monitoring, target setting, people management) adopted to evaluate firms' practices in their previous studies. They find that school management matters for a school's success. In particular, they highlight two key factors: stronger accountability of performance to an external body and high quality school leadership able to develop long-term strategies to reach higher standards.

While understanding whether autonomous schools improve pupils' performance is of great importance, we believe that investigating the main determinants of such success is crucial to building successful examples of best practice able to influence the entire school system. Therefore, our aim is to contribute to the rising literature on schools and management by investigating the effects of centralised versus decentralised governance structure in English academies.

²See for instance the No Excuses approach introduced by charter schools in the US. Its success is mainly due to a substantial increase in instruction time compare to public schools, the adoption of a formal discipline system, and the provision of extra tutoring for poor performing students.

3 Institutional Setting

The English School System and the Academy Reform

Primary education in England is organised into two phases, Key Stage 1 (KS1) and Key Stage 2 (KS2). Children enter primary school in Reception year, when they are aged 5. KS1 runs from Reception year to year 2, when students are aged 7. KS2 runs from year 3, when students are aged 8, to year 6, when students are aged 11. State-funded schools are the majority and enrol about 95% of all students (Department for Education, 2016): these are free to attend as parents do not have to pay any fee.

Traditional state-funded schools are managed by Local Authorities (LA), but differ across many dimensions, such as admission criteria, composition of the governing body running the school, and religious affiliation. Community, Voluntary Aided (VA), and Voluntary Controlled (VC) schools are the most common types of state-funded schools.³ Community schools are entirely managed by the LA, whereas VA and VC schools have a certain degree of autonomy from the LA and are managed by the local governing body. The main difference between VA and VC schools is the composition of the governing body. In VA schools, the majority of the body is made up of members appointed by the foundation (often a Church). In VC schools, instead, foundation governors represent a minority.⁴ Despite such differences, all these schools are under the direct control of the local government, whose role is to recruit teachers and staff, set their pay (based on the national legislation), set the curriculum, provide schools with all the services and receive, as well as administer the school budget set by the central government for each institute.

The government began to introduce academies in the year 2000. They were first established under Tony Blair through the Learning and Skills Act 2000 with the aim of improving pupils' performance. In particular, similarly to US charter schools, they were established with the aim of helping students with low academic achievements, as well as schools located in deprived areas. During the first 10 years the reform only targeted secondary schools classified as inade-

³Other less common types of state-funded schools are Foundation schools, Free schools and City Technology Colleges. Additionally, special schools and Pupil Referral Units provide education specifically for students with special needs.

⁴In addition, VA schools admission is mainly based on faith, while VC schools can recruit both staff and pupils according to non-secular criteria. Both VA and VC schools are state-funded, but the latter are owned by the Local Authority, while VA are not. Among VA schools the most common are Roman Catholic and Church of England schools.

quate as a result of Ofsted inspections.⁵

The reform was then expanded to all schools in July 2010 when the new government expanded academisation to both primary and secondary schools. Beside Sponsor Led academies, a term that was introduced after 2010 to refer to poor performing schools whose conversion was mandatory, the so-called Converter academies appeared. Converter academies' conversion is voluntary. Although the opportunity to convert was initially given only to outstanding schools (as judged by Ofsted), in April 2011 also those schools performing well were allowed to convert into academies. As a result the academisation process grew quite dramatically, as indicated by the Department for Education (DfE), 4,087 out of 16,766 schools have converted into academies as of August 2017, and 1,045 are in the pipeline to become academies.

Academies are autonomous from local and central government and are non-profit charitable trusts. Similar to state-funded schools, they are entirely funded by the central government through the DfE. They are autonomous in aspects such as staffing (recruiting and paying teachers and staff, staffing structures, career development, discipline and performance management), provision of services (e.g. maintenance, HR, audit, legal services), national curriculum (with the exception of few subjects they are free to diverge from the traditional curriculum), and admission (academies are free to set their own admission criteria, subject to the guidelines stated in the Admission Code). Unlike state-funded schools, academies have a board of directors that acts as a Trust and the trustees are legally, though not financially, accountable.

Table 1 shows the main characteristics of academies and state-funded schools. There are differences both in terms of pupils' intake and schools' characteristics. Academies show, on average, a lower percentage of free school meal (FSM) eligible pupils, students with special educational needs (SEN), and black origin students. More importantly, academies tend to perform better compared to state-funded schools. Panel B shows that pupils enrolled in academies have higher scores in both KS1 and KS2 tests and are more likely to reach the top level (Level 5) in both KS tests. As expected, early converter academies were also among the best performing schools in the country. Moreover, academies are significantly bigger and more likely to be community schools rather than faith-based institutions. Notably, the table shows that as of May 2012 a small proportion of schools decided to convert in the first two years of the reform, thus suggesting the presence of a significant trade-off between independence and the challenge of running what would effectively become a small business.

⁵Ofsted is the Office for Standards in Education, Children's Services and Skills and regularly carries out inspections in schools. Following an inspection, schools are graded from outstanding to inadequate.

Multi-Academy and Single-Academy Trusts

Besides Sponsor Led and Converter academies, another important distinction arose after 2010. Together with the decision of converting, Converter academies can choose between converting in a stand-alone academy and joining a chain of academies. Such distinction resulted in two different models of governance. On the one hand, stand-alone schools became SATs and the governing body remained almost unchanged compared to the traditional local governing body of state-funded schools. On the other hand, MATs have a single governing body that runs all the schools belonging to the chain.⁶ Figure 1 shows the geographic location of MATs and SATs in England. As expected, academies are more likely to be present in urban areas. Importantly, we do not observe areas characterized by clusters of either MATs or SATs. They are, instead, equally spread across the whole country.

The main distinction between the two categories is governance. In MATs the trust is responsible for all the academies in the chain and there is no lead school within the cohort. Even if a MAT is established by a single school, once formed, the governing body cannot give preferential treatment to any school within the chain. While SATs maintain the same governing body after conversion, which is identical to the local governing body, schools within a MAT share the same board of governors which takes up most of the tasks previously performed by the single local governing body in each school. The presence of such board of directors thus creates an additional tier of governance between foundation members and local governing bodies. In particular, foundation members belong to the trust and have ultimate control over the academy trust. The members appoint the board of directors, also called governors or trustees, and its role is to set the direction of the MAT, hold head-teachers accountable, and ensure financial probity. In addition, members can also be part of the board of directors, although the Department for Education encourages MATs to have at least a majority of members that are independent from the board. The board of a MAT is made up of at least three signatory members, the CEO, and two elected parents. No more than 20% of trustees can be persons associated to a LA (e.g. head-teachers of community schools, LA officers). Figure 2 shows the average number of people on the main MAT board. The average size of boards is 8 members, and more than half of MATs have between 7 and 10 members. Trustees can delegate some functions to the local governing body of single schools whose functions are now limited compared to local governing bodies

⁶A chain does not have to be formed by schools providing education for the same school phase. Therefore, primary and secondary schools can belong to the same chain.

of single-academy trusts. Indeed, the model introduced by MATs aims at removing pressures on local governing bodies, whose aim is to focus on local representation. In addition, one advantage of sharing a governing body is to avoid recruiting high skill governors for each single school (Grotberg and Lobb, 2015).

The new reform gave rise to two very distinct models. While SAT stands for a decentralized system in which each single school provides its own services, MAT models are based on a centralised system in which functions and operations are attributed to different actors along the "governance chain". In particular, the generic aim of this latter model is to allow local governing bodies to run the school and to leave the managerial functions to the governors whose knowledge of business practices is expected to be better than the one of school head-teachers. In this regard, Table 2 shows the distribution of roles within MATs. Notably, Trust Boards handle financial and legal compliance, senior appointments, and risk management, while schools mostly handle operational functions (e.g. school development plans, strategies, school staffing structures design).

Despite the advantages of MATs, at the very beginning Converter academies were more likely to convert into stand-alone academies. However, as shown in Figure 3, this trend has changed in recent years and the proportion of schools belonging to MATs has significantly increased. Additionally, a survey conducted by the Department for Education (Cirin, 2014) reveals very different reasons for converting between SATs and MATs.⁷ Table 3 shows that while for stand-alone academies the main reason for converting is to gain freedom to use funding as they see fit, schools belonging to chains are more likely to convert to create opportunities for collaboration with other schools, as well as to raise educational standards (Cirin, 2014). Table 4 shows the main characteristics of MATs and SATs. In terms of pupil characteristics (Panel A) we highlight that MATs are more likely to have a larger share of FSM eligible, SEN, and black origin students. Panel B shows that students attending SATs have higher scores in both KS1 and KS2 tests. As expected, SATs are significantly better performing schools. Finally, on average, Panel C shows that MATs are more likely to be smaller than SATs and more likely to be community schools opposed to faith schools.

⁷The survey includes both primary and secondary academies converted between 2010 and May 2013.

4 Data and Sample Selection

We use data from the National Pupil Database (NPD), a unique and rich dataset containing information at pupil and school level in England. Within the NPD, the Pupil Level Annual School Census (PLASC) provides information at pupil level for all pupils attending state-funded schools in England from Reception to year 6 (the last year of primary school) during the academic year 2001/2002 and onwards. The dataset contains detailed demographic characteristics such as gender, ethnicity, language spoken at home, eligibility for FSM and SEN status, pupils' area of residence, and school attended.

Pupil level data also contains information on students' achievements at the end of KS1 and KS2. At the end of KS1 students are assessed by their own teachers. This kind of evaluation makes assessments hardly comparable across schools. However, they do provide a good proxy for pupils' performance at year 2, as they represent low-stake evaluations for both students, teachers, and schools. KS2 tests, instead, are standardised tests taken at year 6, which is the last year of primary schools. These are national tests in math and English, homogeneous across schools and marked by external markers, so that scores are easily comparable across schools. Since students are also awarded a Level of attainment depending on the score they obtain, the data provides both pupils' test score and Level for each test. Pupils can be awarded Level 3 to Level 5, where Level 5 represents the highest level.⁸ For the purpose of our study, we are interested in Key Stage 2 test scores in math and English. The final sample of students will consist of all pupils eligible for the test and for whom the test score is available. In our main specification we also include Key Stage 1 results to control for past achievement.

We complement NPD data with the school census, published together with the NPD and available from the 2005/2006 academic year. The school census provides information on schools (e.g. identifier, address, type), pupils, as well as on number of teachers by category (e.g. qualified, non-qualified teachers and teaching assistants). We also link NPD data and the school census with Ofsted inspections' results from 2005 onwards, which are publicly available on the UK Government website. Finally, the main source of information on academies is the dataset from the DfE (Edubase) that contains school level data on single and multi-academy trusts (time of conversion, date in which the school has joined a chain, type of support, trust's size).

⁸These levels are meant to capture the position of the student in the achievement distribution. Hence, students awarded Level 3 are students performing below expectations, those awarded Level 4 are students working at the expected level and Level 5 students are those performing above the average.

The initial sample consists of all state-funded schools (and their students) appearing in the NPD from 2005 onwards. We then only keep academies, both MAT and SAT, whose conversion is between April 2011 (when schools performing well were first allowed to convert into academies) and August 2012 (the last month before the beginning of the school year). We exclude from our sample very early converter academies, namely those that converted in 2010. The reason is that they were exceptional schools and we want to avoid contaminating the results. As a result of this selection, the final sample consists of 486 schools and 211,688 pupils over the 2005 – 2015 period.

5 OLS Estimates of exposure to academy

The empirical analysis aims to investigate heterogeneous effects of conversion between stand-alone academies and academies grouped in chains. In particular, we are interested in estimating the effects of exposure to MATs or SATs on KS2 test scores in math and English.

We exploit variation within schools and across cohorts of students. Instead of comparing test scores of students exposed to academy with students who attend state-funded schools, we will compare cohorts of students within the same school who take KS2 tests after conversion - and therefore have spent in the academy from 1 to 4 years - with cohorts who took KS2 tests before conversion. The main advantage of excluding state-funded schools from the sample is to avoid comparing schools whose unobservable characteristics may lead to ambiguous conclusions. In fact, while other studies on English academies (Eyles et. al, 2015; 2016a) compare early converters with later ones, under the assumption that those schools are similar, we believe that the timing of conversion might be endogenous. Specifically, there might be different incentives between schools that converted in the early stages of the reform and those that converted in later years correlated with unobservable characteristics. The consequence is that this approach would provide biased estimates.

Hence, we are interested in estimating the following OLS regression:

$$Y_{ist} = \alpha_0 + \beta_0 D_{ist} + \beta_1 D_{ist} \cdot MAT_{ist} + \beta_2 X_{ist} + \gamma_s + \delta_t + \eta_{ist} \quad (1)$$

where Y_{ist} is the KS2 score of pupil i enrolled in school s and taking the test in year t . Test scores are standardised by subject and year. D_{ist} is the number of years spent by each pupil into the academy. For schools converted in 2011 D will take values from 0 to 4, while for those

converted in 2012 D will take values between 0 and 3. For all cohorts of pupils taking the test before the conversion year D will have value 0 since they spent 0 years in the schools after conversion. MAT is an indicator variable that takes value 1 if the school joined a chain and 0 otherwise. The main coefficient of interest is β_1 , representing the impact of being exposed to one additional year to an academy that joined a MAT with respect to a stand-alone academy (SAT). X_{ist} is a vector of pupil characteristics: it contains information on gender, ethnicity, FSM eligibility, SEN status, pupil attainment at KS1, and language spoken at home. Finally, we add school (γ_s) and year (δ_t) fixed effects.

Panel A of Table 5 shows the results of the OLS regression for math and English (reading) test scores. The first row shows the marginal gain for pupils exposed to one extra year of academy treatment in MATs compared to SATs. The most complete specifications in columns (3) and (6) suggest that one extra year of exposure to MAT improves pupils' test scores by 0.75 and 0.25 points in math and English respectively compared to students enrolled in SATs. Interestingly, coefficients for years of exposure to a SAT (columns (3) and (6)) have similar magnitudes, but opposite sign: this implies that if we consider a child's exposure to academies without taking into account the heterogeneity in governance models, we would find no effect on a student's scores. This is also consistent with the findings of Eyles and co-authors (2016b) who find no effect of primary academies on student overall achievement.

We then test whether the effect increases in the number of years of exposure. Indeed, one may worry that schools "teach to the test", implying that we would expect no differences between the improvement of students who spent 1 year into MATs compared to those who spent 4 years.

We therefore estimate the following OLS regression:

$$Y_{ist} = \alpha_0 + \beta_0 D_{ist} + \sum_{k=1}^4 \beta_k D_{kist} \cdot MAT_{ist} + \beta_5 X_{ist} + \gamma_s + \delta_t + \eta_{ist} \quad (2)$$

where we allow the returns to MAT exposure to vary depending on the total number of years a child spends in a MAT. These are captured by D_{kist} , which represents a set of indicator variables taking value 1 when the number of years a student has spent in an academy is equal to k , with $k = 1, 2, 3, 4$. Other variables follow the notation defined above.

Results are shown in Table 5, panel B. Column (3) shows the results for math test scores once controlling for school and time fixed effects. One extra year of exposure improves pupils'

test scores by about 1 point, whereas for students with 4 years of exposure the gain is around 2.5 points. These estimates would suggest that the improvement is increasing over time that is, the higher the number of years of exposure to a MAT, the higher the achievement compared to pupils exposed to a SAT. A slightly different pattern can be observed for English test scores (column (6)). While pupils exposed to MATs perform better than those exposed to SATs, the pattern is not clearly as increasing as it is for math tests, and the magnitude of the coefficient is smaller (about 0.7 and 0.8 points for 1 and 4 years of exposure respectively).

6 IV Estimates of exposure to academy

The above specification does not account for the endogenous sorting of students across schools. Mobility is quite high in English schools, especially after KS1, and tends to grow the closer we get to the last year of primary school. In the period we consider about 13% of students have changed school after entering KS2. In particular, since children can always change school, every year the fraction of students who spent all previous years in the school will be mechanically lower. This implies that any estimate one would get with a naive OLS regression would not reflect the true impact of academies in MATs. Indeed, this would not take into account that not all students taking KS2 tests have spent the same number of years in the school.

Second, it might be that schools that decide to convert into academies attract better students, so that the effects of being exposed to a MAT would be, to some extent, the result of self-selection of good students into a MAT or SAT. As long as the self-selection is correlated to pupils' unobservable characteristics, the OLS regression estimated above would provide biased estimates of the effect of exposure to academy. Our identification strategy aims at accounting for this two fold self-selection that might severely bias coefficient estimates obtained with a simple regression model.

First Stage Estimates

In order to deal with endogenous self-selection of pupils into academies we exploit the fact that enrolment decisions made by parents happens years before the decision of conversion. Since the 2010 reform could not be anticipated by parents, we can safely assume that enrolment in a MAT or SAT between 2007 and 2009 is orthogonal to the school's decision of converting. Therefore, we consider only students who were already enrolled in the school before conversion. Since

KS2 lasts four years, we can consider up to four years of treatment after the conversion takes place.

In practice, this is similar to a framework where we instrument the student status of being in an academy at the time of KS2 tests with a variable indicating whether the student was already enrolled in the school before conversion. However, since we are particularly interested in understanding whether the number of years one spends in an academy matters, it is useful to frame the problem in terms of years of exposure, as we do in equation (2). As we know the date of enrolment of each pupil in their school, we also know exactly how many years each child should have spent in the school. Hence, instead of a simple indicator variable for all students who were enrolled before conversion, we can predict the number of years they spent in an academy with the number of years they should have spent in the academy according to their enrolment year.

Finally, we are mainly interested in understanding heterogeneous effects of governance on students' performance. Hence, consistently with the design of equation (2) we interact the instrument with an indicator variable (MAT) for whether the academy attended by the student participates in a MAT. This motivates the following first stage regressions:

$$D_{ist} = \alpha_0 + \beta_0 Z_{ist} + \sum_{k=1}^4 \beta_k Z_{kist} \cdot MAT_{ist} + \beta_5 X_{ist} + \gamma_s + \delta_t + \eta_{ist} \quad (3)$$

$$D_{jist} \cdot MAT_{ist} = \alpha_0 + \beta_0 Z_{ist} + \sum_{k=1}^4 \beta_k Z_{kist} \cdot MAT_{ist} + \beta_5 X_{ist} + \gamma_s + \delta_t + \eta_{ist} \quad (4)$$

where Z_{ist} takes values from 0 to 4 for schools converted in 2011 and from 0 to 3 for schools converted in 2012. In particular, Z_{ist} will take value 0 for those students who were not enrolled in the academy before conversion; for all other students, Z_{ist} indicates the number of years the student has spent in the academy. Z_{kist} is a set of indicator variables taking value 1 if the student was enrolled in the academy before conversion and the number of years he has spent is equal to k , with $k = 1, 2, 3, 4$; as before, MAT is an indicator variable that takes value 1 if the school joined a chain and 0 otherwise. Equation (4) is estimated separately for each indicator variable D_{jist} , with $j = 1, 2, 3, 4$. Other variables follow the notation defined above.

Table 6 shows results from estimation of the set of equations (4). Column (1) shows results for one year of exposure ($D_{1ist} = 1$), column (2) for two years ($D_{2ist} = 1$), column (3) for three years ($D_{3ist} = 1$) and column (4) for four years ($D_{4ist} = 1$). Consistent with what one would

expect, in each regression the only meaningful independent variable is the one predicting a number of years of exposure consistent with the dependent variable. This coefficient effectively represents the fraction of students who have spent the full number of available years in the school (i.e. students who have not changed school). To exemplify, in column (1) if all students taking KS2 tests after one year had been in the school before conversion, β_1 would be equal to one. The coefficient is instead around 0.98, implying that 98% of students remain in the academy post conversion for the last year of primary school. The coefficient in column (4) is instead around 0.91, implying that 91% of students remain in the academy post conversion for the last four years of primary school.

The pattern of these coefficients reflects the simple fact that the longer the potential time a child has to spend in a given school, the larger the probability that he will move to a different school - for any reason - before finishing primary school. Our estimates imply that within the sub-group of academies, mobility of students is relatively high, with 9% of them failing to spend the entire Key Stage 2 phase in the same school. These estimates are in line with similar estimates obtained by Eyles et al. (2016b).⁹

2SLS Estimates

In this section we present 2SLS estimates, shown in Table 7. Panel A shows the coefficients of the marginal gain of attending a MAT compared to SAT. Once controlling for the endogenous selection of pupils into academies, we still find that pupils enrolled in MATs obtain higher results in math and English tests compared to those enrolled in SATs. Columns (3) and (6) suggest that one extra year of exposure to MATs increases the test scores in math and English tests respectively by 0.9 and 0.4 points (about 0.045 standard deviation for both subjects). As in the previous section, we are interested in estimating the gain relative to the number of years of exposure. Panel B shows that the improvement in math test scores is positively correlated with the number of years of exposure to MATs, while improvement in English tests is quite similar from 2 to 4 years of exposure.

So far we have looked at the aggregate sample of academies - both MATs and SATs - converted in 2011 and 2012. Because the early phase of the reform only opened up the possibility

⁹Eyles et al. (2016b) estimates follow the same pattern, although their coefficients' magnitude happens to decrease sharply after 1 year of exposure. While our estimates suggest that 91% of students stay in the same school for the entire KS2, their figure is about 85%. However, beside the (slightly) different sample employed, the coefficient we identify is different because it effectively represents those who stayed in the same *MAT* school.

of converting to outstanding schools, we wonder whether the above results differ with respect to the timing of conversion. Table 8 shows the OLS and 2SLS estimates for academies converted in 2011 only. We consider here 2SLS estimates shown in Panel B. Compared to the aggregate sample we notice that the gain of academies belonging to chains compared to stand-alone ones is stronger in the first 2 years of conversion, and smaller in the third year. Once we reach the fourth year of exposure there are no statically significant differences between pupils enrolled in MATs or SATs in math or English tests. A different pattern can be observed for academies that converted in 2012. Table 9, panel B shows 2SLS estimates. While being exposed for one year to a MAT is not statically different from being exposed to a SAT, starting from the second year of exposure the improvement of pupils enrolled in chains is significantly higher, and increases alongside the number of years of exposure. In particular, columns (3) and (6) suggest that after 3 years of exposure to academy, pupils enrolled in MATs improve their test scores by 3.3 and 1.3 points (which correspond to about 0.16 and 0.14 standard deviation respectively) in math and English tests.

Such heterogeneity arising from different years of conversion might be due to different characteristics of schools converting in 2011 and 2012. We consider this hypothesis in tables 10 and 11, which present school characteristics and Ofsted inspections respectively. Table 10 shows that schools converted in MATs in 2011 have a lower fraction of students with SEN, students eligible for FSM, and non-natives (Panel A), and a larger fraction of students awarded Level 5 in math and reading (Panel B). Finally, schools in 2012 MATs tend to be smaller and more likely to be faith schools compared to those converted in 2011. Overall, this table does seem to suggest that schools that became academies in 2011 were substantially better than those that converted in 2012.

This is confirmed when we look at Ofsted ratings (Panel A, Table 11). 38% of schools that became academies in 2011 and joined a MAT were judged outstanding during the last Ofsted inspections carried out before the conversion. The same figure decreases to 20% if we consider those converted in 2012. Schools that became academies and joined a MAT in 2011 were also more likely to be rated outstanding for the quality of teaching (30% versus 20%) and pupil's learning (32% versus 22%). The same pattern can be observed for SATs (Panel B).

Notably, according to Ofsted inspections, management quality seems to vary substantially across different waves of conversion. Considering MATs (Panel A, Table 11), schools that converted in 2011 have a larger probability of being rated outstanding for the management (41%

versus 31% of those converted in 2012), for the effectiveness of the governing body (40% versus 22%), and for leadership and management of teaching (30% versus 15%). This would suggest that early converter schools in MATs are more likely to be the leader, as well as the founder of the chain, and benefit from an already developed set of management practices. Instead, those schools converting in 2012 seem weaker from a managerial perspective and therefore will be more likely to join an already existing network of schools with well-established practices.

In this context, the lack of results for children in 2012 converter academies over the first year of exposure might be due to the fact that MATs are more likely to set long-term strategies involving new schools, and their implementation might take time. In particular, the governing body may want to extend established (possibly managerial) practices to new-joiners and coordinate efforts among schools. However, the lack of data regarding changes implemented by MATs and SATs disaggregated by year of conversion prevents us from investigating further the implications of the timing of conversion.

Heterogeneous Effects

We conclude the discussion of our results by analysing heterogeneous effects across pupils. In particular, we are interested in the performance of students eligible for FSM and students with SEN. On the one hand, the achievement gap between advantaged and disadvantaged students was one of the main reasons for the establishment of the academy reform in the first place. On the other hand, disadvantaged students' achievement represents one of the main factors Ofsted evaluates during the inspection of schools, highlighting the importance of this indicator for school evaluation.

For our purpose, we select only students eligible for FSM and students with SEN at the time of KS2 test. While the first is a good proxy for family income, the second category includes students with learning difficulties, physical disabilities and behavioural problems. We define these as disadvantaged students, and discuss here separate results considering academies converted in 2011 and 2012.¹⁰ Table 12 shows results for 2011 academies by years of exposure. Panel A and Panel B report OLS and 2SLS estimates respectively. The most complete specifications in columns (3) and (6) suggest no statistically significant differences on disadvantaged students' performance between MAT and SAT.

Results are quite different if we look at the sample of academies converted in 2012, shown in

¹⁰Results on the subsample of students with no disadvantage - or other subsamples - are available upon request.

Table 13. Panel B presents 2SLS results, with column (3) in Panel B suggesting that after three years of exposure to MATs, on average, disadvantaged students improve their math test score by 5 points (about 0.23 standard deviation) compared to similar students enrolled in SATs. Gains for English tests are about 2 points (about 0.21 standard deviation) after 3 years of exposure. These results show that there is a large gain for disadvantaged students enrolled in schools that became academies in 2012 and joined a MAT. In particular, these estimates happen to be larger than those obtained considering the whole sample. Overall, these results seem to suggest that exposure to MATs led to a decrease in the gap between advantaged and disadvantaged students.

7 Robustness Checks

Schools' Decision, Intake and Performance

Although enrolment decisions made by parents - and thus years of exposure - are arguably orthogonal to the decision of conversion by the school, one might still be worried about the existence of pre-conversion trends. Indeed, the decision by a school to convert - and how to convert, in a SAT or MAT - could be possibly driven by school characteristics such as performance or intake in pre-conversion years.

While in our context the determinants - both observable and unobservable - of the decision of becoming an academy are largely irrelevant (we condition on schools that have already become academies), the decision of a school to convert as a SAT or join a MAT could still be correlated to pre-existing trends in school performance, characteristics and intake. Additionally, we want to show that the timing of conversion does not depend on the strength of the cohorts. Indeed, schools may decide to convert in a particular year because they are aware of the potential of the cohort taking KS2 tests in that same year. This would then boost KS2 results of the school independently on the year of exposure. We check for this by looking at each cohort's results at KS1.

We test for the presence of pre-conversion trends in school characteristics by plotting the evolution over time of school and student characteristics for different school types. Figure 4 and 5 show series of student and school characteristics considering academies that converted in 2011 and 2012 respectively. Each figure plots the fraction of students eligible for free school meals (Panel A), natives (Panel B), students with special needs (Panel C) and school enrolment (Panel D) for MATs, SATs and schools that have never become academies. All characteristics

happen to follow a similar and parallel trend across different types of schools, so that we can rule out the presence of different pre-trends in student and school observables.

Figure 6 plots the evolution over time of KS1 assessments. Panels A1 and B1 show the fraction of students awarded Level 3 in math for schools that converted into academies in 2011 and 2012 respectively. Panels A2 and B2 plot the fraction of students awarded Level 3 in English. As before, the fraction of top students in MATs, SATs and other schools follow a similar pattern, pointing to the absence of different pre-trends in school performance.

Additionally, these figures confirm that academies converting in 2011 and 2012 represent a selected group of schools. They tend to perform better than other schools, have less students eligible for FSM or with SEN, and more natives. Furthermore, within the group of academies, schools in a MAT tend to have lower KS1 scores than stand-alone academies, as well as more FSM students and students with SEN. This is consistent with the idea that schools that are under-performing are incentivised to join a chain. Importantly, these pre-trends in school characteristics and performance show that the timing of conversion does not seem to reflect particularly strong cohorts. Indeed, if this was the case, cohorts of students taking KS2 tests across MATs and SATs in 2011 and 2012 should exhibit a markedly different composition or higher KS1 assessments with respect to past cohorts.

We end the section by performing an additional test for the absence of pre-trends, focusing specifically on the school’s decision of whether joining a MAT or remaining a SAT after conversion. We estimate the following regression, at school level:

$$MAT_s = \alpha_0 + \alpha_1 \Delta M_s + \alpha_2 \Delta W_s + v_s \quad (5)$$

where MAT is a dummy taking value 1 if school s joins a MAT in 2011 or 2012, and 0 in case the school remains a stand-alone school (SAT). ΔM_s is a vector of pre-conversion changes in school performance: it includes KS2 test scores and KS1 assessments by school teachers in math and English, as well as KS1 average point score. ΔW_s is instead a vector of changes in cohort composition before conversion. It includes controls for FSM eligibility, ethnicity, language spoken at home, SEN status, indicators for school type and school enrolment.

The equation is estimated over the period 2005 – 2010, using differences between 2010 and 2005 (Table 14, column (1)) as well as 2010 and 2007 (Table 14, column (2)) in school composition and performance. Coefficients regarding changes in school composition and performance are never statistically significant. The only coefficients that are significant across specifications

are those for the indicator variable taking value 1 if the academy was a community school before conversion. This tells us that community schools are more likely to join a MAT after conversion. Community schools on average tend to perform worse with respect to schools enjoying independence from the LA (e.g. VC schools). Therefore, the estimate indicates that schools that decide to join MATs tend to be on average worse than those remaining stand-alone schools. Despite that, these estimates overall suggest that the decision of joining a MAT cannot be explained by any trend in observable school characteristics.

Event Study

In this section we consider a falsification test in order to make sure that results presented in previous sections are not driven by possibly unobserved school characteristics or other pre-existing differences between MATs and SATs. We do that in a reduced form framework.

In order to check for that, we create a ‘fake’ conversion event for our main sample. Since we consider four years of exposure, we set the ‘fake’ policy event in 2007 for schools that become academies in 2011 and 2008 for schools becoming academies in 2012. To put it differently, we assume that academies that converted in 2011 (2012) converted instead in 2007 (2008). The timing is chosen to avoid overlap between the ‘fake’ and true treatment. In this framework we estimate the following regression:

$$Y_{ist} = \alpha_0 + \eta_0 Z_{ist} + \eta_1 Z_{ist}^f + \sum_{k=-3}^0 \beta_k Z_{kist} \cdot MAT_{ist} + \sum_{k=1}^4 \beta_k Z_{kist} \cdot MAT_{ist} + \beta_5 X_{ist} + \gamma_s + \delta_t + \varepsilon_{ist} \quad (6)$$

where the notation follows the one defined before and β_k coefficients with $k = -3, \dots, 0$ represent the treatment years after the ‘fake’ conversion event set either in 2007 or 2008. Z_{ist}^f is the equivalent of Z_{ist} for the ‘fake’ treatment periods. The equation is estimated separately for schools converted in 2011 and schools converted in 2012. For the latter, consistently with the main analysis, coefficients that estimate the impact of the true treatment run only from $k = 1$ to $k = 3$.

Figures 7 and 8 plot the series of coefficients estimated with regression (6) for KS2 math test scores (Panel A) and KS2 English test scores (Panel B). We consider first schools that became academies in 2011 (Figure 7): for both subjects coefficients estimated before the event of conversion (set to zero) are small and never statistically different from zero. For schools

that became academies in 2012 we observe an increase in math scores right before the time of conversion, followed by a drop one year after and a subsequent increase (Figure 8, Panel A), consistently with what we find in Table 9. However, one year before conversion the coefficient is statistically different from zero only at 5% level; furthermore, math scores do not keep increasing, but rather experience a sudden drop one year after conversion. Panel B shows that for English scores we do not observe such a trend, with the coefficients estimated before conversion that are never statistically different from zero. Overall, this leads us to exclude any pre-existing trends before the conversion to MAT that might confound the estimates from the IV regressions presented in Section 6.

8 Survey data

The empirical evidence in the previous sections suggests that MATs have a positive impact on pupils' achievement compared to SATs. In this section we explore possible determinants of such findings by exploiting a recent survey conducted by the DfE (Cirin, 2017). In July 2014 the DfE published the first research on academies practices without distinguishing between MATs and SATs. Given the increase in the proportion of MATs, a new survey was conducted in late 2016 to shed light on similarities and differences between types of trusts¹¹.

In light of our research, the most relevant section of the survey concerns the changes implemented by trusts after conversion. Table 15 shows the proportion of MATs and SATs that implemented the changes listed in column (1). Interestingly, results differ quite significantly between chains and stand-alone academies. While SATs are more likely to make changes at school level (e.g. changing the curriculum offered, introducing revenue generating activities, adding non-teaching positions), MATs are more likely to make organizational-level changes, mostly related to the reconstitution of governing body. Moreover, when asked to rank the 5 most important changes made after conversion, 60% of MATs mentioned changes in school leadership, while only 22% of SATs mentioned this change. Such difference persists also when schools are asked what they considered as the most important change available after conversion. Table 16 shows that most of MATs consider crucial changing the leadership, as well as reconstituting the governing body. SATs mention as the most important changes the curriculum offered and the procurement of services previously provided by the LA. In addition, SATs

¹¹The survey contains schools converted into academies before February 2016. The total sample contains 326 MATs and 542 SATs, both primary and secondary schools.

are more heterogeneous in their responses as well as more likely to find school level changes more important than organizational ones. MATs, instead, are more homogeneous and consider school-related changes less crucial.

The survey also focuses on how being part of a MAT facilitates the collaboration between schools. Despite non-formal collaborations between schools also existing outside trusts, the perception of schools belonging to the MATs is that the creation of formal networks enforces schools' engagement.

In addition, Table 17 shows the best ways to facilitate collaboration within a MAT. Among other opportunities, establishing formal partnerships and exchanging support are the most effective ways to improve collaboration. In particular, school-to-school support - such as regular meetings of leaders, joint program development, helping teachers, and exchange of best practices between schools - are among the most effective activities. In addition, the establishment of trusts and the consequent centralization of finance, ICT, HR functions increased is perceived as a professional way to increase efficiency within the trust.

Overall, these figures suggest that chains prioritised changes at the managerial level rather than focusing on traditional school level changes, such as the curriculum offered or school day length. Since our findings suggest that chains perform better this might be due to the implementation of new governance practices. This is consistent with the evidence provided by Dobbie and Fryer (2013) for US charter schools, where traditional input measures, such as pupil to teacher ratio, per pupil expenditure, and hiring of high qualified teachers, are not correlated with school effectiveness. Similarly, the study by Bloom et al. (2015) finds that the success of autonomous schools is not linked to autonomy *per se*, but rather to school management, such as strong leadership, and the presence of external governing bodies exercising strong accountability on schools' head-teachers.

9 Conclusion

The recent mass academisation of English primary and secondary schools gave rise to new governance structures never experienced by the education system. In particular, the rapid expansion of chains of autonomous schools, the so-called MATs, brought in a new model of governance characterized by the separation of roles and responsibilities along the governance chain.

While most of the literature focuses solely on the effectiveness of autonomous schools com-

pared to non-autonomous ones, this paper investigates whether and how school governance plays a role in schools' success. In particular, we explore whether chains have a positive impact on pupils' achievement compared to stand-alone academies. We deal with the potential endogeneity of students' self-selection into schools by exploiting the fact that enrolment occurred prior to the reform and therefore prior to the decision of the school to become a SAT or join a MAT. Hence, we can safely argue that school conversion could not be anticipated by parents. We then compare math and English scores of students taking the test before and after the conversion within the same school.

Baseline results show that pupils exposed to schools belonging to chains perform better in both math and English. In particular, one extra year of exposure to a MAT compared to a SAT increases test scores by about 0.9 and 0.4 points respectively. We then differentiate between schools converted in 2011 and schools converted in 2012. For the latter in particular, the improvement is increasing in the number of years and pupils who spend 3 years in a MAT gain 3.3 additional points in math and 1.3 in English. Gains turn out to be significantly stronger for disadvantaged students. After three years of exposure to MATs they improve their math and English scores by 5 and 2 points respectively compared to students enrolled in SATs.

While our results suggest that students enrolled in chains do improve their performance, less clear is the mechanism underpinning such findings. Recent survey data collected from the DfE show that while SATs are more likely to make changes at the school level (e.g. changing the curriculum offered, introducing revenue generating activities, adding non-teaching positions), MATs are more likely to make changes related to managerial practices (e.g. reconstituting the governing body, changing the school leadership, creating formal networks between schools). This survey evidence, coupled with our results about performance, suggests that interventions at the managerial level might improve school effectiveness. However, at this stage, the impossibility of combining school level and survey data prevents us from establishing a causal link between governance and performance.

References

- Abdulkadiroğlu, A., Angrist, J. D., Dynarski, S. M., Kane, T. J., and Pathak, P. A. (2011). Accountability and flexibility in public schools: evidence from Boston's charters and pilots. *The Quarterly Journal of Economics*, 126(2):699–748.
- Angrist, J. D., Dynarski, S. M., Kane, T. J., Pathak, P. A., and Walters, C. R. (2010). Inputs and impacts in charter schools: KIPP Lynn. *American Economic Review*, 100(2):239–243.
- Angrist, J. D., Pathak, P. A., and Walters, C. R. (2013). Explaining charter school effectiveness. *American Economic Journal: Applied Economics*, 5(4):1–27.
- Bloom, N., Lemos, R., Sadun, R., and Reenen, J. V. (2015). Does management matter in schools? *The Economic Journal*, 125(584):647–674.
- Bolton, P. and Long, R. (2016). Every school an academy: the white paper proposals.
- Cirin, R. (2014). Do academies make use of their autonomy? *Research Report*.
- Cirin, R. (2017). Academy trust survey 2017. *Research Report*.
- Department for Education (2016a). Multi-academy trusts. Good practice guidance and expectations for growth.
- Department for Education (2016b). Revised GCSE and equivalent results in England: 2014 to 2016.
- Department for Education (2016c). Schools, pupils and their characteristics. *Statistical First Release*, 20.
- Department for Education (2016d). White paper: Educational Excellence Everywhere.
- Dobbie, W. and Fryer, R. G. (2011). Are high-quality schools enough to increase achievement among the poor? Evidence from the Harlem children's zone. *American Economic Journal: Applied Economics*, 3(3):158–187.
- Dobbie, W. and Fryer, R. G. (2013). Getting beneath the veil of effective schools: evidence from New York City. *American Economic Journal: Applied Economics*, 5(4):28–60.

- Dobbie, W. and Fryer, R. G. (2015). The medium-term impacts of high-achieving charter schools. *Journal of Political Economy*, 123(5):985–1037.
- Eyles, A., Hupkau, C., and Machin, S. (2016a). Academies, charter and free schools: do new school types deliver better outcomes? *Economic Policy*, 31(87):453–501.
- Eyles, A. and Machin, S. (2015). The introduction of academy schools to England’s education. *CEP Discussion Paper No. 1368*.
- Eyles, A., Machin, S., and McNally, S. (2016b). Unexpected school reform: academisation of primary schools in England. *CEP Discussion Paper No. 1455*.
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782):1900–1902.
- Hoxby, C. M. and Murarka, S. (2009). Charter schools in New York City: who enrolls and how they affect their students’ achievement. *NBER Working Paper No. 14852*.
- Hutchings, M., Francis, B., and Kirby, P. (2016). The impact of academy chains on low income students. *The Sutton Trust*.

Table 1. Descriptives

| | All schools | | Academies | |
|--------------------------------------|-------------|-------------|-------------|-------------|
| | Mean (1) | S.D. (2) | Mean (3) | S.D. (4) |
| <i>Panel A. Students</i> | | | | |
| Male | 0.5084 | 0.4999 | 0.5080 | 0.4999 |
| Eligible for free school meals (FSM) | 0.1482 | 0.3553 | 0.1133 | 0.3169 |
| White | 0.8431 | 0.3637 | 0.8539 | 0.3533 |
| Black | 0.0361 | 0.1866 | 0.0298 | 0.1701 |
| Natives | 0.8991 | 0.3011 | 0.9118 | 0.2836 |
| With special educational needs (SEN) | 0.2168 | 0.4121 | 0.1869 | 0.3898 |
| <i>Panel B. Scores</i> | | | | |
| KS1 math Level 2 | 0.9126 | 0.2824 | 0.9399 | 0.2377 |
| KS1 math Level 3 | 0.2424 | 0.4285 | 0.2771 | 0.4476 |
| KS1 reading Level 2 | 0.8678 | 0.3387 | 0.8993 | 0.3009 |
| KS1 reading Level 3 | 0.2835 | 0.4507 | 0.3208 | 0.4668 |
| KS2 math score | 68.17 | 20.66 | 71.13 | 19.93 |
| KS2 math Level 5 | 0.3793 | 0.4852 | 0.4452 | 0.4970 |
| KS2 reading score | 30.98 | 9.23 | 32.14 | 8.90 |
| KS2 reading Level 5 | 0.4994 | 0.5000 | 0.5581 | 0.4966 |
| <i>Panel C. Schools</i> | | | | |
| Community schools | 0.5597 | 0.4965 | 0.5967 | 0.4911 |
| Voluntary Controlled schools | 0.1772 | 0.3819 | 0.0967 | 0.2959 |
| Voluntary Aided schools | 0.2395 | 0.4268 | 0.1955 | 0.3970 |
| KS2 grade enrolment | 31.64 | 19.17 | 42.63 | 24.81 |
| Pupil-teacher ratio | 20.94 | 2.78 | 21.99 | 2.48 |
| Percent qualified teachers | 0.9727 | 0.0371 | 0.9640 | 0.0467 |
| Percent non-qualified teachers | 0.0210 | 0.0334 | 0.0273 | 0.0417 |
| Schools | 7,302 | | 486 | |
| Students | 2,466,682 | | 211,688 | |

Note. The table presents summary statistics for all schools (columns (1) and (2)) and for schools converted into academies (columns (3) and(4)). Schools considered in columns (1) and (2) include all state-funded schools in Local Authorities where there is at least one academy. Means and standard deviations are computed over the period 2005-2015.

Table 2. Location of responsibility in MATs

| | Trust Board (1) | Regional/Cluster level (2) | School level (3) |
|---|--------------------|-------------------------------|---------------------|
| Financial compliance | 95% | 4% | 1% |
| Legal compliance | 93% | 4% | 3% |
| Appointing headteachers/principals | 91% | 4% | 5% |
| Managing risks | 88% | 5% | 6% |
| Holding individual headteachers/principals to account | 82% | 8% | 10% |
| Monitoring the performance of individual schools | 73% | 13% | 15% |
| Human resources | 72% | 10% | 18% |
| Allocating school budgets | 70% | 6% | 24% |
| Directing school improvement support | 62% | 17% | 21% |
| Setting academic targets | 44% | 12% | 44% |
| Designing school staffing structures | 31% | 15% | 54% |
| Setting individual school strategy/objectives | 31% | 8% | 60% |
| School development action plans | 9% | 13% | 78% |

Note. The table presents the location of responsibility in multi-academy trusts (MATs) by Trust Board (column (1)), Regional/Cluster level (column (2)) and School level (column (3)). Source: Academy trust survey 2017. The sample of respondents contains 267 MATs and 436 SATs, both primary and secondary.

Table 3. Main reason for converting

| | Primary (1) | Secondary (2) | In a MAT (3) | Not in a MAT (4) |
|---|----------------|------------------|-----------------|---------------------|
| To raise educational standards | 23% | 20% | 28% | 20% |
| To create new opportunities to collaborate with other schools | 14% | 7% | 22% | 4% |
| To gain greater freedom to use funding as you see fit | 24% | 23% | 15% | 26% |
| To make specific changes to the way the school operates | 2% | 1% | 2% | 2% |
| To make you independent of the local authority | 19% | 13% | 13% | 18% |
| To obtain more funding for front-line education | 14% | 34% | 16% | 28% |
| To reduce bureaucracy | 2% | 1% | 2% | 1% |
| To realise savings through increased efficiency | 2% | 1% | 2% | 1% |

Note. The table shows the main reason for converting as stated by primary schools (column (1)), secondary schools (column (2)), schools that joined a MAT (column (3)) and schools that remained stand-alone academies (column (4)). The sample of respondents contains 262 Primary and 286 Secondary schools, 167 in a MAT and 405 not in a MAT. Both Converter and Sponsor Led academies are included. Source: Do academies make use of their autonomy? (2014).

Table 4. Descriptives MAT vs SAT

| | MAT | | SAT | |
|--------------------------------------|-------------|-------------|-------------|-------------|
| | Mean (1) | S.D. (2) | Mean (3) | S.D. (4) |
| <i>Panel A. Students</i> | | | | |
| Male | 0.5103 | 0.4999 | 0.5058 | 0.5000 |
| Eligible for free school meals (FSM) | 0.1310 | 0.3375 | 0.0965 | 0.2952 |
| White | 0.8558 | 0.3513 | 0.8520 | 0.3551 |
| Black | 0.0318 | 0.1754 | 0.0280 | 0.1649 |
| Natives | 0.9148 | 0.2792 | 0.9090 | 0.2876 |
| With special educational needs (SEN) | 0.2031 | 0.4023 | 0.1716 | 0.3770 |
| <i>Panel B. Scores</i> | | | | |
| KS1 math Level 2 | 0.9305 | 0.2543 | 0.9487 | 0.2206 |
| KS1 math Level 3 | 0.2582 | 0.4377 | 0.2950 | 0.4560 |
| KS1 reading Level 2 | 0.8859 | 0.3179 | 0.9119 | 0.2834 |
| KS1 reading Level 3 | 0.3006 | 0.4585 | 0.3399 | 0.4737 |
| KS2 math score | 69.92 | 20.40 | 72.27 | 19.40 |
| KS2 math Level 5 | 0.4211 | 0.4937 | 0.4679 | 0.4990 |
| KS2 reading score | 31.63 | 9.03 | 32.63 | 8.74 |
| KS2 reading Level 5 | 0.5325 | 0.4989 | 0.5823 | 0.4932 |
| <i>Panel C. Schools</i> | | | | |
| Community schools | 0.6789 | 0.4679 | 0.5125 | 0.5009 |
| Voluntary Controlled schools | 0.0854 | 0.2800 | 0.1083 | 0.3115 |
| Voluntary Aided schools | 0.1626 | 0.3698 | 0.2292 | 0.4212 |
| KS2 grade enrolment | 41.31 | 25.89 | 43.98 | 23.63 |
| Pupil-teacher ratio | 21.63 | 2.51 | 22.36 | 2.40 |
| Percent qualified teachers | 0.9644 | 0.0437 | 0.9637 | 0.0497 |
| Percent non-qualified teachers | 0.0259 | 0.0384 | 0.0288 | 0.0449 |
| Number of schools (2011) | | 120 | | 139 |
| Number of schools (2012) | | 126 | | 101 |
| Number of students | | 102,855 | | 108,833 |

Note. The table presents summary statistics for multi-academy trusts (columns (1) and (2)) and single-academy trusts (columns (3) and(4)). Means and standard deviations are computed over the period 2005-2015.

Table 5. OLS regressions for academies converted in 2011 and 2012

| | Math points | | | English points | | |
|----------------------------------|---------------------|---------------------|----------------------|---------------------|---------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Panel A. Marginal gain:</i> | | | | | | |
| Years of Exposure to MAT | 0.543*** (0.176) | 0.777*** (0.165) | 0.746*** (0.164) | 0.192** (0.079) | 0.250*** (0.063) | 0.249*** (0.063) |
| Years of Exposure | 1.581*** (0.118) | 1.379*** (0.108) | -0.699*** (0.256) | 0.468*** (0.051) | 0.397*** (0.046) | -0.353*** (0.102) |
| <i>Panel B. Exposure to MAT:</i> | | | | | | |
| 1 year | 3.509*** (0.412) | 4.286*** (0.387) | 1.091*** (0.396) | 1.976*** (0.180) | 2.295*** (0.160) | 0.674*** (0.167) |
| 2 years | 2.648*** (0.514) | 3.631*** (0.483) | 1.965*** (0.493) | 1.428*** (0.226) | 1.829*** (0.189) | 0.863*** (0.191) |
| 3 years | 0.837 (0.544) | 2.181*** (0.514) | 2.232*** (0.512) | -0.214 (0.234) | 0.314 (0.195) | 0.592*** (0.194) |
| 4 years | 0.142 (0.703) | 0.925 (0.678) | 2.538*** (0.687) | -0.087 (0.338) | 0.137 (0.285) | 0.836*** (0.290) |
| Observations | 211,688 | 211,688 | 211,688 | 211,533 | 211,533 | 211,533 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| School FE | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | No | Yes | No | No | Yes |

Note. The table shows OLS regressions of KS2 math scores (column (1) to (3)) and KS2 English scores (column (4) to (6)) on years of exposure to a MAT (Panel A) and four indicator variables for years of exposure to a MAT (Panel B). Both schools converted in 2011 and 2012 are considered. Columns (1) and (4) control for gender, free school meals eligibility, ethnicity, language spoken at home, special educational need status, student's average point score at KS1 and school enrolment. Columns (2) and (5) add school fixed effects; columns (3) and (6) add year fixed effects. Standard errors, shown in brackets, are clustered on schools. *** p<0.01, ** p<0.05, * p<0.1

Table 6. First stage regressions

| Predicted exposure to a MAT: | Years of exposure | | | |
|------------------------------|---------------------|---------------------|---------------------|---------------------|
| | (1) one | (2) two | (3) three | (4) four |
| One year | 0.984*** (0.002) | | | |
| Two years | | 0.974*** (0.002) | | |
| Three years | | | 0.938*** (0.006) | |
| Four years | | | | 0.912*** (0.015) |
| Observations | 211,688 | 211,688 | 211,688 | 211,688 |
| Number of schools | 486 | 486 | 486 | 486 |
| Controls | Yes | Yes | Yes | Yes |
| School FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |

Note. The table shows first stage regressions of years of exposure to a multi-academy trust (MAT) on predicted exposure to a MAT. The sample includes all schools converted into academies in 2011 and 2012. All regressions include indicators for student characteristics (gender, free school meals eligibility, ethnicity, language spoken at home, special educational need status), student's average point score at KS1, school enrolment, and year and school fixed effects. Standard errors, shown in brackets, are clustered on schools. *** p<0.01, ** p<0.05, * p<0.1

Table 7. IV regressions for academies converted in 2011 and 2012

| | Math points | | | English points | | |
|----------------------------------|----------------------|----------------------|---------------------|----------------------|----------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Panel A. Marginal gain:</i> | | | | | | |
| Years of Exposure to MAT | 0.459** (0.207) | 0.920*** (0.222) | 0.908*** (0.217) | 0.217** (0.093) | 0.378*** (0.086) | 0.374*** (0.084) |
| Years of Exposure | 2.495*** (0.141) | 2.067*** (0.139) | -0.008 (0.525) | 0.921*** (0.062) | 0.751*** (0.059) | -0.242 (0.250) |
| <i>Panel B. Exposure to MAT:</i> | | | | | | |
| 1 year | 3.225*** (0.437) | 3.672*** (0.420) | 1.278*** (0.445) | 1.867*** (0.190) | 1.997*** (0.178) | 0.680*** (0.188) |
| 2 years | 1.399*** (0.535) | 2.233*** (0.527) | 2.017*** (0.528) | 0.777*** (0.240) | 1.069*** (0.209) | 0.808*** (0.205) |
| 3 years | -0.726 (0.554) | 0.470 (0.606) | 2.552*** (0.590) | -0.974*** (0.253) | -0.587** (0.240) | 0.801*** (0.227) |
| 4 years | -3.095*** (0.784) | -2.094*** (0.810) | 2.003** (0.837) | -1.478*** (0.379) | -1.337*** (0.338) | 0.863** (0.341) |
| Observations | 211,688 | 211,688 | 211,688 | 211,533 | 211,533 | 211,533 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| School FE | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | No | Yes | No | No | Yes |

Note. The table shows 2SLS regressions of KS2 math scores (column (1) to (3)) and KS2 English scores (column (4) to (6)) on years of exposure to a MAT (Panel A) and four indicator variables for years of exposure to a MAT (Panel B). Both schools converted in 2011 and 2012 are considered. Columns (1) and (4) control for gender, free school meals eligibility, ethnicity, language spoken at home, special educational need status, student's average point score at KS1 and school enrolment. Columns (2) and (5) add school fixed effects; columns (3) and (6) add year fixed effects. Standard errors, shown in brackets, are clustered on schools. *** p<0.01, ** p<0.05, * p<0.1

Table 8. OLS and IV regressions for academies converted in 2011

| Exposure to MAT: | Math points | | | English points | | |
|----------------------|----------------------|---------------------|---------------------|----------------------|----------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Panel A. OLS</i> | | | | | | |
| 1 year | 3.643*** (0.536) | 4.044*** (0.460) | 1.415** (0.605) | 1.798*** (0.252) | 1.929*** (0.197) | 1.118*** (0.276) |
| 2 years | 3.310*** (0.691) | 3.581*** (0.657) | 2.003*** (0.744) | 2.492*** (0.283) | 2.567*** (0.242) | 0.869*** (0.280) |
| 3 years | 2.003*** (0.691) | 2.568*** (0.679) | 2.094*** (0.715) | 0.233 (0.287) | 0.415* (0.243) | 0.785*** (0.269) |
| 4 years | 0.516 (0.759) | 1.206 (0.766) | 2.185*** (0.746) | 0.043 (0.364) | 0.250 (0.319) | 0.684** (0.314) |
| <i>Panel B. 2SLS</i> | | | | | | |
| 1 year | 3.506*** (0.569) | 3.382*** (0.503) | 1.405** (0.643) | 1.756*** (0.269) | 1.610*** (0.229) | 1.178*** (0.310) |
| 2 years | 2.252*** (0.726) | 2.229*** (0.708) | 1.801** (0.784) | 2.047*** (0.310) | 1.929*** (0.281) | 0.638** (0.308) |
| 3 years | 0.076 (0.712) | 0.583 (0.811) | 1.712** (0.835) | -0.585* (0.339) | -0.596* (0.319) | 0.702** (0.325) |
| 4 years | -2.503*** (0.867) | -1.742* (0.934) | 1.111 (0.855) | -1.170*** (0.418) | -1.117*** (0.396) | 0.504 (0.355) |
| Observations | 118,600 | 118,600 | 118,600 | 118,578 | 118,578 | 118,578 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| School FE | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | No | Yes | No | No | Yes |

Note. The table shows OLS (Panel A) and 2SLS regressions (Panel B) of KS2 math scores (column (1) to (3)) and English scores (column (4) to (6)) on indicator variables for years of exposure to a MAT. Only schools converted in 2011 are considered. Columns (1) and (4) control for gender, free school meals eligibility, ethnicity, language spoken at home, special educational need status, student's average point score at KS1 and school enrolment. Columns (2) and (5) add school fixed effects; columns (3) and (6) add year fixed effects. Standard errors, shown in brackets, are clustered on schools. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 9. OLS and IV regressions for academies converted in 2012

| Exposure to MAT: | Math points | | | English points | | |
|----------------------|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Panel A. OLS</i> | | | | | | |
| 1 year | 3.096*** (0.615) | 4.447*** (0.628) | 1.317* (0.724) | 2.061*** (0.251) | 2.694*** (0.245) | 0.474* (0.286) |
| 2 years | 1.498** (0.696) | 3.384*** (0.703) | 2.668*** (0.762) | 0.067 (0.277) | 0.953*** (0.265) | 0.848*** (0.300) |
| 3 years | -1.081 (0.750) | 1.295* (0.767) | 2.407*** (0.736) | -1.001*** (0.337) | 0.092 (0.304) | 0.646** (0.298) |
| <i>Panel B. 2SLS</i> | | | | | | |
| 1 year | 2.742*** (0.651) | 3.926*** (0.670) | 1.223 (0.798) | 1.869*** (0.269) | 2.389*** (0.261) | 0.319 (0.321) |
| 2 years | 0.277 (0.739) | 2.052*** (0.781) | 2.252*** (0.825) | -0.692** (0.297) | 0.123 (0.284) | 0.676** (0.320) |
| 3 years | -1.955** (0.846) | 0.076 (0.916) | 3.298*** (0.856) | -1.682*** (0.372) | -0.713** (0.355) | 1.264*** (0.347) |
| Observations | 93,088 | 93,088 | 93,088 | 92,955 | 92,955 | 92,955 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| School FE | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | No | Yes | No | No | Yes |

Note. The table shows OLS (Panel A) and 2SLS regressions (Panel B) of KS2 math scores (column (1) to (3)) and English scores (column (4) to (6)) on indicator variables for years of exposure to a MAT. Only schools converted in 2012 are considered. Columns (1) and (4) control for gender, free school meals eligibility, ethnicity, language spoken at home, special educational need status, student's average point score at KS1 and school enrolment. Columns (2) and (5) add school fixed effects; columns (3) and (6) add year fixed effects. Standard errors, shown in brackets, are clustered on schools. *** p<0.01, ** p<0.05, * p<0.1

Table 10. School characteristics for 2011 and 2012 academies

| | MAT | | SAT | |
|--------------------------------------|-------------|-------------|-------------|-------------|
| | 2011 (1) | 2012 (2) | 2011 (3) | 2012 (4) |
| <i>Panel A. Students</i> | | | | |
| Male | 0.5117 | 0.5088 | 0.5040 | 0.5087 |
| Eligible for free school meals (FSM) | 0.1262 | 0.1361 | 0.0896 | 0.1071 |
| White | 0.8690 | 0.8421 | 0.8735 | 0.8187 |
| Black | 0.0409 | 0.0223 | 0.0236 | 0.0348 |
| Natives | 0.9386 | 0.8901 | 0.9146 | 0.9004 |
| With special educational needs (SEN) | 0.1993 | 0.2070 | 0.1659 | 0.1805 |
| <i>Panel B. Scores</i> | | | | |
| KS1 math Level 2 | 0.9335 | 0.9274 | 0.9526 | 0.9426 |
| KS1 math Level 3 | 0.2618 | 0.2546 | 0.3071 | 0.2762 |
| KS1 reading Level 2 | 0.8905 | 0.8812 | 0.9169 | 0.9043 |
| KS1 reading Level 3 | 0.3081 | 0.2929 | 0.3473 | 0.3283 |
| KS2 math score | 71.03 | 68.77 | 72.80 | 71.46 |
| KS2 math Level 5 | 0.4427 | 0.3988 | 0.4793 | 0.4502 |
| KS2 reading score | 32.12 | 31.12 | 32.79 | 32.38 |
| KS2 reading Level 5 | 0.5549 | 0.5093 | 0.5895 | 0.5712 |
| <i>Panel C. Schools</i> | | | | |
| Community schools | 0.7333 | 0.6270 | 0.5108 | 0.5149 |
| Voluntary Controlled schools | 0.1167 | 0.0556 | 0.1007 | 0.1188 |
| Voluntary Aided schools | 0.0750 | 0.2460 | 0.2158 | 0.2475 |
| KS2 grade enrolment | 43.11 | 39.60 | 46.15 | 41.00 |
| Pupil-teacher ratio | 21.63 | 21.64 | 22.42 | 22.27 |
| Percent qualified teachers | 0.9616 | 0.9670 | 0.9604 | 0.9683 |
| Percent non-qualified teachers | 0.0295 | 0.0225 | 0.0326 | 0.0234 |
| Number of schools | 120 | 126 | 139 | 101 |
| Number of students | 52399 | 50456 | 66201 | 42632 |

Note. The table presents school characteristics for multi-academy trusts converted in 2011 (column (1)) and 2012 (column (2)) and single-academy trusts converted in 2011 (column (3)) and 2012 (column (4)). Means are computed over the period 2005-2015.

Table 11. Fraction of schools by Ofsted judgement and year of conversion

| | Outstanding | | Good | | Satisfactory | |
|---|-------------|-------------|-------------|-------------|--------------|-------------|
| | 2011 (1) | 2012 (2) | 2011 (3) | 2012 (4) | 2011 (5) | 2012 (6) |
| <i>Panel A. Multi-academy trusts (MAT)</i> | | | | | | |
| Overall grade | 0.38 | 0.27 | 0.44 | 0.54 | 0.18 | 0.19 |
| Behaviour and safety of pupils | 0.54 | 0.37 | 0.41 | 0.60 | 0.05 | 0.03 |
| Quality of teaching | 0.30 | 0.20 | 0.53 | 0.62 | 0.17 | 0.18 |
| Quality of pupils' learning | 0.32 | 0.22 | 0.51 | 0.58 | 0.17 | 0.20 |
| Quality of SEN pupils' learning | 0.34 | 0.24 | 0.52 | 0.60 | 0.13 | 0.17 |
| Pupils' attendance | 0.13 | 0.17 | 0.56 | 0.46 | 0.31 | 0.37 |
| Leadership and management | 0.41 | 0.31 | 0.44 | 0.56 | 0.15 | 0.13 |
| Effectiveness of Governing Body | 0.40 | 0.22 | 0.46 | 0.57 | 0.13 | 0.21 |
| Leadership and management of teaching | 0.30 | 0.15 | 0.50 | 0.64 | 0.20 | 0.21 |
| <i>Panel B. Single-academy trusts (SAT)</i> | | | | | | |
| Overall grade | 0.54 | 0.26 | 0.42 | 0.60 | 0.04 | 0.14 |
| Behaviour and safety of pupils | 0.70 | 0.50 | 0.29 | 0.49 | 0.01 | 0.01 |
| Quality of teaching | 0.45 | 0.19 | 0.53 | 0.67 | 0.03 | 0.14 |
| Quality of pupils' learning | 0.47 | 0.22 | 0.49 | 0.64 | 0.04 | 0.14 |
| Quality of SEN pupils' learning | 0.51 | 0.24 | 0.45 | 0.64 | 0.04 | 0.12 |
| Pupils' attendance | 0.30 | 0.25 | 0.54 | 0.48 | 0.17 | 0.28 |
| Leadership and management | 0.58 | 0.31 | 0.40 | 0.58 | 0.02 | 0.11 |
| Effectiveness of Governing Body | 0.46 | 0.22 | 0.46 | 0.60 | 0.08 | 0.18 |
| Leadership and management of teaching | 0.26 | 0.18 | 0.70 | 0.70 | 0.05 | 0.12 |

Note. The table shows the fraction of schools by Ofsted judgement and year of conversion. The sample includes schools that became academies between April 2011 and August 2012. Only Converter academies are considered. Panel A presents grades for multi-academy trusts (MATs) and Panel B for single-academy trusts (SATs). Columns (1) and (2) show the fraction of schools judged outstanding; columns (3) and (4) show the fraction of schools judged good; columns (5) and (6) show the fraction of schools judged satisfactory or inadequate. The table uses the last available Ofsted ranking before the conversion took place.

Table 12. OLS and IV regressions for academies converted in 2011.
Sample of FSM eligible and SEN students

| Exposure to MAT: | Math points | | | English points | | |
|----------------------|----------------------|----------------------|-------------------|---------------------|----------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Panel A. OLS</i> | | | | | | |
| 1 year | 4.345*** (0.821) | 4.467*** (0.754) | 1.223 (0.998) | 2.423*** (0.394) | 2.181*** (0.307) | 0.989** (0.441) |
| 2 years | 3.549*** (0.978) | 3.197*** (0.963) | 1.364 (1.114) | 2.470*** (0.453) | 1.920*** (0.411) | 0.681 (0.486) |
| 3 years | 1.436 (1.079) | 1.094 (1.068) | 0.551 (1.169) | 0.523 (0.495) | -0.171 (0.439) | -0.238 (0.468) |
| 4 years | -0.556 (1.272) | -0.616 (1.311) | 0.830 (1.278) | -0.526 (0.631) | -1.111* (0.577) | -0.354 (0.581) |
| <i>Panel A. 2SLS</i> | | | | | | |
| 1 year | 4.226*** (0.872) | 3.546*** (0.839) | 1.190 (1.080) | 2.376*** (0.435) | 1.762*** (0.374) | 0.982* (0.515) |
| 2 years | 2.278** (1.093) | 1.571 (1.109) | 1.425 (1.246) | 2.056*** (0.508) | 1.256*** (0.482) | 0.626 (0.544) |
| 3 years | -1.339 (1.205) | -1.726 (1.334) | -0.293 (1.420) | -0.275 (0.566) | -1.207** (0.566) | -0.252 (0.599) |
| 4 years | -4.806*** (1.434) | -4.737*** (1.578) | -0.922 (1.458) | -1.836** (0.746) | -2.556*** (0.705) | -0.468 (0.641) |
| Observations | 29,580 | 29,580 | 29,580 | 29,416 | 29,416 | 29,416 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| School FE | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | No | Yes | No | No | Yes |

Note. The table shows OLS (Panel A) and 2SLS regressions (Panel B) of KS2 math scores (column (1) to (3)) and English scores (column (4) to (6)) on indicator variables for years of exposure to a MAT. The sample includes students eligible for free school meals and students with special educational needs. Only schools converted in 2011 are considered. Columns (1) and (4) control for gender, ethnicity, language spoken at home, student's average point score at KS1 and school enrolment. Columns (2) and (5) add school fixed effects; columns (3) and (6) add year fixed effects. Standard errors, shown in brackets, are clustered on schools. *** p<0.01, ** p<0.05, * p<0.1

Table 13. OLS and IV regressions for academies converted in 2012.
Sample of FSM eligible and SEN students

| Exposure to MAT: | Math points | | | English points | | |
|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| <i>Panel A. OLS</i> | | | | | | |
| 1 year | 4.094*** (0.900) | 5.731*** (0.905) | 2.216** (0.980) | 2.222*** (0.426) | 2.965*** (0.421) | 1.046** (0.465) |
| 2 years | 2.934*** (1.114) | 5.014*** (1.099) | 4.901*** (1.181) | 1.001** (0.444) | 1.977*** (0.429) | 1.337*** (0.473) |
| 3 years | -0.455 (1.341) | 2.151 (1.324) | 2.999** (1.333) | -0.787 (0.563) | 0.393 (0.537) | 1.285** (0.543) |
| <i>Panel A. 2SLS</i> | | | | | | |
| 1 year | 3.876*** (0.994) | 5.466*** (0.997) | 2.349** (1.140) | 1.949*** (0.476) | 2.602*** (0.471) | 0.871 (0.572) |
| 2 years | 1.894 (1.201) | 3.945*** (1.216) | 4.701*** (1.327) | 0.304 (0.494) | 1.219** (0.482) | 1.162** (0.543) |
| 3 years | -0.685 (1.458) | 1.842 (1.492) | 5.012*** (1.539) | -1.273** (0.647) | -0.188 (0.632) | 2.254*** (0.654) |
| Observations | 25,679 | 25,679 | 25,679 | 25,430 | 25,430 | 25,430 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| School FE | No | Yes | Yes | No | Yes | Yes |
| Year FE | No | No | Yes | No | No | Yes |

Note. The table shows OLS (Panel A) and 2SLS regressions (Panel B) of KS2 math scores (column (1) to (3)) and English scores (column (4) to (6)) on indicator variables for years of exposure to a MAT. The sample includes students eligible for free school meals and students with special educational needs. Only schools converted in 2012 are considered. Columns (1) and (4) control for gender, ethnicity, language spoken at home, student's average point score at KS1 and school enrolment. Columns (2) and (5) add school fixed effects; columns (3) and (6) add year fixed effects. Standard errors, shown in brackets, are clustered on schools. *** p<0.01, ** p<0.05, * p<0.1

Table 14. Probability of joining a MAT

| | 5-year lag (1) | 3-year lag (2) |
|---|----------------------|---------------------|
| KS2 English scores | 0.014 (0.010) | 0.003 (0.010) |
| KS2 math scores | 0.001 (0.005) | 0.007 (0.005) |
| KS1 English points | -0.215 (0.164) | -0.347* (0.177) |
| KS1 math points | -0.164 (0.157) | -0.109 (0.158) |
| KS1 Average Point Score | 0.192 (0.241) | 0.204 (0.242) |
| Students eligible for free school meals | -0.007 (0.305) | 0.094 (0.286) |
| White students | -0.244 (0.327) | -0.604 (0.408) |
| Black students | -0.376 (0.557) | 0.127 (0.692) |
| Native students | 0.629 (0.454) | 0.464 (0.493) |
| Students with special educational needs | 0.220 (0.211) | 0.008 (0.199) |
| Community school | 0.264*** (0.082) | 0.238*** (0.078) |
| Voluntary Controlled school | 0.222** (0.109) | 0.187* (0.106) |
| Voluntary Aided school | 0.123 (0.095) | 0.075 (0.090) |
| KS2 grade enrolment | -0.008*** (0.003) | -0.005* (0.003) |
| Number of schools | 366 | 366 |
| Observations | 366 | 366 |

Note. The table shows regressions of an indicator variable taking value one for schools that joined a MAT on changes in student and school characteristics. The time period considered is 2005-2010. In columns (1) changes are computed over 5 years (2010-2005), and in column (2) over 3 years (2010-2007). Standard errors, shown in brackets, are clustered on schools. *** p<0.01, ** p<0.05, * p<0.1

Table 15. Proportion of academies making changes

| | Proportion of MATs (1) | Proportion of SATs (2) |
|--|---------------------------|---------------------------|
| Procured services that were previously provided by the Local Authority | 82% | 89% |
| Introduced savings in back-office functions | 77% | 70% |
| Reconstituted their governing body | 72% | 57% |
| Changed the performance management system for teachers | 43% | 48% |
| Changed the pattern of capital expenditure | 42% | 57% |
| Changed school leadership | 40% | 42% |
| Changed the curriculum | 28% | 58% |
| Added non-teaching positions | 24% | 54% |
| Introduced or increased revenue-generating activities | 19% | 47% |
| Changed staff pay structures | 19% | 29% |
| Changed your admission criteria | 15% | 26% |
| Hired teachers without qualified teacher status (QTS) | 9% | 28% |
| Increased the planned admission number | 7% | 30% |
| Changed the length of school terms | 6% | 11% |
| Sought to attract pupils from a different geographical area | 4% | 15% |
| Increased the length of the school day | 4% | 8% |

Note. The table presents the type of changes made by academies. For every change, column (1) shows the proportion of MATs that introduced the change; column (2) shows the proportion of SATs. The sample of respondents contains 267 MATs and 435 SATs, both primary and secondary. Source: Academy trust survey 2017.

Table 16. Most important change available to MATs and SATs

| | Proportion of MATs | Proportion of SATs |
|---|--------------------|--------------------|
| Introducing savings in back-office functions (e.g. HR, ICT, insurance, legal and payroll) | 28% | 10% |
| Changing school leadership | 25% | 4% |
| Reconstituting their governing body | 13% | 4% |
| Procuring services that were previously provided by the Local Authority | 11% | 27% |
| Changing the curriculum | 10% | 24% |
| Changing the performance management system for teachers | 4% | 2% |
| Changing the pattern of capital expenditure | 3% | 8% |
| Changing staff pay structures | 1% | 1% |
| Introducing or increased revenue-generating activities | 1% | 6% |
| Changing your admission criteria | 1% | 2% |
| Increasing the number of pupils on roll | 1% | 8% |
| Hiring teachers without qualified teacher status (QTS) | 1% | 1% |
| Seeking to attract pupils from a different geographical area | 0% | 1% |

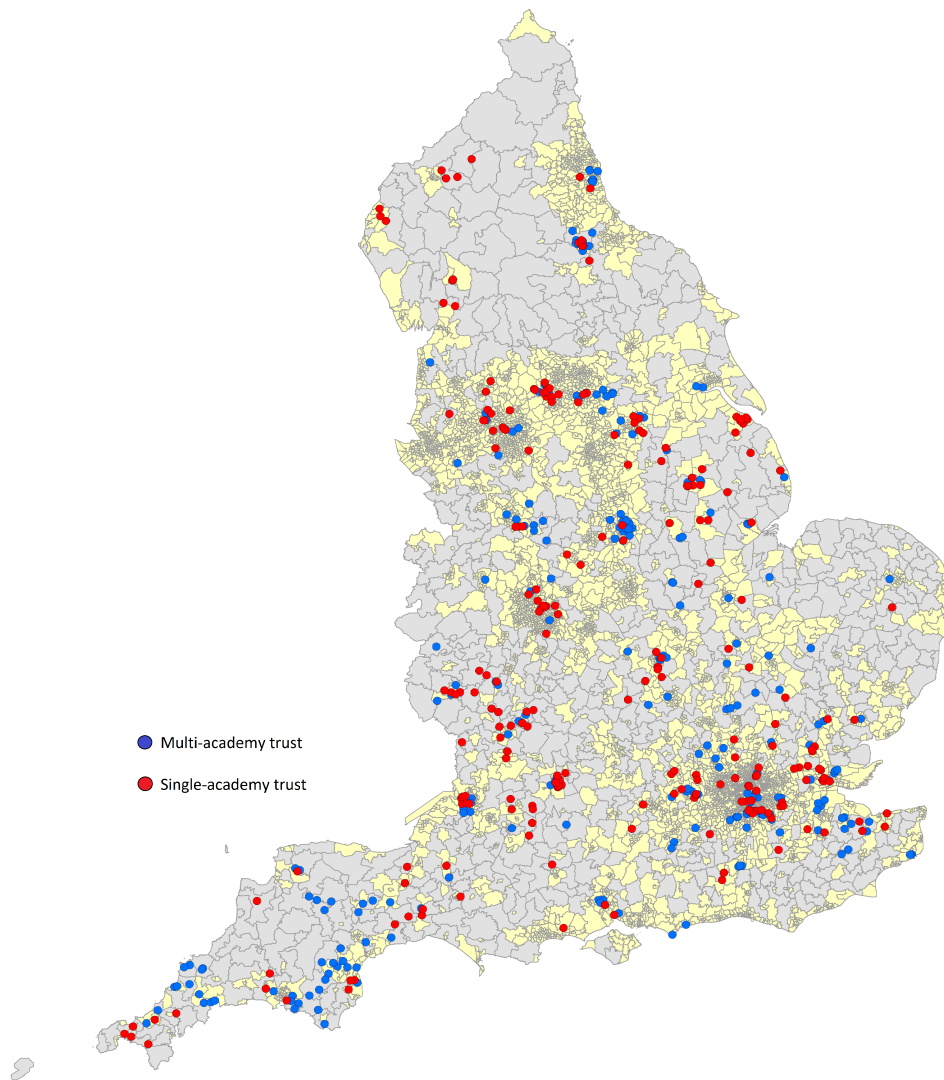
Note. The table presents the most important change that MATs (column (1)) and SATs (column (2)) had the opportunity to undertake after conversion. The sample of respondents contains 267 MATs and 436 SATs, both primary and secondary. Source: Academy trust survey 2017.

Table 17. Ways to facilitate collaboration within a MAT

| | Proportion of MATs (1) |
|--|---------------------------|
| Partnership/collaboration/efficiencies incl. internal and external collaboration | 44% |
| Support/improvement | 35% |
| Assessment/moderation incl. cross phase moderation | 25% |
| Continuing Professional Development (CDP) | 18% |
| Leadership and management development | 14% |
| Staffing/recruitment incl. staff circulation, sharing | 14% |
| Training/development opportunities incl. meeting, events | 12% |
| Good/best practices | 9% |
| Curriculum development | 8% |
| Planning/strategies incl. joint planning | 7% |
| Policies/protocols | 3% |

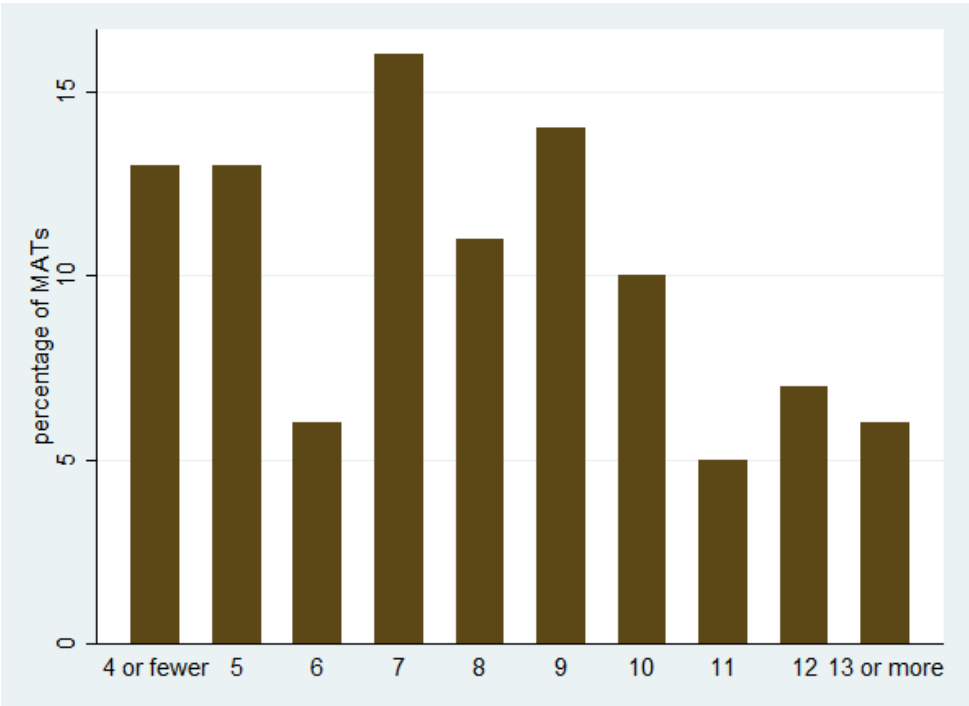
Note. The table presents different ways of fostering collaboration within multi-academy trusts. Column (1) shows the proportion of MATs engaging in each particular practice. The sample of respondents contains 256 MATs, both primary and secondary. Source: Academy trust survey 2017.

Figure 1. Geographical distribution of MATs and SATs



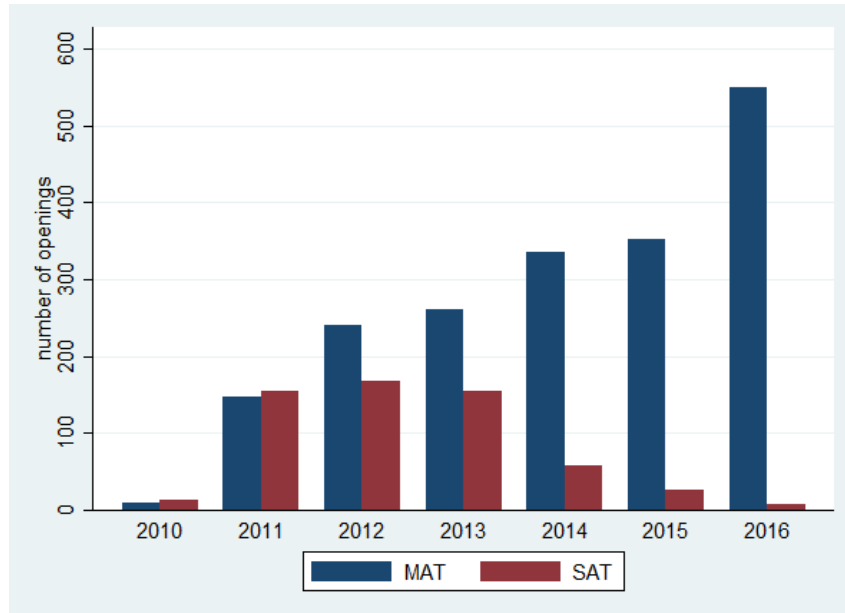
Note The figure shows the geographical distribution of multi-academy trusts (blue dots) and single-academy trusts (red dots) across England. Urban areas are marked in yellow.

Figure 2. Number of members on MAT board

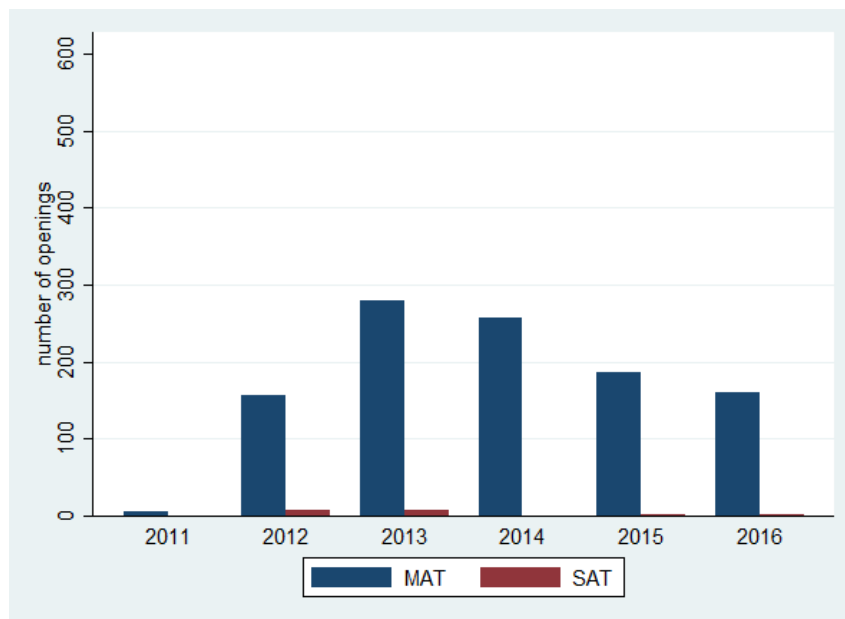


Note The figure shows the fraction of MATs by number of members on the board. The sample of schools who answered the question contains 326 MATs, both primary and secondary. Source: Academy trust survey 2017.

Figure 3. Yearly openings of academies



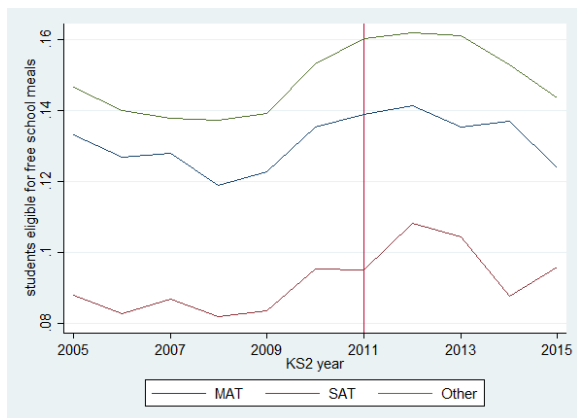
Panel A. Converter Academies



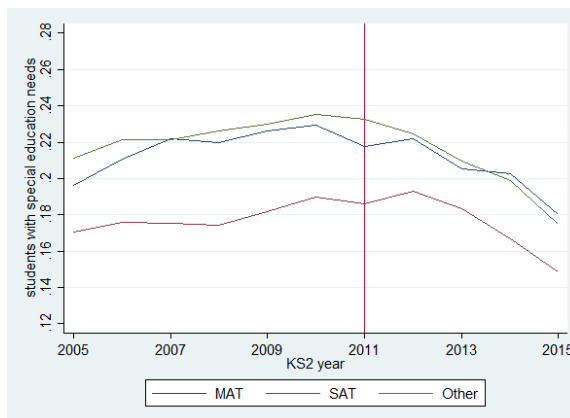
Panel B. Sponsor Led Academies

Note. The figure shows the number of openings of Converter (Panel A) and Sponsor Led (Panel B) academies by year of opening and academy status (MAT or SAT).

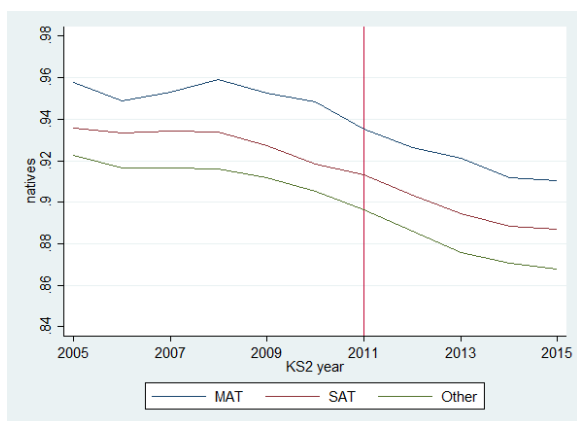
Figure 4. Student and School Characteristics for 2011 Academies



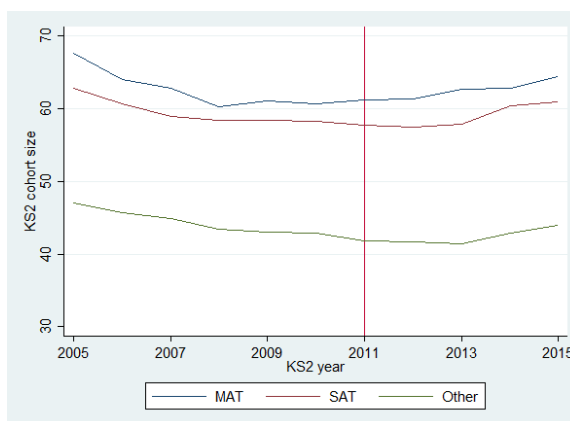
Panel A. Free school meals eligible



Panel B. Students with SEN



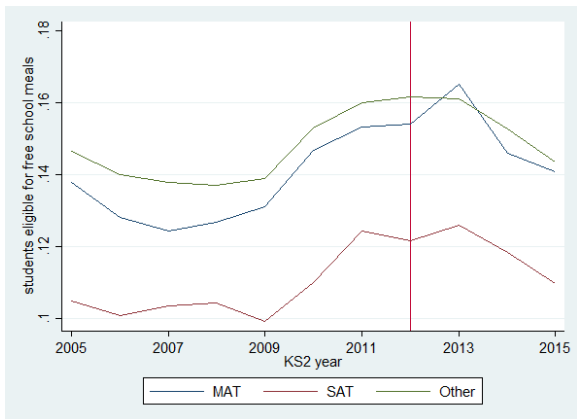
Panel C. English as first language



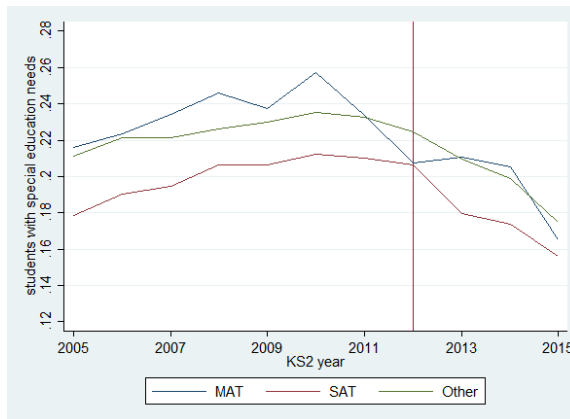
Panel D. School enrolment

Note. The figure shows student and school characteristics from 2005 to 2015 for multi-academy trusts (blue line), single-academy trusts (red line) and school that are not academies (green line). Only schools converted in 2011 are considered. The red vertical line denotes the year of conversion. Panel A shows the fraction of students eligible for free school meals at the end of primary school; Panel B and C show the fraction of students with special educational needs and whose first language spoken at home is English respectively; Panel D shows KS2 grade enrolment.

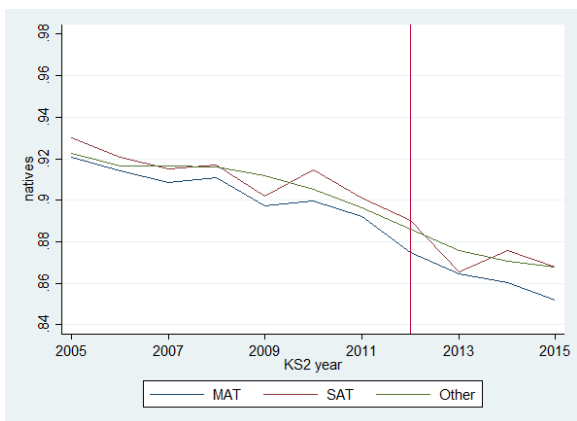
Figure 5. Student and School Characteristics for 2012 Academies



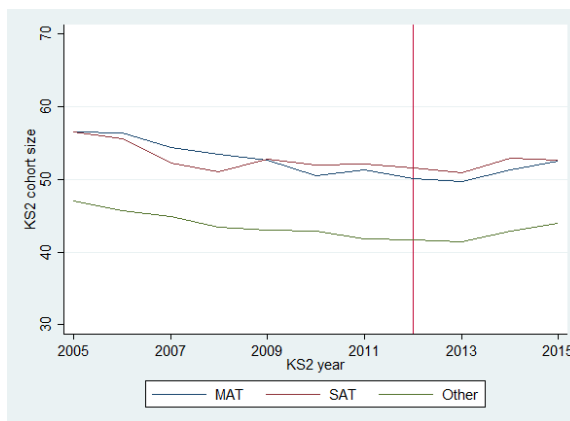
Panel A. Free school meals eligible



Panel B. Students with SEN



Panel C. English as first language

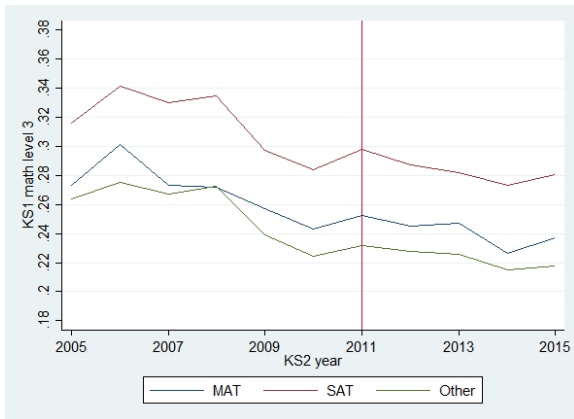


Panel D. School enrolment

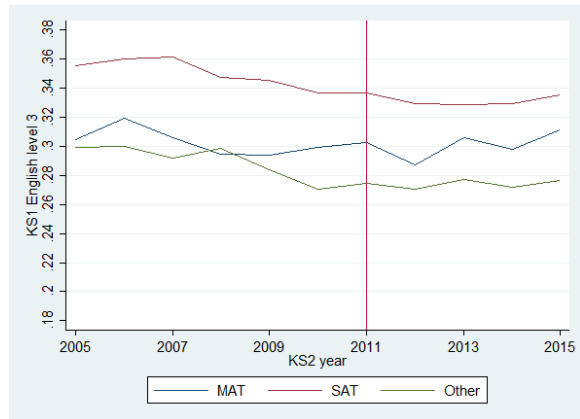
Note. The figure shows student and school characteristics from 2005 to 2015 for multi-academy trusts (blue line), single-academy trusts (red line) and school that are not academies (green line). Only schools converted in 2012 are considered. The red vertical line denotes the year of conversion. Panel A shows the fraction of students eligible for free school meals at the end of primary school; Panel B and C show the fraction of students with special educational needs and whose first language spoken at home is English respectively; Panel D shows KS2 grade enrolment.

Figure 6. KS1 Teacher Assessments

A. 2011 Academies

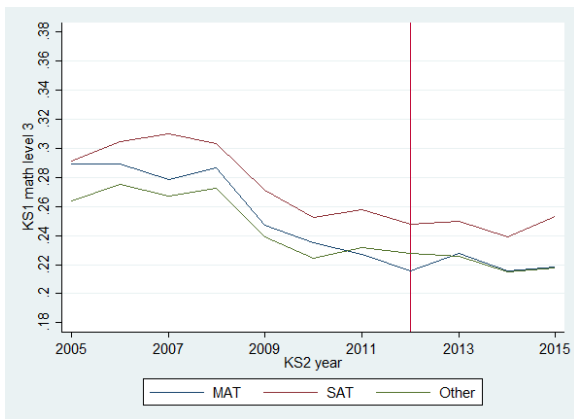


Panel 1. Math Level 3

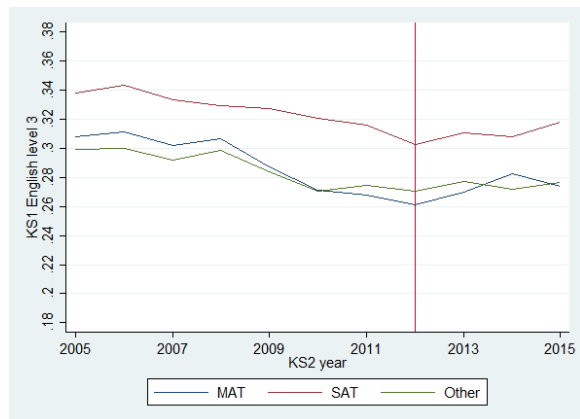


Panel 2. English Level 3

B. 2012 Academies



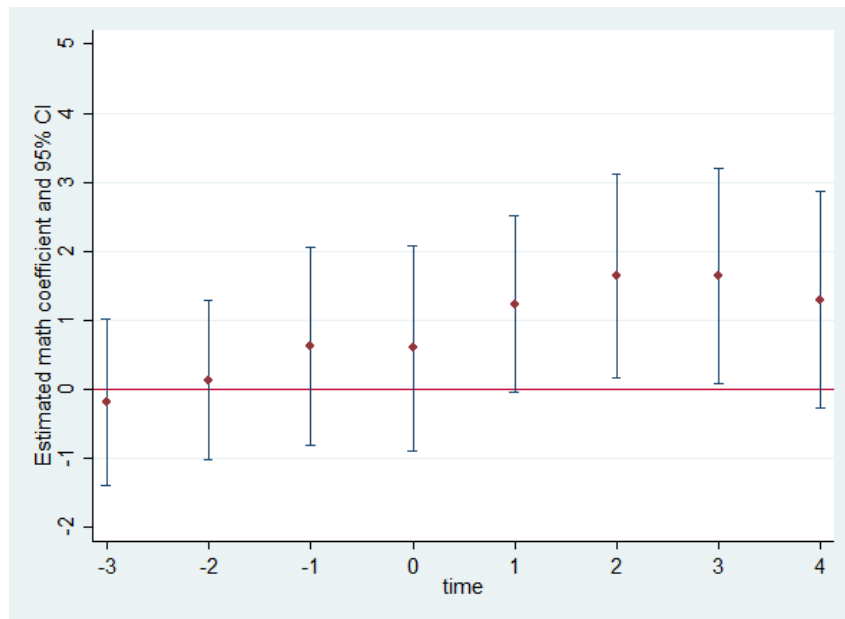
Panel 1. Math Level 3



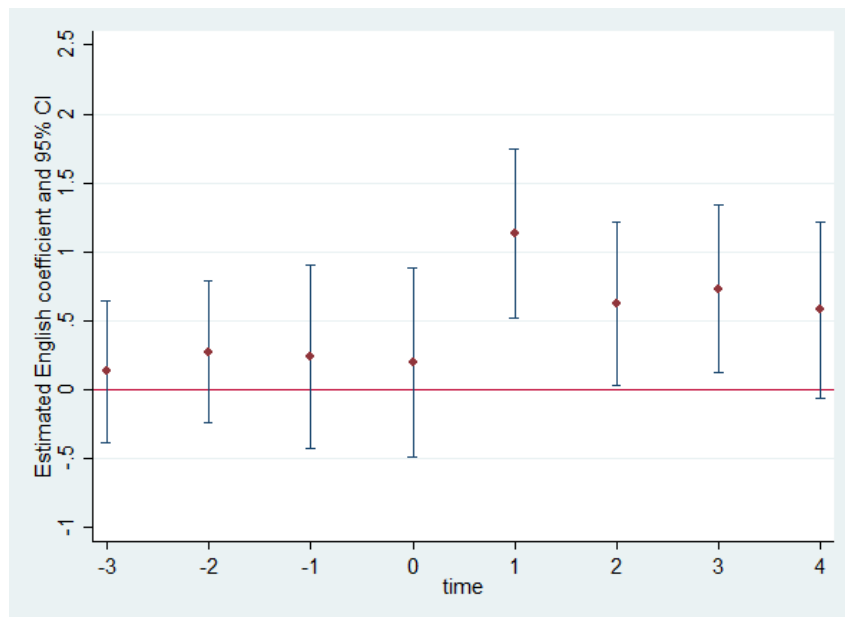
Panel 2. English Level 3

Note. The figure shows KS1 scores from 2005 to 2015 for multi-academy trusts (blue line), single-academy trusts (red line) and school that are not academies (green line). Panel A and Panel B show KS1 scores for schools converted in 2011 and 2012 respectively. The red vertical line denotes the year of conversion. Figure 1 in each Panel shows the fraction of students awarded Level 3 in math in KS1 teacher assessments; Figure 2 in each Panel shows instead the fraction of students awarded Level 3 in English.

Figure 7. Event Study: Converter Academies in 2011



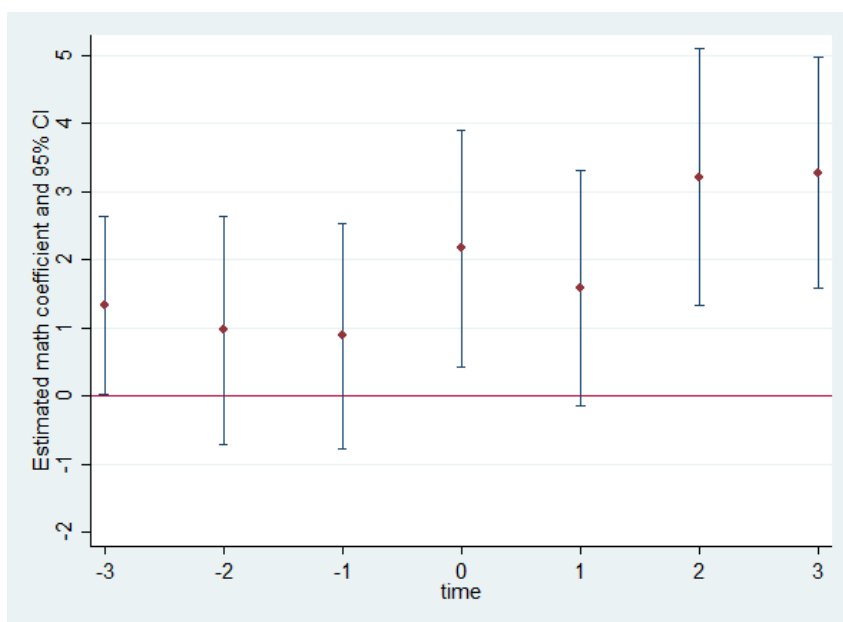
Panel A. Math



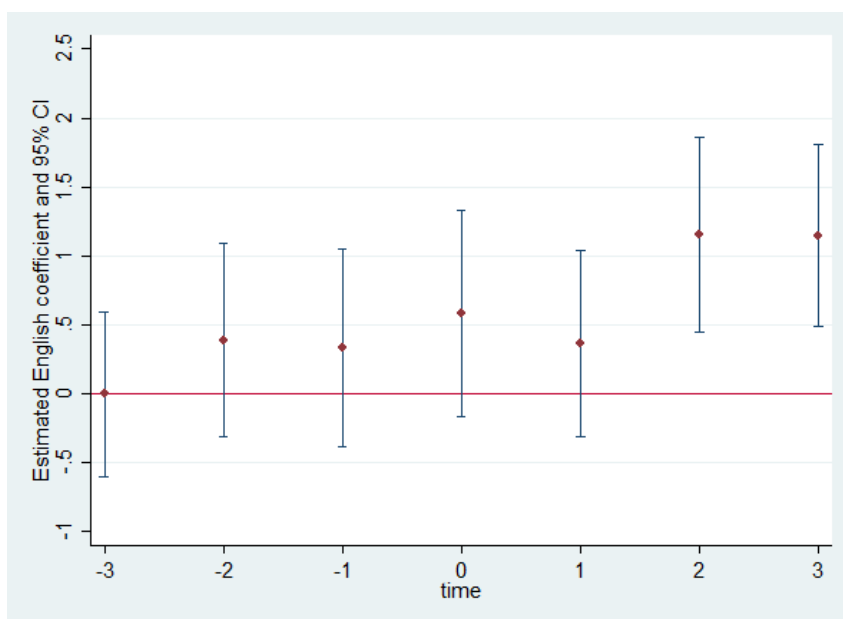
Panel B. English

Note. The figure plots the event study for math (Panel A) and English (Panel B). The coefficients are estimates from a reduced form regression of KS2 scores on predicted years of exposure. For each coefficient, the 95% confidence interval is shown. The treatment year is shifted back to 2007, four years before the actual year of conversion, which is set to zero. Only academies converted in 2011 are included in the sample.

Figure 8. Event Study Converter Academies in 2012



Panel A. Math



Panel B. English

Note. The figure plots the event study for math (Panel A) and English (Panel B). The coefficients are estimates from a reduced form regression of KS2 scores on predicted years of exposure. For each coefficient, the 95% confidence interval is shown. The treatment year is shifted back to 2008, four years before the actual year of conversion, which is set to zero. Only academies converted in 2012 are included in the sample.

School of Economics and Finance



This working paper has been produced by
the School of Economics and Finance at
Queen Mary University of London

8deng\]i`Æ¹ %&-`AdgZcod`CZgY`
: ahWZiiVEVh`c^Væg\]ihgZhZgkZY

School of Economics and Finance
Queen Mary University of London
Mile End Road
London E1 4NS
Tel: +44 (0)20 7882 7356
Fax: +44 (0)20 8983 3580
Web: www.econ.qmul.ac.uk/research/workingpapers/