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Are England's Academies More Inclusive or More 'Exclusive'? The Impact of Institutional Change on the Pupil Profile of Schools

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Executive Summary

State sector education policy in England aims to deliver raised standards of attainment and equality of educational opportunity by offering fair access to schools for all pupils from any background. During the lifetime of the previous Labour government (May 1997 to April 2010) a key policy tool used to tackle entrenched low levels of academic performance among state secondary schools in areas of decline has been the school renewal initiative of the Academies Programme. This scheme was first announced in March 2000 and came into operation in public sector secondary schools from September 2002, with the opening of 3 renewed schools in that year. By end-April 2010, a total of 203 Academies had been established.

In its original form, the Academies Programme has involved the rejuvenation of a failing secondary school through giving a private sponsor the flexibility to adopt innovative approaches in the running of the rebuilt and rebranded institution. Additionally, Academies have acquired an independent status which grants them autonomy from the local authority control characteristic of most state secondary schools. From the outset, the aims of the initiative have been: (1) to drive up overall standards of school performance, including raising the achievement and aspirations of underprivileged pupils in deprived areas; (2) to enhance local choice and diversity in the provision of state schooling through offering new techniques of education delivery; and (3) to feature a more inclusive and mixed-ability background of pupils within the Academy school.

In this paper the effectiveness of the Academies model of school improvement through institutional transformation is assessed with specific reference to whether the scheme has been capable of delivering inclusive access for disadvantaged pupils in poor areas (aim (3)). Empirical evaluation looks at how the pupil profile of Academies changed once they opened under their renewed school type. Pupil-level data contained in the National Pupil Database and school-level data derived from various sources is used to consider (i) how the academic quality and composition of pupils entering year 7 of Academies and (ii) how the whole school composition of Academies have differed from both those in their predecessor versions and in similar schools that did not convert to Academy status. The methodological approach taken is that of a difference-in-differences analysis applied to a sample consisting of 33 Academy schools (five cohorts) and 326 non-Academy schools over an 11 year period of available data, 1997 to 2007.

Results indicate that the Academies Programme is failing some disadvantaged pupils, precisely the group the original scheme has aimed to cater for. Academy conversion is associated with a school performance-favouring change in the pupil profile of these institutions, an outcome that is in direct contrast to objective (3). Key findings are:-

- There is an immediate jump up in the academic quality of pupils entering year 7 of the Academies sample once the policy comes into effect. Academies admit pupils into year 7 with a Key Stage 2 end-of-primary-school attainment record that is 2.409 total points higher on average. This is a statistically significant and robustly identified finding that remains even after accounting for a potentially larger pupil capacity in Academies.

- There is some evidence to suggest that the entry of higher ability pupils to Academies has been made possible by a reduction in intake numbers at the lower end of the attainment distribution. Evaluation shows that once schools converted into Academies they reduced their intake ability dispersion by 0.514 standard deviation units, implying that the attainment profile of pupils entering these schools reflects a more 'exclusive' intake.

- Intake into Academies has consisted of a lower proportion of pupils from relatively deprived backgrounds, measured by those who are eligible for free school meals. In the Academy years the average percentage of free school meal eligible pupils in year 7 fell by 5.563 percentage points to 38.61% (a drop of 12.59%). Again this finding is statistically significant and remains even after controlling for school size changes in Academies.

Taken together, these results suggest that the Labour government's programme of school conversion into an Academy has featured a relative rise in stratification within the schooling system compared to that which went before, implying a worsening of education inequality. Since the Coalition party came into power in May 2010 there has been a marked shift in the direction and core focus of the Academies Programme. All state primary, secondary and special schools throughout England can now convert to Academy status, while secondary schools with outstanding pupil performance in age-16 tests have been able to gain priority fast-track conversion. The outcomes of the original policy indicate the consequences of this revised version. Aspects like independence from local authority control coupled with a continued pursuit of academic excellence may encourage newer Academies to adapt their admissions towards a more homogeneous and advantageous pupil intake, a fragmented situation that would further reduce fairness in access to schools, lowering potential attainment and educational opportunity among disadvantaged pupils in particular.

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Acknowledgments

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1 Introduction

State sector education policy in England aims to deliver raised standards of attainment and equality of educational opportunity through offering *fair access* to schools for all pupils irrespective of their background and geographical location. The 1988 Education Reform Act lay the foundations for the formation of a quasi-market in the provision of state education, by giving pupils the possibility of choosing the school attended and allowing a scheme of competition between schools for pupils to be established as means for developing higher achievement and more equal access. The Act also implemented long-term changes in the way the education budget is transferred to schools in order to grant institutions more autonomy over their financial operations. Self-management was put in place through enabling the governing bodies of individual schools to receive their annual revenue funding direct from central government as opposed to through usual Local Education Authority (LEA) administration (Machin and Vignoles, 2005). At the same time a system of pupil-led funding began to evolve, in which the monies passed on to maintained schools have been made to more closely take account of the background circumstances and quantity of their pupil base, under a 'fair funding formula' determined by the LEA (West and Pennell, 1997; Sibieta *et al.*, 2008).

During the lifetime of the former Labour government (May 1997 to April 2010) per-pupil spending in the state schools sector rose by 6.4 per cent per year net of inflation, while overall expenditure on publicly-provided education saw real term increases averaging about 4.3 per cent per year from 2000 (Holmlund *et al.*, 2009; Sibieta *et al.*, 2008). Despite this rise in the real value of education funding – coupled with increasing school budgetary control and policies that sought to generate market-like competition – the education policy stance of the previous ruling party involved tackling the existence of a persistent tail of underperforming state secondary schools at the bottom end of the attainment distribution. In their 1997 election manifesto, Labour launched an attack on low state school standards, adopting a "zero tolerance of underperformance" approach to dealing with the issue (Labour Party, 1997). Historically, low-attaining secondary schools have featured heavily in deprived areas and are largely responsible for providing education to pupils characterised by social and economic disadvantage. Sustained failure in schools at the secondary education phase maintains the problem of education inequality and the

presence of a pool of 'hard-to-reach' pupils whose situation of deprivation and disadvantage continues into adulthood (Machin and Vignoles, 2005; Machin *et al.*, 2007).

As part of a strategy to improve school standards, policy initiatives revolving around institutional change as a means for school renewal have been instigated since 1997, following the introduction of Fresh Start schools[1]. One particular high-profile scheme that was announced by the Labour government in March 2000 and came into operation in state secondary schools from September 2002 is that of the Academies programme. In its original form, this initiative involved the rejuvenation of a *failing* secondary school in an area of disadvantage through delegation of school control to a private sponsor. The Academy sponsor has the flexibility to adopt innovative approaches in the running of the school (initially this was in return for a committed financial contribution), in an attempt at reforming the school into a viably competitive education provider. Crucially, Academy schools are granted exemption from the LEA control that is characteristic of most state secondary schools and they instead have acquired an independent status. As a result they have a greater degree of input associated with determining facets of their functioning, including their staffing, subject teaching, and admissions rules, particularly those applied when there is above-capacity demand for entry to the school – subject to compliance with the legal requirements of the School Admissions Code. On the whole the scheme has sought to achieve three main aims from its outset: (1) to drive up overall standards of school performance, including raising the achievement and aspirations of underprivileged pupils in deprived areas; (2) to enhance local choice and diversity in the provision of state schooling through the use of new techniques of education delivery; and (3) to feature a more inclusive and mixed-ability background of pupils within the Academy school. By end-April 2010, a total of 203 Academies had been established (Machin and Vernoit, 2010a), with plans to extend their coverage to 15 per cent of secondary school education provision by 2015[2]. The scheme had received a greater

[1] The Fresh Start initiative was first introduced by the Labour government in 1997 in the White Paper *Excellence in Schools* as part of the school improvement policy agenda. It was applied to underperforming schools – those classified as being in 'special measures' – from 1998 onwards. More specifically, "where schools over three consecutive years failed to get 5 good GCSE [General Certificate of Secondary Education] passes for at least 15 per cent of their pupils, they would be considered for a Fresh Start" (DfES, 2000). Very often it acted as a last resort for failing schools often characterised by a high fraction of pupils from low socio-economic backgrounds with lower-than-average academic outcomes. The policy involved the closure of a failing school, the employment of new school staff and the development of a renewed school ethos, plus either a complete refurbishment of the physical plant of the school or the continued use of existing school buildings. The initiative was partially modelled on the American schools model of 'Reconstitution', under which failing schools were started from afresh with new staff, new leadership and a new curriculum (Matthews and Kinchington, 2006). In total, only 37 Fresh Start schools were established in England by 2008 (Hansard, 2008d). From their inception Academy schools were hailed as a "new approach", bringing "a radical new edge to the Fresh Start initiative – strengthening the programme designed to turn failure into school improvement" (DfES, 2000) (see also Wilson, 2009 for further details).

[2] The Academies scheme initially came with a government target of 200 Academy schools to be either fully open or in the pipeline by 2010, 60 of which were to be in London (DfES, 2004, pp. 9, paragraph 6). In November 2006 this

platform of significance following Labour's announcement of the National Challenge in 2008, a new target system of achievement requiring all schools to have at least 30 per cent of their pupils attaining five or more A*-C General Certificates of Secondary Education, or GCSEs (including English and Maths) by 2011. Under this initiative all such weak schools were to be given the option to convert to an Academy school (DCSF, 2008; Curtis *et al.*, 2008).

In this paper the effectiveness of institutional transformation in the form of the original Academies model is assessed with specific reference to whether the scheme has been capable of delivering inclusive access to the renewed school for pupils in disadvantaged areas (aim (3)), in light of the requirement of these schools to raise educational standards of attainment (aim (1))[3]. School reconstitution can be expected to positively affect the schooling and life chances of pupils if it results in the provision of better quality education and more schooling options for all at the expense of none. On the other hand school improvement initiatives that result in increased stratification along the lines of pupil ability and pupil characteristics will worsen education inequality. The Academies programme of the Labour government is of particular significance in this respect as the popularity of these schools increased during their time in power, with applications for places frequently exceeding school capacity, suggesting that as these new types of schools re-established themselves they may have been more able to 'cherry pick' pupils to enter the school from the pool of applicants. More specifically, Academies may have pursued a more favourable intake and composition of pupils beginning their secondary phase of education, with a school-performance-enhancing slant towards entry by those of higher prior ability and from a relatively better-off family background, to the detriment of less well-off and academically weaker pupils comprising their conventional admissions type. Equally, the renewed institutions may have aimed to acquire an improved pupil composition within the school as a whole in order to secure and maintain a stronger record of performance at the expense of wide-ranging inclusion. Such outcomes call into question the capability of a scheme that has sought to offer school improvement to a target group, through increased access to potentially better quality schooling, to bring about change to that audience. In turn these outcomes produce uncertainty over the extent to which the initiative has been able to achieve both its specific objective of greater inclusion and

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was doubled to 400 Academies that had been predicted as being established by 2015 (HC, 2008; Rogers and Migniuolo, 2007). Labour projected that the number of state secondary schools in the system would be 2,659 by the academic year 2014-2015 (HC, 2008).

[3] All details presented in this paper are from the 'Key Concepts: School Choice and School Improvement' section and Part II (chapters three to five) of the author's PhD thesis. This was submitted in September 2009, the viva examination was passed in December 2009 and the final thesis was completed and submitted in March 2010 (see Wilson, 2009).

the more general education policy aims of raising standards of academic attainment and reducing education inequality.

Delivery on goal (3) of Labour's Academies programme is evaluated here by looking at how the pupil profile of Academy schools changed once they opened under their renewed school type. In this respect, pupil-level data contained in the National Pupil Database and school-level data derived from various sources is used to consider (i) how the academic quality and composition of pupils entering year 7 of Academy schools has differed from both that in their predecessor versions and in other similar schools that did not convert to Academy status; and (ii) how the whole school composition of Academies has differed from that in their pre-Academy versions and in comparison schools. The methodological approach to empirical evaluation is that of a difference-in-differences analysis applied to a sample of Academy and non-Academy schools over an 11 year period of available data, 1997 to 2007. Findings reveal an immediate jump up in the academic quality of pupils entering year 7 of the Academies sample once the policy comes into effect. There is some evidence to suggest that entry into Academies of higher ability pupils has occurred to the detriment of academically weaker pupils. Furthermore, intake into Academies has consisted of a lower proportion of pupils from relatively worse-off backgrounds. These results indicate unequal access to the renewed schools for pupils from deprived backgrounds with a lower historical education performance, thereby suggesting that the renewed schools have failed in their delivery of goal (3) and are more 'exclusive' post-policy. Thus the Labour government's programme of school conversion into an Academy seems to have featured a relative rise in stratification within the schooling system compared to that which went before, implying a worsening of education inequality.

A potentially more stratified education system resulting from the original Academies model also presents a plausible negative outcome arising from the version of this model recently developed by the Coalition party. The general elections of May 2010 saw the replacement of the ruling Labour party with a Coalition government (comprising of Conservatives and Liberal Democrats), whose education policy has been marked by a significant shift in the direction and focus of the Academy schools programme, details of which are contained in the Academies Act 2010[4]. As is the case for existing Academies, the Act allows institutions subscribing to the scheme to be

[4] Details of the Coalition's Academies Act can be found on the Department for Education (DfE) website (accessed 25 February 2011): http://www.education.gov.uk/schools/leadership/typesofschools/academies/a0061222/academies-act-2010. Note that the Coalition government established the DfE in May 2010. This replaces the Department for Education and Skills (DfES) and the Department for Children, Schools and Families (DCSF), both of which were names given to the central government education department when the Labour party was in power, the former in the time of Tony Blair and the latter when Gordon Brown took over party leadership in June 2007.

autonomous from local authority control, enabling greater operational independence. However, the new policy has also witnessed a major extension that has taken its scope of coverage in all directions, with a particular initial emphasis on status change among schools at the upper end of the attainment distribution. Specifically, the Act has put in place the legislative groundwork for all state primary, secondary and special schools throughout England to convert to Academy status. Secondary schools deemed to be *outstanding* in terms of the performance of their pupils in age-16 examinations (GCSEs) have been able to gain priority fast-track conversion status. At the same time, these outperforming institutions are required to enter into partnerships with weaker-attaining maintained secondary schools in their area in order to help boost their standards. Thus, while the policy caters to some degree for the tail-end of public sector secondary schools, it places the majority of immediate emphasis on Academy conversion among high-achieving state schools in this phase of education, so that overall the vastly revised initiative represents a momentous divergence from the original programme that had at its core a focus on improvement among failing secondary schools in particular and the underprivileged pupils in areas of decline who typically attend these schools[5]. Aspects such as independence from local authority control coupled with a continued pursuit of academic excellence may encourage newer Academies to adapt their admissions towards a more homogeneous and advantageous pupil intake, a fragmented situation that would produce less fairness in access to schools, lowering potential attainment and educational opportunity among disadvantaged pupils. Thus findings from the analysis presented here have implications for education policy that go well beyond those attributable to the original form of this school renewal initiative, mattering also for the latest take on this scheme by indicating one possible dimension of its likely consequences.

The outline of the rest of this paper is as follows: Section 2 presents a short history of the Academies programme and outlines the key features of Academy schools. The objectives of the scheme since its inception are also set out, while the capacity of the initiative to have achieved one of its key aims of inclusion is discussed as a motivation behind empirical evaluation. Additionally, evidence on what is known about the effectiveness of the programme so far is presented here, focussing on standards of age 16 examination attainment in Academy schools.

Section 3 sets the scene for the empirical focus on the effectiveness of school improvement. Details on the Academies that opened between the academic years 2002/03 and 2006/07 are

[5] The Academies of the Coalition government aim to improve standards for all pupils, to narrow the education inequality gap, and to provide world class schools – see http://www.bbc.co.uk/news/10161371 (accessed 25 February 2011).

presented, where these schools form the five cohorts for assessment. Then the data to be analysed in this paper is introduced and explored, with the main data source being the National Pupil Database, indicators from which are combined with those in school-level data files. The dataset construction section includes the procedure behind the formation of a balanced panel of observations used to analyse intake composition changes in state secondary schools over 2001/02 to 2006/07 and intake quality and whole school composition patterns over the 11 year window of 1996/97 to 2006/07. Further to this comes a description of the empirical strategy employed – that of difference-in-differences regression estimation combined with propensity score evaluation. This approach enables estimation of an 'Academy effect' on intake and composition changes to be determined and compared to both changes in predecessor schools and also those in a set of control schools contained within an identified region of common support.

Section 4 includes the main results from statistical regression analysis. Empirical findings on KS2 intake quality changes in Academy schools relative to comparison groups are laid out. A host of robustness checks are presented, which explore whether the estimated post-conversion jump up in intake quality captures the actual policy effect. The notion of heterogeneous responses to the policy by the Academy cohort is then examined through a series of dynamic effect model specifications. Further to this, the possible mechanisms driving the change to intake quality are looked at, and evidence on changes in the dispersion of intake is put forward. Section 5 assesses other dimensions of compositional variation in Academies relative to predecessors and non-Academies, including changes in the proportion of pupils admitted to the renewed schools who are eligible for free school meals. Finally, Section 6 concludes with a summary and discussion of the work presented in this paper, in which some thoughts are offered on the effectiveness of this scheme of institutional change in enhancing equality in educational opportunity through fair access. Furthermore, the implications of the results from evaluation are considered in light of the significant changes made to the Academies Programme by the Coalition government.

2 Labour's Academies Programme: Structure, Aims and Effectiveness

Brief history

As is the case for many of the more recent education policy initiatives, the legislative origins of the Academies programme lie in the 1988 Education Reform Act. It was in this Act that a new type of state secondary school, the City Technology College (CTC) was introduced. These non-fee-charging institutions represented the very first type of specialist school of their kind as they were particularly oriented towards teaching the subject of technology. CTCs combined autonomy from LEA control with a path-breaking initial implementation of public-private collaboration in state education, involving as they did business or voluntary sector sponsorship (Astle and Ryan, 2008). CTCs provided the initial legislative framework for the introduction of Academies, which were first launched onto the secondary schools arena by the then Labour government in March 2000 in a speech on transforming the secondary phase of education, given by the former Secretary of State for Education, David Blunkett[6]. The first three Academy schools officially opened early on in the 2002/2003 academic year and over time the scheme witnessed steady growth followed by a flourish of heightened activity prior to the change in government in May 2010. Academies, like CTCs, were originally described as "independent state schools" (Curtis *et al.*, 2008, pp. 22, in reference to the then Prime Minister, Tony Blair). The key features of these distinctive institutions that led to this term are set out below, and are compared to those of traditional state secondary schools.

Key features

(i) Autonomy – In contrast to other state schools, Labour's Academies were set up so as to be fully managed by their governing body and they remain independent from LEA control[7]. As a result the LEA has no direct funding link to these Academies as it does for all maintained schools

[6] The actual legislation for the formation of Academies is contained in the 2000 Learning and Skills Act (Astle and Ryan, 2008).

[7] As has been the case for CTCs, Academy school independence has not meant that parents of pupils attending these renewed schools have had to pay fees, since Academies are in the state schooling sector, where education provision is free. Instead fee-charging occurs within private schools in England, independently-run institutions that are autonomous from any form of state control.

in its jurisdiction. Instead Academy funding is channelled straight from central government as a block grant, an aspect that can reduce transaction costs in their financial management, with the resultant savings said to enable higher per pupil funding and teacher salaries (Gadkowski, 2007).

(ii) Governance – Under the original scheme, conversion to Academy status led to the governing body of the school being created afresh. Small in size, there are anywhere between 6 to 16 governors on the board of the established schools, though it is common to have 13 members, the majority of whom (usually around seven) were appointed by the Academy sponsor upon conversion, subject to approval by the central government education department (Astle and Ryan, 2008)[8]. Stakeholder governors have featured heavily on the governing body so that sponsor representatives have been able to "determine the ethos and leadership of the academy, and ensure clear responsibility and accountability."[9] Early Academies were not required to appoint elected community or staff representatives to their governing body, nor were they required to have more than one elected parent governor and one LEA representative (Rogers and Migniuolo, 2007). The operations of the governing body are contained within each individual Academy's Funding Agreement, legal documentation that was drawn up between the school and the education department of the Labour government (Astle and Ryan, 2008). In comparison, in LEA-controlled schools the governing body comprises of both appointed and elected representatives (Gadkowski, 2007). Of these, Community schools tend to have higher LEA representation; Voluntary-controlled (VC), Voluntary-aided (VA) and Foundation schools with a Foundation contain representatives from the Foundation Body on their governing board (Goodwin, 2007). Hence the governance structure of Academies has given them management autonomy, with the majority sponsor-appointed board of governors largely holding responsibility for steering the operations of the school.

(iii) Sponsorship – Non-governmental sponsorship is a feature of Labour's Academies. Sponsors have originated from a number of different fields such as business, religious organisations, the voluntary and charitable sectors and individual philanthropy. School sponsorship has arisen either through government invitation or otherwise interested parties have independently put themselves forward to get involved in the scheme (Gadkowski, 2007). In earlier versions of the programme, sponsors, in return for a financial contribution to the Academy, entered into a schools partnership with the government, and were granted management control of the school as well as the freedom

[8] See also http://www.standards.dfes.gov.uk/academies/what_are_academies/organisation/?version=1 (accessed 21 August 2008).
[9] See http://www.standards.dcsf.gov.uk/academies/what_are_academies/?version=1 (accessed 21 August 2008).

to shape aspects of the school through the Funding Agreement[10] (see (*iv*) below). Specifically, sponsors have been able to influence factors such as the curriculum, through introducing innovative curriculum practices, and the choice of subject(s) in which the school specialises. They are also able to make their mark in areas like the pupil learning behaviour policy (which includes discipline), governance rules and admissions procedures in the event of place oversubscription (Gadkowski, 2007). In terms of the maintained schools sector, specialist schools are also sponsored, though their LEA control means that the influence of the sponsor is much weaker in comparison to that of Academy school contributors (Curtis *et al.*, 2008).

(iv) Financing and Buildings – Capital financing of Academies was the original means by which an Academy sponsor contributed to the school and justified their permitted input into school functioning. Sponsors put forward the lesser of £2 million or 10 per cent of capital costs towards the development of a new or refurbished Academy school building, payable over the lifetime of the building project. The substantial remaining construction expenses[11] were initially covered by the Labour government through their school capital expenditure scheme that provided finance for the building of 1,100 new schools over a decade spanning 1997 to 2007 (Astle and Ryan, 2008). Subsequent Academy builds have been covered entirely by the Building Schools for the Future (BSF) capital programme, which has provided finance for school constructions undertaken from 2005/06, although under the new government this has since changed[12]. The sponsor's capital contribution was replaced by an endowment fund to go towards expenses that are unrelated to the school build, but more recently Labour had planned to remove the financial contribution requirement altogether so as to facilitate broader sponsorship interest in the scheme[13].

[10] Funding agreements have tended to omit any detailed targets relating to the academic performance of the Academy (Gadkowski, 2007).

[11] The National Audit Office evaluated the cost of 26 out of 27 of the Academy schools that opened between school years 2002/03 and 2005/06 and estimated that Academies had cost around £24 million to build on average, and around £27 million for a completely new build. These figures compare with costs of £20-£22 million for other (non-academy) new secondary schools, representing as much as a near 17% lower cost. (NAO, 2007).

[12] On 5 July 2010 the newly-established Coalition government announced an overhaul in the building programme of England's schools, including an ending of the BSF programme of capital financing (see http://www.education.gov.uk/schools/adminandfinance/schoolscapital/funding/bsf/a0061486/overhaul-to-englands-school-building-programme accessed 18 February 2011).

[13] In July 2006 an endowment model of sponsorship was introduced. Here sponsor proceeds of £2 million would go into a charitable endowment fund, the payment of which was normally expected to be spread over 5 years with an initial fee of £500,000 due in the first year. Disposal of this endowment was to be undertaken by the Academy trust and was to be spent on measures aimed at counteracting "the educational impact of disadvantage and deprivation and/or for educational work within the local community" (Rogers and Migniuolo, 2007, pp. 10). In 2009 the then Labour government announced that *new* Academy sponsors would no longer be required to make a financial contribution to the school, and this was to apply to Academies opening from September 2011 (see http://www.dcsf.gov.uk/pns/DisplayPN.cgi?pn_id=2009_0158 accessed 8 September 2009).

The financing of all non-capital costs relating to Labour's Academy schools has come entirely from central government. They have included an initial start-up grant for books, materials and classroom equipment, where this has been calculated according to the expected pupil capacity in the Academy and is mostly paid during the first year of opening. Academies opening in 2008/09 received an average funding of about £874,000 through this grant. Additionally, Academies have been eligible for a grant to cover transitional costs and financial outlays associated with the process of Academy preparation. This fund is made available over the first two to three years of Academy school opening, or longer if the Academy did not replace any predecessor school(s). For Academies opening in 2008/09 grant awards of this kind averaged around £969,000, but with considerable variation across Academies, some receiving as little as £123,000 and others as much as £3.2 million (Hansard, 2008b).

Coverage of the running costs of the school has come under a "general annual grant" which the Academy received directly from the Secretary of State under Labour. Funding allocated to existing Academies is calculated according to the LEA's funding formula, yet it also includes an additional allowance that is equivalent to the money that the LEA does not usually pass on to maintained schools. This means that Academy school governors, as the administrators of the school's finances, manage a higher proportion of their budget than do LEA-governed schools and it appears that they receive a greater budget overall, factors which give them greater financial freedoms. However the Labour government did state its commitment to reaching parity of funding between Academies and other maintained schools in the same area facing similar circumstances to Academies. The general annual grant has offered further provisions for a per pupil allowance for Academy schools with specialist status, though this is funding which all specialist schools, including maintained specialist schools, are entitled to[14].

(v) Admissions – Independence from the LEA in Academy schools means that the governing body is the admissions authority in these institutions. Details on the admissions policy are contained within the Funding Agreement of each of the established Academies. Where an Academy has replaced a predecessor school or schools, most pupils from the old school(s) have been expected to be given the option of readmission to the Academy school[15]. Since the 2002

[14] See http://www.standards.dcsf.gov.uk/academies/what_are_academies/funding/?version=1 (accessed 21 August 2008). The funding that the LEA withholds from maintained schools reflects expenses that go towards the payment of central services such as Pupil Referral Units (PRUs) and costs associated with SEN provision (Sibieta *et al.*, 2008). LEAs do not control established Academy schools and it is likely that any central services required by the Academy can be paid for directly. Therefore the Academy school share of these withheld funds can go straight into Academies, increasing their budget.

[15] See http://www.standards.dcsf.gov.uk/academies/faq/?version=1#582283 (accessed 21 August 2008).

Education Act, Academies have been able to acquire specialist school status in one or more subjects so that, like maintained specialist schools (of which almost 90 per cent of state secondary schools are), they can reserve up to 10 per cent of their intake for pupils with an aptitude or ability in the school's specialism(s) (Gadkowski, 2007; Astle and Ryan, 2008; Smithers and Robinson, 2009[16]). However, selection of this kind has only been permitted where the school has opted to specialise in particular subjects, namely sports or physical education (PE), the visual arts, the performing arts, modern foreign languages, information technology and design and technology[17]. In practice most specialist schools, including currently active Academies, do not undertake admissions selection based on some indicator of talent in the specialism (Smithers and Robinson, 2009). Gadkowski (2007) reviewed the Funding Agreements of 46 Academies that opened between September 2002 and September 2006 and found that, of these, only 6 operated priority entry to the school according to specialism knowledge. Academy schools were originally described as being "fully inclusive all ability schools" that must comply with the School Admissions Code; under Labour enforcement of this was assigned a responsibility of the Secretary of State for Education[18].

In comparison, in Community and VC schools admissions decisions are in the hands of the LEA, while VA and Foundation schools are, like Academies, their own admissions authority. All LEA-maintained schools are also required to comply with the School Admissions Code, enforcement of which is carried out by the schools adjudicator. While existing Academy schools have only been required to be involved in local admissions forums, Community, VA, VC and Foundation schools must all participate in coordinated admission systems across the LEA (Goodwin, 2007). In the event of oversubscription to the school, Academies, like Foundation and VA schools, have been able to set their own oversubscription admissions conditions and this is done according to ranking categories determined by the Academy sponsor(s). Preferential entry based on measures of proficiency in the school's specialism and place allocation through the grouping of pupils into admissions bands are two commonly identified procedures that can be used alone or conjunctionally (Gadkowski, 2007; Hansard, 2008a).

The two distinct aspects of Labour's Academy schools mentioned here – namely their independence from LEA control and their discretion to set their own admissions arrangements

[16] Between 1994 and 2008 a total of 2,688 out of 3,073 state secondary schools were designated as specialist, representing 87.5% overall (where the figure of 3,073 schools excludes those with a sixth form, CTCs and Academies) (Smithers and Robinson, 2009).
[17] See http://www.standards.dcsf.gov.uk/academies/faq/?version=1#582277 (accessed 21 August 2008).
[18] See http://www.standards.dcsf.gov.uk/academies/what_are_academies/management/?version=1 (accessed 21 August 2008).

within compliance of the legal requirements of the Code[19] – suggest room for variation in intake patterns following school conversion to Academy status. This is because predecessor schools were not organised along these more autonomous lines. These specific features, together with the stated aims of the original Programme (outlined in the 'Aims and Objectives' section below), provide the motivations for comparing the composition of pupils entering these Academy schools with that of pupils entering the predecessor version(s) in particular.

(vi) Staffing – In established Academies appointment of the school principal has been in the hands of the sponsor(s) initially and after that the governing body, while school governors have taken full responsibility for the employment of school staff. In maintained schools there is more LEA involvement in both head teacher and staff appointment, though governor input in these matters takes place in VA and Foundation schools (Goodwin, 2007). Labour's Academy schools have a far greater degree of flexibility over staff employment contracts relative to LEA-controlled schools. The governing body of the Academy is able to authorise any changes to the terms and conditions of employment relating to hired personnel and has ultimate responsibility for the approval of personnel practices concerning matters such as staff development and discipline[20]. Academies have not been required to follow national frameworks relating to staff pay and conditions[21]. However, despite these freedoms, most staff from the predecessor school(s) have been expected to transfer to the new Academy school under the 1981 Transfer of Undertakings (Protection of Employment) or TUPE regulations, in which case their existing terms and conditions of employment are upheld. Otherwise, a common variant of staff terms used by existing Academies has involved lengthening the working day, or year, or both (Rogers and Migniuolo, 2007) Additionally, these Academies have been able to operate performance related pay measures including the payment of bonuses to their staff for good performance; they may

[19] For the sample of Academy schools (as well as their predecessors and non-Academies) analysed here, the applicable School Admissions Codes are those of 1999 and 2003, which cover the admissions period September 2000 to August 2007, after which point the 2007 and 2009 Codes came into effect for September 2007 and September 2009 admissions respectively. The 1999 and 2003 Codes came attached with fewer statutory adherence requirements than subsequent versions: they contained admissions guidelines, which admissions authorities for schools (the LEA or a school's governing body) were only required to "have regard to" (DfES, 2003, pp. 40, paragraph A.1). Thus for the period September 2000 to August 2007 schools who were their own admissions authority had more discretion to decide on who to admit to the school, both under normal conditions and in the event of oversubscription, so long as procedures adopted were not unlawful (West *et al.*, 2009; Wilson, 2009, Chapter One, Section 1.4.1).

[20] See http://www.standards.dcsf.gov.uk/academies/what_are_academies/organisation/?version=1#1576175 (accessed 21 August 2008).

[21] Specifically, Labour's Academies have not had to follow the School Teachers' Pay and Conditions Document (STPCD) or the national framework of service conditions for school teachers in England and Wales, known as the Burgundy book. The STPCD is a legally enforced document that establishes teacher pay scales, rules for promotion and working time, professional tasks, and absence cover conditions, among other issues. The Burgundy book additionally sets out illness pay, maternity pay and notice to leave requirements. In practice pay scales in Academies tend to closely replicate those in the STPCD (Sibieta *et al.*, 2008).

also offer other financial incentives such as childcare subsidies and contributions to relocation expenses (Astle and Ryan, 2008).

(vii) Accountability – The governing bodies of existing Academy schools have been directly accountable to the Secretary of State for Education in the main, though they are additionally answerable to local parents. The Secretary of State must approve any policy change requests by the Academy that relate to its admissions, SEN, learning behaviour or terms of governance, as contained in each Academy's Funding Agreement. The governing body of a maintained school is considered to be more accountable to local parents. As for all state schools, Academies are inspected by the Office for Standards in Education (OfSted) school inspections body whose job it is to monitor and ensure their compliance with national standards of education provision. Once opened, Academies were fully inspected within one to three years, more commonly in their third year (Gadkowski, 2007),[22] although less formal monitoring visits also took place soon after the initial open date of the Academy (Curtis *et al.*, 2008).

(viii) Curriculum – Earlier cohorts of Academies (those existing prior to the Summer of 2007) were not required to adhere to complete teachings of the National Curriculum as are other state schools. Instead their curriculum was to be broad and balanced, only requiring teaching and assessment in the core subjects of English, maths and science at Key Stage 3 (when pupils are aged 13/14). Curriculum innovation has been encouraged in Labour's Academies programme, and the governors and senior managers of established schools have the flexibility to develop a curriculum catering for the needs of individual low-attaining pupils. Additionally, Academy schools are specialist schools and as such their curriculum includes a focus on the chosen specialist subject(s) (Gadkowski, 2007).

Overall, there are many and varied differences between Academies and other schools in the state sector, which revolve in the main around the concept of independence, and give rise to the classification of Academies as "independent state schools". In the next section the aims of the distinctive Academies model developed by the previous Labour government are set out in detail and the means by which the features of these schools have been expected to help them deliver on their goals are discussed.

[22] See http://www.standards.dcsf.gov.uk/academies/what_are_academies/cucciculum/?version=1 (accessed 21 August 2008).

Aims and objectives

In February 2003 the education department of the former Labour government commissioned PricewaterhouseCoopers (PwC) to undertake an independent five-year evaluation of the Academies programme and to produce a report for each year, the first of which was available in November 2003 (Rogers and Migniuolo, 2007). This report sets out the three "ultimate" objectives of the scheme from its inception:-

(1) "Academies will contribute to driving up standards by raising achievement levels for their own pupils, their family of schools and the wider community by breaking the cycle of underachievement and low aspirations in areas of deprivation with historical low performance;

(2) Academies will be part of local strategies to increase choice and diversity in education. They will have innovative approaches to one or more of governance, curriculum, staffing structures and pay, teaching and learning[,] structure of the school day and year[,] using ICT [Information and Communications Technology]; and

(3) Academies will be inclusive, mixed ability school[s]"[23]

Originally, the Academies programme concerned the replacement of "seriously failing schools"[24], in which the underachieving predecessor school or schools that went before were to be rebuilt and rebranded into an Academy. In this respect Academies were to establish themselves "where significant changes in the nature and management of schools were needed" (DfES, 2000). Otherwise the initial Academy set-up was to involve a new school development in an area of sustained low educational attainment. Hence objective (1) emphasises that Academy schools aimed to play a key role in community regeneration. From the outset these schools were posited as a means for tackling educational underperformance and "establishing a culture of ambition to replace the poverty of aspiration that was generally there before" (Adonis, 2008, pp. 15). Their

[23] PwC (2003, pp. A1). See also Curtis *et al.* (2008).

[24] Curtis *et al.*, 2008, pp. 14, quoting a speech by the then Education Secretary David Blunkett in March 2000. Failing schools were initially defined as those "which are either in special measures or underachieving" (DfES, 2000). One Academy school could replace more than one pre-existing failing school at a time, though the rebuild usually used the existing land site of either of the failing schools being replaced. Originally, the Academies model was applied to cities; hence the term "City Academies" was used in reference to these new types of school. The prefix 'city' was dropped in the 2002 Education Act, when the policy was extended to include non-urban areas (Curtis *et al.*, 2008; Education Act, 2002).

formation was to target areas characterised by a historic trend of disadvantage and decline, with Academies considered as having the capacity to transform the education experiences of children in these areas. More specifically, Labour's Academy schools have been largely intended to cater for pupils most exposed to the local area deprivation that represents a feature of their establishment, so that it is likely that the social background and educational attainment of pupils attending these schools reflects the relatively deprived circumstances of the area they inhabit.

Objective (2) places Academies in the realm of choice-oriented education policies. They were viewed as being schools of innovation, designed to generate institutional competition, resulting in a diversification in the supply of state-funded education at the local level. This implies an inadequacy in available provisions at that time, a gap that was to be filled by a new type of school run along more autonomous lines than those afforded to traditional state schools.

Elaboration on the meaning behind objective (3) is given in the 2002 Education Act, where it is stated that an inclusive, diverse-ability Academy school is one that "provides education for pupils of different abilities who are wholly or mainly drawn from the area in which the school is situated" (Education Act, 2002, Section 65, 2(b)). Like the first objective then, aim (3) emphasises that Academy schools were expected to be at the forefront of local improvement. Academies were to incorporate a varied spectrum of pupil types, with pupil admissions taken predominantly from the local supply pool, so that the characteristics of their composition should largely reflect the demographics of the local pupil population.

The nature of the original Academies model was such that it was perceived as being able to attain the first objective. The new school building resulting from the scheme was anticipated to offer a flagship feature of symbolic value that could contribute to raised expectations of change and provide a visible demonstration of local community investment and reform taking place (Curtis *et. al.*, 2008; Astle and Ryan, 2008). This redevelopment of school facilities has aimed to foster a pupil's motivation to learn, encouraging both their own and their parents' commitment to and involvement in maintaining standards of quality and performance in the school. Sponsorship of the school by private business, voluntary or religious sector members was also considered a means by which standards could be raised. The assumption was that a sponsor could bring a vision and values to the school that could both define and renew its ethos. His or her business experience, expertise and network of contacts could serve to strengthen the integration of the school into the local community, and position the academy sponsor as an adult role model for

pupils in economically and socially deprived areas. In terms of the functioning of the school, academy autonomy from LEA control provides a means for allowing sponsors the "freedoms and flexibilities" (Rogers and Migniuolo, 2007, pp. 27) to challenge traditional lines of schooling operations and introduce innovative practices into the school in a bid to raise performance. The sponsor is able to shape the way things are done in the academy through his or her personal and potentially unique contribution to the Funding Agreement, in which the organisation of the school in relation to aspects such as the curriculum, governance, admissions and discipline are outlined (Gadkowski, 2007). In general, it is the various institutional arrangements of Labour's Academies model – such as their curriculum innovation, accountability, staffing and funding autonomy, their new school building, and the unique input of an Academy sponsor into the school – that policy-makers expected would provide the mechanisms through which performance improvements would be triggered.

In terms of objective (2), the independence of an Academy, its use of innovative techniques and the collaboration with non-government organisations that the original programme involved were all designed to serve the purpose of creating a new approach to education provision and an alternative type of state-funded education in the secondary schooling arena. The notion that an Academy school could inject further choice and a diversity of supply into state education thus relates to the ability of this schooling model to rejuvenate a failing, unpopular pre-existing school with spare capacity and reintroduce it to the quasi-market place as a viable, in demand, education provider. An increased diversification in the local mix of schools brought on by the successful Academy status restart of a predecessor school was presumed to encourage "more competition and contestability which can lift performance in an area" (PSA Delivery Agreements, 2008, pp. 9), suggesting another means by which the Academies model was considered able to achieve the local area benefits of the first aim.

In respect of goal (3), a potentially higher pupil capacity in an Academy was to provide one channel through which the school could be expected to incorporate a more inclusive and socially diverse range of pupils. Places offered at the Academy were to be greater in number to the extent that the new school building or the remodelled version could accommodate a larger quantity of pupils than the predecessor school(s). Another means for achieving this goal has come through the admissions rule of 'banding', which existing Academies can apply only when they are oversubscribed (DfES, 2003). This method of ranking place allocation "is generally taken to mean selecting an intake so that its spread of ability is representative of a wider population. This

wider population could be all the applicants to a particular school or group of schools, or the whole pupil population in a geographical area such as a local authority or nationally" (Tough and Brooks, 2007, pp. 19). The process "involves testing all children applying for a school place and placing them into ability bands as a result of the test" (DfES, 2003, pp. 16, paragraph 3.27). This is therefore an additional aspect of Academy school functioning that was anticipated to enable them to cater to the final objective.

A system of expanded school capacity and oversubscription rules that were intended to offer fair chances of admission to pupils from across the ability range might have ensured a more balanced academic intake into Labour's Academies and may have allowed these schools to be more inclusive without changing the quality distribution of their pupil entrants. On the other hand, the requirement of Academies to raise achievement standards could have created an incentive for these schools to try to adopt more 'exclusive' admissions practices and skew their intake distribution towards students with a historically high level of attainment and associated social characteristics, so as to make the task of driving up performance in the Academy school easier. In the time over which the Labour party were in power it was well documented that Academies were becoming increasingly popular, with their admissions demand exceeding available places at the schools. The central government education department noted that "Academies overall are three times oversubscribed. The brand new Academies, without an underperforming predecessor school, have nearly six applicants for every place. Academies directly replacing previously underperforming schools have more than two applicants for each place, and are now filling nearly 25% more places than the schools they replaced."[25] Oversubscription was bringing with it interest in Academy admission by a different class of pupils, a new direction that was openly welcomed by the Minister for Schools who was responsible for the programme at that time: "The popularity of academies extends across all classes and I welcome this. I want academies to be socially mixed schools attractive to the middle class" (Adonis, 2008, pp. 8). Thus Academy schools were broadening their appeal to include a particular genre of pupils that had not been a prominent feature of predecessor school(s), while at the same time Academies were starting to face capacity pressures as a direct consequence of their heightened status. These situations, together with the fact that established Academies are their own admissions authority, offer preliminary suggestions

[25] See http://www.standards.dcsf.gov.uk/academies/what_are_academies/working/?version=1 (accessed 21 August 2008)

of changes in intake patterns in the renewed schools relative to those in the previous LEA-governed school(s), and in particular they imply a shift towards a favourably 'exclusive' intake[26].

The aim of this study is to compare the pupil profile of Labour's Academy schools to that in both predecessor institutions and similar schools that did not turn into Academies over the time period of available data. Evaluation considers the prior attainment and background composition of year 7 entrants – and aspects of whole school-level composition – in Academies relative to these other schools over the years 1997 to 2007. Thus the purpose of evaluation is to determine the extent to which aim (3) of the original Academies Programme in particular has been satisfied. To date no previous research taking an identical empirical approach exists in this specific area[27]. The competition effects of Academies, implicated by aim (2), have also not yet been assessed and this type of analysis provides a potential area for future research. In terms of objective (1), preliminary analysis that considers the academic performance of early cohorts of Labour's Academies at the GCSE stage relative to achievement levels of their predecessors has been conducted. Findings from this research are summarised below in order to provide some initial information on what is known about the effectiveness of the programme as it originally stood.

Academy schools and GCSE performance

Recent co-authored research (Machin and Wilson, 2008) conducted a school-level analysis of changes in GCSE performance in Labour's Academy schools, in order to evaluate the effectiveness of the scheme in delivering its explicit aim of raising standards in education. This goal, as was mentioned above, was presumed to be deliverable through the private sponsorship aspect of the Academies Programme in particular and the freedoms granted to the Academy sponsor to introduce innovative techniques into the running of the school, including a business-like system of school management and governance.

[26] In Appendix 7, the prior school types of schools that converted to Academies are discussed, in reference to the sample of 33 Academies that form the basis of this research. About 72% and 3% of Academy predecessors were Community and Voluntary-controlled schools respectively in this sample. These schools are characterised by majority-LEA representation on the school governing body, such that the LEA was the admissions authority for most of the Academy predecessors.

[27] In their recently released work, Machin and Vernoit (2011) use the unique approach of comparing outcome variables in Academy schools to a particular set of control schools, namely those state sector schools that represent post-sample period future Academies. They find similar – though weaker – results on changes to intake quality as those outlined in this paper under their analytical method.

The study considered Academy schools opening in their new status between September 2002 and September 2005, thus including four cohorts of 27 Academies in total. The methodological approach taken was that of statistical difference-in-differences estimation, in which the pre-policy school-level GCSE attainment of Academy predecessors was contrasted with the GCSE performance of these schools in the effective years of the policy, and this difference was set against that in two groups of comparison schools. The first group consisted of matched schools, one per Academy, where the matching school was identified as one within the LEA of an Academy, sharing similar pre-policy levels and trends in GSCE performance as the Academy, but without itself acquiring Academy status. The second group included all other state secondary schools in the Academy school's LEA. The purpose behind establishing a unique group of matched schools in particular was to enable assessment of the impact of a school becoming an Academy on GCSE achievement with unobservable school-level components that might explain some of the measured result netted out.

Estimation utilised 11 years of school-level records of GCSE attainment, covering the period 1995/96 to 2005/06, where attainment was measured by the percentage of pupils getting 5 or more A*-C grades at the GCSE stage (when pupils are aged 15/16). Table 1 shows the results from difference-in-differences regression analysis that compares changes in GCSE outcomes over the pre-policy and post-policy years in Academies relative to that in both matched schools (Panel A) and other LEA secondary schools (Panel B)

Across almost all cohorts there is no evidence of a positive 'Academy effect' on GCSE performance for schools that switched to Academy status. This is not the case for cohort 3 Academies (opening from September 2004), when they are compared to the matched set of schools (columns 5 and 6). The percentage of pupils achieving 5 or more GCSEs graded A*-C is 10 percentage points higher in the effective policy years for this cohort (and is 8.95 percentage points higher when school-level time-varying controls are added to the regression), suggesting that GCSE attainment improved relative to the predecessor years of the schools. However, given that there are only five Academy schools in this cohort, this finding provides at best a weak indication of performance improvements in the renewed schools as a whole.

More recent research has indicated potential GCSE attainment gains among Academy schools that have been open for a longer time period. Machin and Vernoit (2010b) determine the impact of conversion into an Academy on school performance by comparing the pre-and-post conversion

GCSE attainment of existing Academies to that in a selected counterfactual group of schools due to open as Academies in the future. This difference-in-differences comparison enables evaluation to consider what the attainment outcome would have been for current Academies if they had not become Academies. Their preliminary evidence has revealed that, for Academies that have been open for two years or more, "an extra 3% of pupils in the academies are achieving at least five or more grades A*-C at GCSE/GNVQ compared with the schools that have not yet become academies" (*ibid.*, pp. 20). The authors have found no evidence of performance improvements among Academies that have been open for less than two years, offering one reason as to why the earlier study by Machin and Wilson (2008) drew no positive attainment effects of Academy status. They comment that their results, although preliminary and inconclusive, offer some signs "that academy schools can deliver faster gains in GCSE performance than comparable schools" (*ibid.*, 2010b, pp. 20), at least in the case where analysis covers an extended time frame of renewed status.

In the study by Machin and Wilson (2008) reviewed above, the GCSE attainment of all four cohorts of Labour's Academy schools largely consisted of pupils who sat for their GCSE exams in the Academy but who entered the school at the beginning of their secondary phase of education five years earlier, when the school was in its predecessor years[28]. Thus the estimated 'Academy effect' reflects the outcome of pupil learning in both school types and, importantly, is based on a pupil intake that was determined by the predecessor school(s). It is plausible to suggest that, once a school converted into an Academy, it faced a strong incentive to make compositional changes in the school in order to increase its likelihood of higher GCSE performance in the long-run. In particular, gains might have been sought through changes to the academic quality and social background composition of pupil intake into the Academy school relative to the profile of pupil admissions into its predecessor(s) so that, five years after re-opening as an Academy, that more favourable pupil intake yields higher levels of GCSE attainment. In this case the 'Academy effect', which is entirely attributable to pupil learning in the Academy, would appear improved relative to that attached to earlier cohorts admitted by the predecessor school(s). This would then boost the chances of the Academies Programme as a whole delivering on aim (1) of the policy, where this goal required the schools to contribute to

[28] The GCSE performance of these Academies will also include those pupils who were not in the school (and its predecessor) for all five years leading up to the GCSE exam stage. The first cohort of Academies opened in the academic year 2002/03 and their GCSE attainment as Academies can be tracked for four years under the sample window of the reviewed study, until 2005/06. Pupils who took their GCSEs in the Academy in 2005/06 will, in most cases, have entered the school in 2001/02, as a year 7 entrant of the predecessor version of the school. Hence, even among the earliest cohort of Academies, the sample window includes the GCSE attainment of pupils who attended both versions of the school.

driving up standards through increasing levels of achievement among their own pupils. In fact, Curtis *et al.* (2008, pp. 16-17) note that "[o]ne of the intermediate objectives related to...[aim (1)]...was for Academies to achieve the national average for attainment (at various levels) within four years of opening." If changes in intake 'quality' took place immediately after conversion, raised pupil performance at the GCSE stage after five years of Academy opening could certainly be more easily achieved, resulting in a greater chance of the accomplishment of this intermediate aim, albeit with a delay of one year. If this were the case then the findings of Machin and Vernoit (2010b) – with initial results showing improved GCSE attainment among Academies as the duration of the scheme's implementation has increased – may be driven by compositional changes in these schools. Importantly, employing a strategy of changing the pupil profile within an Academy school carries implications for delivery on goal (3) of the Academies Programme, suggesting a conflict of interest in the "ultimate" objectives of the scheme. This situation provides the key motivation behind the focus of evaluation in this research, the empirical starting stages of which are discussed below.

3 Outlining the Empirical Process

Academy schools sample

Prior to describing the data sources that are used for the purposes of empirical evaluation, it is necessary to set out details on the sample of Academy schools that the analysis refers to. As was noted in the 'Introduction' section to this paper, the first cohort of Academy schools came into being in September 2002 and additional cohorts arose in each academic year following on from then, continuing along the lines of Labour's Academies model until the Coalition government took over in May 2010. At the initial time of writing (June 2009) there were 133 open Academy schools dispersed across 65 LEAs, of which a total of 46 (in 34 LEAs) could be traced in the available pupil-level and school-level datasets obtainable at the time of data analysis (August 2008). Table 2 lists each of these 46 Academies that opened between the school years 2002/03 and 2006/07 and also provides facts on their date of opening, their geographical location, the relative deprivation ranking of the area in which each functioning Academy school is situated, the amount of finance the sponsor(s) committed themselves to contributing to the school, and the subject area(s) of specialism for every Academy. The Table also includes other information

relevant for the empirical work, as will be discussed in section 4, 'Empirical Results: Main Findings', such as whether each established Academy school represents a completely new school or simply a new building, the number of predecessor schools that the Academy has replaced, and if such replacement has involved a school that was formerly a CTC.

As can be seen from Table 2, the majority of Academies featuring in the sample period opened during the 2006/07 academic year, when a total of 19 were launched, as compared with 3 opening in 2002/03, 9 in 2003/04, 5 in 2004/05 and 10 in 2005/06 (column 2). Most of these Academies are located in London, in line with the previous government's goal of establishing 60 Academies in this region by 2010. Altogether 23 Academy schools were set up in London in the five years since the programme began, corresponding to half of the aggregate amount, of which 13 were formed in inner London and 10 in the outer London regions. Following behind Greater London is the area of Yorkshire and the Humber, containing a far fewer sum of 6 Academies over the sample time-frame. At the Local Authority District (LAD) level, Middlesbrough (in the North East) and Southwark (in Inner London) each had three Academies in them by 2006/07, more than in any of the other LADs (column 3). These Academies are situated in districts that are characterised by high levels of deprivation, ranking 9th and 26th respectively (out of 354 LADs) on the 2007 Indices of Deprivation[29]. In fact, the vast majority of Academy schools shown in the Table have been formed in disadvantaged areas: column 4 reveals that 34 Academies (out of the 44 with an available deprivation ranking for their area) feature in the 100 most deprived localities, based on the 2007 Indices. This conforms with the notion that, in its original form, the scheme was to target weak schools in areas of decline, and therefore the underprivileged pupils that frequently attend these schools and inhabit such areas[30].

Moving on to address Academy school sponsorship, both the United Learning Trust and the Harris Federation of South London Schools Trust have gained prevalence in the programme as multi-Academy sponsors, the former being involved in whole or in part with nine of the listed Academies and the latter with four. Sponsor financial pledges to Academies have averaged £1.69

[29] The 354 district-level authorities comprise 36 metropolitan districts, 32 London boroughs, 284 non-metropolitan districts, the Isles of Scilly, and the City of London (see the section on district 'types' in particular from http://encyclopedia.thefreedictionary.com/districts+of+England (accessed 3 March 2009)). The Indices of Deprivation for 2007 is based on seven domains, namely income deprivation, employment deprivation, health deprivation and disability, education, skills and training deprivation, barriers to housing and services, crime, and the living environment deprivation (The English Indices of Deprivation, 2007).

[30] According to the DCSF Standards Site the expectation was that by September 2008 around 50% of the 100 most deprived Local Authority Districts (LADs) in England would feature at least one Academy school, where deprivation is measured according to The English Indices of Deprivation 2004 and concerns a ranking system for all 354 LADs. See http://www.standards.dcsf.gov.uk/academies/what_are_academies/working/?version=1 (accessed 21 August 2008).

million, which is about 6.3 to 7.0 per cent of the overall cost of recreating a school into an Academy, depending on whether the school was formed through an entirely new build or as a refurbishment (column 5)[31]. The most frequently chosen subject of specialism has been that of Business and Enterprise, either as a sole specialism or in conjunction with another field of study. Otherwise, sponsors have tended to opt for sports as their Academy's area of expertise (column 6).

Table 2 additionally highlights specifics pertaining to each Academy school, as shown in column 7. In some LADs (such as Middlesbrough and Southwark) two pre-existing schools were amalgamated into one Academy, while unique to the LAD of Westminster has been the replacement of one predecessor school by two Academies. A total of five new schools were set up as Academies from 2002/03 to 2006/07, raising the number of available schools and therefore school places in their respective localities. For seven predecessor schools a change to Academy status resulted in capital expenditure on a school rebuild rather than the use of the existing school facilities. And finally, five Academy schools had formerly been a CTC, with the largest conversion of this kind taking place during 2005/06 when 3 CTCs changed to Academy school status. This conversion has been described as natural, given the close connection in design between CTCs and Academies (Curtis *et al.*, 2008). It is likely that this would have been a more prominent feature of future Academy cohorts developed under Labour, since in early 2009 the party had suggested a further extension of the model that involved encouraging successful schools, such as CTCs, to become Academies[32].

Though the Academies listed in Table 2 are spread across several LEAs and, in line with education policy at that time, their magnitude and dispersion was on the rise, Academy schools were not expected to account for a significant fraction of state secondary education provision until around 2015, by which time 400 such schools were intended to be in existence (around 15 per cent of the total: see section 1, 'Introduction'). Table 3 indicates that by 2006/07 Academy schools held just a 1.4 per cent share in the overall stock of state secondary schools. Their allocations of pupils and teachers at this time were equally low, at 1.3 per cent and 1.5 per cent respectively, while within Academies this slight over-balance of teachers has allowed for a

[31] See section 2, 'Key Features' (part (iv)) for the estimated costs of Academy formation according to the NAO. There is information available on the committed financial contributions of the sponsor(s) for 43 of the listed Academies, totalling £72.55 million, or about £1.69 million on average.
[32] For further details see Curtis *et al.* (2008), section 4 (pp. 50-67). Government interest in converting all CTCs to Academies has been expressed on the following website: http://www.standards.dfes.gov.uk/academies/ctcs/?version=1 (accessed 20 February 2009).

relatively smaller pupil-teacher ratio (15.06) compared to that in all maintained secondary schools (16.47).

Data description

Information on *all* pupils who have been or currently are enrolled in the state schools education sector in England is contained within the National Pupil Database (NPD), a central government collected longitudinal data source that comprises of the Pupil-Level Annual School Census (PLASC) and Key Stage data files. PLASC is a unique national pupil-level administrative Census which has traditionally derived information on the whole school roll in January of each academic year. The Census has legally binding status: schools are statutorily required to provide Census information under Section 537A of the Education Act 1996 (Harland and Stillwell, 2007). PLASC contains some indicators on the background characteristics of each pupil, such as whether the pupil is eligible for Free School Meals (FSME)[33], whether the pupil has Special Educational Needs (SEN), the ethnicity of the pupil, their gender and their first language. These details are provided alongside items such as the school year group to which the pupil belongs, the code of the school that they are currently in, and the LEA within which that school is contained. PLASC collection first began in January 2002 to include pupils on roll for the academic year 2001/2002. At the time of carrying out empirical evaluation (August 2008) six PLASC waves of data had been issued, covering the academic years 2001/02 to 2006/07 inclusive, all of which are used in this empirical work[34].

The National Curriculum was established through the 1988 Education Reform Act and provides a standard form and content of subjects to be taught across schools for all pupils from the age of 5 to 16. It was in place in all maintained primary and secondary schools between the academic years of 1989/90 and 1996/97. The Curriculum divides schooling years into blocks, with each block representing a 'Key Stage' (KS). Curriculum comprehension is tested through national attainment examinations taken at the end of each KS. Formal introduction to the Key Stages

[33] See Appendix 1 for an explanation of the parental financial or other conditions under which their children are entitled to free school meals. This indicator provides a proxy measure for family disadvantage, the drawbacks of which are also discussed in Appendix 1.

[34] Since 2006 (2007) a tri-annual procedure for administrative data collection was introduced into secondary (primary) schools, known as the School Census and featuring data collection points on the third Thursday of the months of May and September in addition to the usual (third Thursday of the month of) January record (Harland and Stillwell, 2007). However for researchers the year-on-year January collection is the most longitudinally available and consistent source, and therefore the most widely used version.

begins at the age of 5/6 (KS1) and comprises of 2 school years of instruction, leading to KS1 examinations at the age of 6/7. The KS2 phase of learning spans 4 school years and final exams are sat for when pupils are aged 10/11. Until recently, after a further 3 academic years, which include a transfer from the primary to the secondary schooling phase (at around the age of 11), KS3 exams were taken at the age of 13/14[35]. At the age of 15/16 the end-of-compulsory-schooling GCSE exams are taken (KS4). Analysis undertaken here utilises pupil test performance at KS1 and KS2, the latter corresponding to the end of the primary school phase of education. Information on the code of the school attended by the pupil at the time of their KS3 tests is also exploited here. KS1 and KS3 data are provided in the NPD from the academic year 1997/98 onwards; those for KS2 are available from 1995/96. PLASC and KS records can all be linked together by means of a unique, anonymous, pupil identifier provided in every data file.

Statistics on school-level characteristics are contained within the Edubase, School Performance Tables (SPT), and Annual School Census (ASC) data sources, which are collected by the central government education department. Edubase is a register of all schools in England and Wales that is available from the academic year 1999/00. Details on the number of pupils in the school and the school type (such as Community, Independent, etc.) can be obtained from this source. League tables of the performance of secondary schools were established since 1994 and contain information on the percentage of pupils getting nationally recognised GCSE qualifications at the age of 15/16 in each school. The consistent indicators of GCSE attainment that are available in all years of SPT data are those of the percentage of pupils attaining five A*-C grades at GCSE and the percentage of pupils getting five A*-G GCSE grades at the school-level. Pupils not achieving any GCSE passes are those with grades lower than the G level in all subjects; therefore the annual percentage of pupils with no GCSE passes can be calculated as 1 minus the percentage of pupils getting five A*-G GCSEs. ASC data covers all schools in England and provision of these statistics by schools is a legislative requirement of the 1996 Education Act. School-level information provided by this source includes the percentage of pupils who are eligible for free school meals, the percentage of pupils with special educational needs with and without a statement, the percentage representation of different ethnic groups of pupils in the school and the pupil-teacher ratio. All annual school-level factors derived from the three data sources outlined here are matched to the NPD dataset by the school code.

[35] These have since been abolished with effect from October 2008, such that the last academic year in which they were sat for was 2006/07. They have been replaced by teacher assessment. See http://www.direct.gov.uk/en/Parents/Schoolslearninganddevelopment/ExamsTestsAndTheCurriculum/DG_10013041 (accessed 25 February 2011) and http://www.telegraph.co.uk/education/primaryeducation/3199156/Sats-for-14-year-olds-abolished-Teachers-and-parents-praise-decision.html (accessed 15 October 2008).

Dataset construction

The empirical analysis made in this paper looks at changes in the academic quality and composition of pupils entering year 7 of secondary school in each year as well as whole-school level year-on-year compositional changes. These angles of enquiry can be assessed using a dataset compiled from the above sources, as set out here.

Changes to *intake composition* in secondary schools can be examined over the 6 PLASC waves only. PLASC provides a sole source of information on the background characteristics of pupils joining each school, with the indicators as outlined above being available for each pupil in each wave. The variable contained in PLASC on the national curriculum year group to which each pupil belongs can be used to identify and extract pupils entering year 7 of each secondary school per year from the full PLASC population[36]. Of this year group, only those pupils entering secondary schools situated in the 34 LEAs in which the sample of 46 established Academy schools are situated are kept. This sample restriction is imposed because one purpose of the analysis is to define a control group of schools whose intake patterns and changes in school composition can be compared with those in existing Academies and their predecessor counterparts. If they are to provide an accurate comparison, schools in the control group should resemble Academy predecessors by sharing similar characteristics to these schools, but being differentiated by the fact that they did not acquire Academy school status. One such attribute is the geographical location of comparison schools. Elimination from the sample of those pupils entering schools that are not located in an LEA in the vicinity of a formed Academy represents an initial movement towards developing an adequate set of comparison schools.

Changes in the academic *intake quality* of new secondary school pupils can be assessed by linking in KS2 records to the PLASC sample of year 7 pupils using the anonymous pupil identifier. KS2 outcomes provide a measure of the academic achievement of each pupil before

[36] As Table 2 showed, Academy schools generally opened in September, and schools traditionally start their new school year in this month, while PLASC information on the pupil roll that is used here was collected in January. This gap of approximately 4 months in the data collection point does create the potential for a discrepancy to exist between the recorded details on pupil enrolment and who actually entered the school. However, it is likely that the amount of the discrepancy is too small to have any discernable impact on the findings, and it should be emphasised that the unit of analysis in empirical evaluation is the school rather than the pupil. Then the year-on-year variations that are witnessed in the data can be considered to be quite accurate, even with pupil entry and exit potentially occurring in these 4 months.

secondary school entry, so that the social background details of pupils entering secondary schools over 2001/02 to 2006/07 are adjoined to the end of primary school prior attainment of these pupils over 2000/01 to 2005/06. One way to lengthen the window of information on pupil intake quality changes so that the years before PLASC are covered is to exploit details on the secondary school attended by each pupil when they sat for their KS3 exams and track this information back to establish which pupils entered year 7 of that same school in each year. Information on the KS2 performance of these pupils can be linked in using the pupil code, as it was for the PLASC year 7 sample. In this case pupils who took their KS3 exams in year 9 of secondary school at the age of 13/14 should have entered the first year of that secondary school, year 7, two school years earlier when aged 11/12, and should have sat for their KS2 tests in primary school one year before then, when aged 10/11. Although pupil-level KS3 attainment data is available in the NPD from 1997/98 onwards, KS2 data is only provided from 1995/96 and this matches to the 1998/99 KS3 outcomes of the same pupils. Thus there are no KS2 records that link up to the initial KS3 year, making it redundant to the analysis. Then the overall sample can be expanded by at most 5 years at the front, to provide 11 years of data on changes in the academic intake quality of pupils joining secondary schools, beginning in the academic year 1996/97.

The assumption that underlies the use of the KS3 data in this way is that pupils did not move schools between year 7 and year 9 of secondary school. If pupils who were in the school in year 7 left by year 9, then KS3-derived information on the set of pupils who were in the school two school years earlier will be smaller than the actual figure. Conversely, if pupils who took their KS3 exams in the school were attending a different school in year 7, the sample size will be larger than it should be. Mobility of this type will matter for the analysis if pupils exhibiting certain characteristics are more likely to engage in moves around this period, a situation which will affect the accuracy of empirical estimation. Research has shown that school mobility during the secondary phase of education is actually lower than that during the primary phase; 6.4 per cent of pupils make non-compulsory changes of school over the entire KS1 period (when aged 5/6 to 6/7) and 5.0 per cent move schools during KS2 (aged between 7/8 and 10/11), compared with mobility of just 3.4 per cent at KS3 (when pupils are secondary school and are aged 11/12 to 13/14) (Machin *et al.*, 2006; Wilson, 2009)[37]. At this point it is worthwhile to note that the reliability of estimates obtained using KS3 details to derive year 7 cohorts in years prior to PLASC availability is considered in section 4, 'Robustness Checks', and it can be stated here that

[37] Non-compulsory school moves refer to those taking place at non-standard times, thus they exclude expected transitions such as from Primary to Secondary school, Infant to Junior school, and other forms of necessary school changes (see Machin *et al.*, 2006; Wilson, 2009).

the KS3-derived part of the sample does appear to act as a valid proxy for determining actual pupil entry to each school in the years before PLASC.

Table 4 highlights the number of years over which the longitudinal panel of observations on pupils entering the same group of secondary schools has been created using both the PLASC dataset and extrapolated KS3 information. The Table also shows the year-on-year number of pupils entering the sample of secondary schools, plus the number and percentage of these pupils that have been successfully linked to their previous KS2 attainment records. As can be seen from the Table, between around 120,500 and 129,000 pupils joined year 7 of the set of secondary schools sampled here in each year. For the majority of these pupils their prior attainment records at the end of primary school are available: the match on KS2 test scores lies between 89.6 per cent and a very high 97.6 per cent. This provides assurance that intake quality changes can be effectively analysed with the information contained in the constructed dataset.

Implicit throughout the discussion of the sample formation so far has been the notion that the unit of analysis is the school rather than the individual pupil. Extracted pupil-level information on entry to year 7 of secondary school is cross-sectional in nature and the consistent longitudinal component here is the sample of schools these pupils entered into. Though they are pupil-level files, both the PLASC and the KS3 parts of the NPD indicate the secondary school to which each pupil currently belongs, enabling them to be collapsed in order to generate a sample that is at the level of the individual school. In creating the school-level dataset, all characteristics pertaining to pupils entering year 7 of secondary school become expressed as fractions, totals or averages at the level of each secondary school, depending on the background indicator in question.

Whole-school level compositional changes can be examined by adding to the dataset indicators on the school that are provided in the centrally-collected Edubase and ASC files. These files can be linked to the school-level dataset created so far using the school code. The Edubase data source is available from the academic year 1999/00 onwards, while ASC data is provided for each academic year of the entire sample period spanning 1996/97 to 2006/07[38]. This step in dataset development is an important one for enriching the evaluation that is carried out as it allows for a better-defined comparison group of schools to Academy predecessors to be

[38] Whole school-level variables that are linked in from Edubase for the school years 1996/97 to 1998/99 make use of the Edubase information for 1999/00. This is a feasible practice because the extracted indicators are relatively time-invariant at the level of the school. It should be noted that school codes differ between the predecessor years and the Academy years of each Academy school. Linkage of both Edubase and ASC information via school codes is therefore done according to the relevant code applying to the school in each year.

established, as will be outlined in section 3, 'Empirical Methodology'. As for intake quality changes, whole school compositional changes can be assessed over the 11 year period of 1996/97 to 2006/07[39].

The final stage of dataset construction involves various procedures that are applied to the sample of schools in order to arrive at a balanced panel of school-level observations. Creating a balanced panel ensures that the findings from analysis into variations in intake patterns and school-level compositional changes across schools are not distorted by attrition in specific variables or in an entire set of annual observations in the sample of schools. The routes taken to create this final dataset are set out in detail in Appendix 2. Table 5 indicates the size of this sample of schools before and after corrections and imputations were made. Panel A shows that the sample of Academies dropped from 46 to 33 schools, while the total number of all other state schools located in an LEA that features at least one Academy school (henceforth termed the sample of "non-Academy schools") fell from 1,699 to 389 schools following the process of data cleaning[40]. The entire schools sample is contained within 25 LEAs, rather than 34 LEAs as was originally the case, which is a direct consequence of some Academy schools being lost from the sample, an issue that is discussed further in Appendix 2. It is worthy to note here a total of 5 Academies were dropped because they formed new schools with no historical pre-policy observations and 2 Academy schools fell from the sample because their predecessors opened later than the start of the sample period, of 1997. The difference in the drop in the number of Academies (of 13 in total) as compared with the loss of LEAs (9 altogether) reflects the fact that some LEAs contain more than one Academy school.

Panel B of Table 5 shows when the switch to Academy status occurred for each of the 5 cohorts of Academies for which empirical details were available at the time of analysis (August 2008), as well as how many schools each cohort has contained. As per the initial sample of Academy schools (shown in Table 2), in the final sample the largest cohort of Academies are those that opened from September 2006, cohort 5. This is also the group from which the most Academies

[39] From here on academic years will be referred to by their end year, such that where 1997 is written in the text, for example, this should be interpreted as referring to the academic year 1996/97.

[40] The original number of non-Academy schools in the sample, of 1,699, is inflated by the presence of schools that cannot be directly compared with Academies because their institutional arrangements differ (such as independent schools) and also by the unusually high number of small schools that are contained in the dataset in 2006. The latter likely reflects an error in records that is unique to this year, since across all other years of school-level data assessed here (1997-2005, and 2007), there are around 600 non-Academies. These and other errors were corrected for, as detailed in Appendix 2.

are lost in reaching the balanced panel – seven Academy schools dropped out in this year, as compared with none from cohorts 1 and 4 and three each from cohorts 2 and 3 (see Appendix 2).

Academy school cohorts are divided between their predecessor years (P) and their Academy years (A), depending on the timing of their institutional conversion. It is anticipated that this break in the status of these schools is marked by a change to their pupil intake patterns and whole-school composition; these *within*-Academy school policy responses form a further aspect of the analytical enquiry to follow (see section 4, 'Dynamic Effects'). For non-Academy schools their status remained unchanged (U) throughout the period, apart from for a negligible percentage of schools in this group (see Appendix 7 for further details).

To summarise, the nature of the constructed dataset allows for changes to intake composition among secondary schools to be analysed over the 6 year window of 2002 to 2007, while intake quality and whole school compositional patterns can be examined for 11 years encompassing 1997 to 2007. The amount of predecessor school information is therefore lower when intake composition effects are addressed, since these details are only available in PLASC, and neither KS3 extrapolation nor the use of school-level Edubase or LEASIS/ASC files can be used to extend the window of this pupil-level dataset.

Empirical methodology

The main methodological approach adopted here is that of a 'difference-in-differences' analysis applied to the constructed longitudinal dataset which contains school-level factors that are tracked through time. This technique involves comparing the difference in an outcome measure in the 'treated' group of schools (those that switched to Academy status) with that in an appropriate comparison group in the years before and after the school status change was implemented. Observed changes reflect the pre-and post-policy excess in the *average* of the outcome measure in the treatment group vis-à-vis the comparison group. Estimation produces a parameter that identifies the average impact of treatment on the treated, or the ATT (Blundell and Costa Dias, 2008). Equation (1) below indicates the basic difference-in-differences model that is applied to the sample of schools here and the key coefficient of interest that derives from model estimation. The relationship between an outcome measure y in secondary school s in a certain time period t and model covariates can be specified in an equation as:-

$$y_{st} = \alpha + \beta A_s + \delta A_s * PolicyOn_{t \geq k} + \varepsilon_{st} \quad (1)$$

The term *A* in this equation refers to the 'Academy' dummy variable. This takes the value of 1 for schools that became Academies, and covers all 11 years of the school (their pre-policy predecessor school years and their post-policy Academy school years); otherwise the variable assumes the value of 0 across all 11 years in non-Academies. The constant or intercept is denoted by α and ε is the error term, a variable that incorporates all unobservable components that are associated with the particular outcome measure. The main parameter of interest is δ on the A_s*$PolicyOn_{t \geq k}$ variable. $PolicyOn_{t \geq k}$ is the treatment variable, a dummy indicator that equates to 1 over the time periods ($t \geq k$) in which the Academy school policy is in effect in school *s* and 0 at all other times (so that *k* is the year that a school re-opened as an Academy). The coefficient δ captures the average change in the outcome measure within the treated group of schools relative to the comparison group, after the school status change occurred, and is therefore an estimate of the ATT parameter. Throughout the analysis that follows the coefficient expression 'δ', and the terms 'ATT', and 'academy on' will be used interchangeably to all refer to this estimated treatment impact.

A more detailed model specification is set out in equation (2) below, which includes regressors that additionally account for observable attributes of schools that may relate to the outcome indicator. Explanatory variables that further exploit the nature of the fixed-effects method in being able to control for unobservable time-invariant factors that may impact on outcomes directly or via correlation with assignment to the treatment group are also modelled here (Emmerson *et al.*, 2003)[41]:-

$$y_{st} = \delta A_s * PolicyOn_{t \geq k} + \Psi Z_{st} + \xi_s + \lambda_t + \varepsilon_{st} \quad (2)$$

[41] Unobservable factors consist of time-constant and time-varying components. The difference-in-differences method accounts for the impact of time-constant unobservable effects on the outcome measure. Time-varying unobservable effects could take the form of (i) an unexpected one-off event, e.g. a sudden change in the composition of a neighbourhood, which affects Academies simultaneously opening in that area at the time of its occurrence; or (ii) a change that occurs through time, e.g. the process of neighbourhood gentrification, which will impact on the neighbourhood composition and on Academies within the area over time, and therefore will display a time-trend. The impact of random events such as case (i) cannot be netted out using the difference-in-differences approach, a limitation of the method that is likely to be small given the unlikelihood of these events happening. The effect of case (ii) can be modelled by fitting a time-trend to the data over all available years and estimating whether the policy effect is attributable to patterns, or 'trends', that were already present in the outcome measure over the pre-policy period. This exercise is carried out as part of a series of 'robustness checks' of empirical findings on changes to intake ability in Academies (see section 4 for the results of these checks).

In the above equation Z represents a vector of observable school-level characteristics, with associated coefficients Ψ. The term λ_t refers to a set of year dummies that are incorporated in the model so as to net out unobservable year-specific effects that are common to all schools in each year (and differ across years). ξ_s indicates a set of school dummies that are added to the difference-in-differences regression in order to account for time-constant observable and unobservable characteristics that are unique to the individual school. That is, the term ξ_s controls for the impact of school fixed effects on y_{st}. In this case all observable features of schools that are unchanging over time become absorbed in the school fixed effect term, including the Academy dummy variable (the βA_s part of equation (1) above). The regression now models the within-school effects of Academy status on each outcome measure[42].

Defining a suitable comparison group of untreated schools constitutes an important part of the process of empirical evaluation. This set of schools provides the closest possible counterfactual scenario, illustrating patterns of behaviour that might have existed in Academy schools had they not participated in Labour's policy of status change. So far a sample of non-Academy schools has been established for this purpose, where this group contains only those state-maintained schools of the traditional type that feature in an LEA in which at least one Academy school came into being over the time period considered (see Appendix 2 for further details). While these untreated schools may represent an adequately defined control group, reaching a well-defined set of non-Academies enables more accurate sample estimation of the ATT parameter, bringing that estimation closer to the true value. Better definition can be achieved by reducing the heterogeneity between the characteristics of non-Academy schools and those of Academy *pre-policy* predecessor schools as much as possible, such that Academies and non-Academies share a similar probability of being subjected to the policy treatment based on their attributes and only differ according to their actual treatment status. Resemblance in the pre-policy characteristics of the two groups of schools matters because it is on factors such as these that the status change is likely to have been based.

[42] More specifically, the regression with school-fixed effects models deviations from school-specific means. Thus deviations of the dependent and independent variables for each school from the school-specific average of these variables over the time period concerned are estimated. In this case any time-constant terms in the regression equation that involve grouped schools are no longer separately identified since they become subsumed within the school fixed effect. As the model with school dummies provides estimation at the lowest hierarchical unit, that of the individual school, it gives a much more unique and informative ATT coefficient than models estimated at more aggregated levels.

Of course the heterogeneity that is present between Academies and untreated schools reflects both observable and unobservable dimensions, and the dataset used here provides information on schools that allows for only certain observable differences to be taken into account. Even if data pertaining to every aspect of schools were collected and freely available, the selection rules governing assignment to the original Academies programme were not precisely stated, making the task of netting out heterogeneous differences less clear. In general Academy school 'treatment' under the Labour government depended on the partially observable features of schools that concern their performance and their levels of disadvantage (see section 2, 'Aims and Objectives'). The National Challenge definition of an underachieving school (as one where 30 per cent of pupils or more *do not* attain five good GCSEs in the A*-C range, including in English and maths) was used as one qualifying criteria for school replacement by an Academy by the previous government from 2008. In terms of the data sources used here, the percentage of pupils not getting any GCSE passes gives an indicator of poor school performance, while a crude measure of school-level disadvantage is provided by the percentage of pupils eligible for free school meals in the school. Though they are incomplete determinants of eligibility for Academy treatment, the availability of statistics on these observable treatment participation components allows for some of the variation between the treated and untreated schools to be separated out. Therefore some control schools that do not have observable historical attributes resembling those of Academy predecessors can be excluded from the analysis. In fact, the advantage of the constructed dataset is that it contains school-level details stretching as far back as 1997 and incorporates available information in the year just prior to the decision of each Academy school to convert to Academy status. Then historical and more recent trends in these observable factors that likely influenced assignment to treatment among schools can be put to use as a means for strengthening the analysis findings[43].

The procedure that is employed in order to determine a distinct control group of schools is that of estimating a statistical propensity score for each school and then restricting the entire sample of schools to those contained within a common support region under which only Academy and non-Academy schools with similar propensity scores feature. The propensity score for a school is the [0, 1] conditional predicted probability of assignment to the treatment group for that school, that is, the likelihood of a school becoming an Academy given the available set of pre-policy observable factors relating to it. This conditional assignment probability can be estimated in a parametric non-linear logit or probit model or through a linear probability model, where the

[43] In fact, a whole host of school-level observable variables are tested for their ability to predict assignment to the Academy treatment group, as will become clear in the discussion that follows.

parametric specification expresses a relationship between the actual treatment status of the school and their observable pre-policy variables. Hence the parametric equation models the Academy dummy variable given by A_s in equation (1) on the left hand side and all pre-policy observable covariates of schools considered to have mattered for determining assignment to Academy status 'treatment' on the right hand side. The coefficients derived under the process of parametric estimation are used to predict a propensity score for each school. The area of overlap in the distribution of the propensity scores of the treatment and control groups indicates those Academy and non-Academy schools sharing similar treatment probabilities, and is known as the 'Common Support Region' (CSR). Schools that are excluded from this region are those displaying a very different set of observable characteristics, such that their likelihood of becoming an Academy, as summarised in their propensity score, is either above or below the threshold points of common support[44]. All empirical results shown in this paper pertain to the sample of schools within the CSR and the sensitivity of findings to the relaxation of this constraint is included as a category of robustness checking. It should be noted that the construction of a reduced sample of schools – produced by the estimation of propensity scores and the associated derivation of a CSR – is carried out as a preliminary stage to the analysis and acts as a subsidiary to the main method of empirical difference-in-differences regression estimation, under which the treatment impacts themselves are gauged[45].

The process leading up to the generation of the CSR sample begins with the presentation of descriptive statistics on the entire sample of schools prior to CSR formation, followed by the tracking of how disparities in the characteristics of treated and control schools are narrowed down once restriction to the CSR occurs. In Panel A of Table 6, indicators on the composition of Academy predecessors and all non-Academy schools are presented in the form of school-level averages covering the pre-policy window that is common to all Academy cohorts contained within the sample, 1997 to 2002. These descriptive variables illustrate statistically significant differences in the pre-treatment observables of Academy predecessors and the full control group of schools. In line with the tendency of Labour's Academies to be set up in areas of decline, the

[44] In practice both treatment and control schools may be discarded from the empirical analysis if their propensity scores do not fall within the common support region. It will be seen from the logit models presented in Table 7 (see also Figure 1 and Figure 2) that none of the 33 Academy schools are excluded from the difference-in-differences evaluation process since each of their propensity scores are featuring in this region of overlap.

[45] As a precursory stage to the regression analysis the propensity score (and subsequent common support) approach has the major advantage of being able to make use of all observable school-level characteristics for which data is available, while not all of these can be included in the difference-in-differences equations as independent variables on the right hand side because many constitute the left hand side outcome measures. Thus the combination of this initial step and difference-in-differencing means that as many observable and unobservable dimensions of schools as possible are controlled for.

Table shows that their predecessor versions were characterised by a far higher proportion of pupils eligible for free school meals than is the case in non-Academy schools, where this measure is a proxy for family disadvantage (see Appendix 1). Over the 6 year period just above 40 per cent of pupils were entitled to FSM on average in the pre-Academies, as compared with about 25 per cent in the whole non-Academy group.

Schools with poor attainment standards were those most likely to convert to Academy status and the tabulated statistics reveal that this holds in the schools sampled here. On average almost one-quarter of the predecessor school population completed their compulsory schooling years achieving no GCSE qualifications (22.25 per cent), while about the same percentage acquired five or more GCSEs graded A*-C (25.45 per cent). Non-Academy schools fared better all round, with just 12.46 per cent of pupils not gaining any GCSE passes across all 6 years on average and 38.34 per cent acquiring the nationally recognised standard of achievement at the GCSE stage. This latter percentage of 38.34 is important as it crudely indicates that non-Academies achieved a sufficiently high enough level of GCSE performance to sit outside of the definition of an under-achieving school ripe for conversion to an Academy that was determined within Labour education policy from 2008. Of course, this recent definition would in no way have influenced conversion to Academy status among the schools featuring in Table 6. Additionally, included in this qualifying criterion for conversion is a focus on attainment in English and maths in particular, while an historical breakdown of per subject GCSE attainment at the school-level is not available in the utilised data sources.

Panel B of Table 6 shows the average characteristics of primary schools at the time when they were attended by pupils subsequently entering year 7 of the secondary schools sample in each pre-policy year. It appears that the compositional differences between Academy predecessors and non-Academies stem *in part* from compositional variations in the primary schools from which these secondary schools got their pupil intake[46]. Indeed pupils joining predecessor secondary schools over 1997 to 2002 tended to come from primary schools with higher levels of social disadvantage. The percentage of pupils eligible for FSM in the primary schools from which predecessor schools sampled is 39.14 per cent, as compared with 26.83 per cent in the primary schools that non-Academies sampled from, a statistically significant difference of 12.31 percentage points. Interestingly, pupils entering pre-Academy schools were apt to come from a larger number of lesser-performing primary schools. Predecessor schools spread their year 7

[46] The reader should note that the statistics in Panel A of Table 6 are at the whole school-level; they do not indicate school-level averages of pupils entering year 7 only.

intake over 36 primary schools on average with a mean KS2 primary school performance of 71.00 points. This compares with non-Academies sampling their year 7 intake from 34 primary schools averaging a higher KS2 quality of 74.56 points. The Labour government set a target of attainment at KS2 of Level 4 in each of the three tested subjects of English, maths and science, the points score equivalent of which is 81 (27 points in each subject). Though school-level averages mask individual variation, it is likely that more pupils entering non-Academies achieved the target level of KS2 attainment in all subjects than did pupils who were admitted into Academy predecessor schools.

The pre-policy observable characteristics of Academy and non-Academy secondary schools shown in panel A of Table 6 are mapped into implied probabilities of each school becoming an Academy using the non-linear logit models as set out in Table 7. The distribution of propensity scores obtained from a logit specification fits well to this sample of schools in particular as the logit function displays wider tails and a smaller central distribution than does the probit function as an alternative model. Therefore the logit model is better able to estimate implied propensities in the extremes of the [0, 1] space for a given set of observable characteristics, areas around which the predicted probabilities of non-Academies (close to zero) and Academies (close to one) can be expected to lie. Although it was highlighted in Table 5 that the cohorts of Academy schools contained within the sample have been set up in different time periods – so that the Academies differ by their predecessor and policy on years – logit estimation undertaken here is based on averaged variables across the 6 pre-policy years (1997 to 2002) that are shared by all of these Academy cohorts. This process of defining a single pre-policy period into which all Academy predecessors are grouped results in the identification of a single common support region and one control group of non-Academies that acts as the counterfactual for all Academy schools. Given that some cohorts of established Academy schools are very small in size, derivation of a cohort-by-cohort common support region and control set of schools (where variations in pre-Academy and Academy policy on years are taken into account) can add little to the process of estimation of treatment effects. Hence throughout the empirical analysis that follows, testing uses the restricted sample of schools contained within this single CSR and involves a comparison of intake behaviour changes and changes in whole school composition within all Academies and separate Academy cohorts relative to the unique group of non-Academy schools.

Columns (1) and (2) of Table 7 are based on estimation of a fully-specified logit model (model 1), in which all the observable pre-treatment factors in Panel A of Table 6 are used as regressors. The results from this model suggest that averaged school-level variables on the fraction of pupils in the school with Special Educational Needs with a statement, the pupil-teacher ratio and the percentage of pupils getting no GCSE qualifications are good predictors of the likelihood of school conversion to Academy status according to their percentage effects. However only the last of these variables retains any statistical significance in the estimation process and otherwise all other explanatory components are redundant to the analysis. Model 2 of Table 7 represents a more parsimonious version of the full logit model, in which indicators that could be endogenously determined by the school (SEN status) or that are highly correlated with another covariate (the percentage of pupils gaining five or more grade A*-C GCSEs) are excluded from the equation[47]. Once again the only statistically significant independent variable is the percentage of pupils with no GCSE passes at the age of 15/16[48].

The implied probabilities of school change to the Academy type that are derived from the logit model with full controls (model 1) display a distribution as shown in Figure 1. The common support region pertaining to this model includes the full sample of Academy schools (33) but a smaller number of non-Academies (266 out of 389), so that 123 non-Academy schools are discarded from the comparison group. A similar graphical interpretation of the region of common support derived from the propensity scores achieved under estimation of logit model 2 is given by Figure 2. While this area of overlap also includes all 33 Academies, fewer non-Academies are excluded from the region than was the case for the CSR associated with model 1. A total of 63 non-Academy schools drop out of the counterfactual set, leaving 326 control schools that share similar pre-treatment observable features to Academy predecessors over the 1997 to 2002 window. Despite the relatively weak explanatory power of these pre-policy observables in determining whether a school was to become an Academy, the subsequent process of defining a CSR does generate more stringent testing by reducing heterogeneity in the characteristics of

[47] See Table A2 in Appendix 3, which shows the correlation coefficients among all pre-policy school-level variables averaged over 1997 to 2002. The coefficient of correlation between the percentage of pupils gaining five or more grade A*-C GCSEs and the percentage of pupils getting no passes at the GCSE stage is a statistically significant -0.8023. This very high inverse relationship between these two indicators suggests that at least one of them should be excluded from the logit model, as their informative content is the same. The former indicator was chosen to be dropped because poor school performance, which is signalled through variables such as the percentage of pupils attaining no GCSE qualifications, is one important dimension of school conversion to an Academy according to the model of the scheme developed under Labour.

[48] Various other logit model specifications were tested for their predictive capabilities, and none were found to improve on the predictive power of the models presented here (see Appendix 4).

treatment and control groups[49]. It is the restricted sample of schools contained within the CSR linked to logit model 2 on which difference-in-differences regression estimation is to be based overall. The logit model with selected controls is marginally better able to predict schools that remained as non-Academies (93.11 per cent correctly predicted, as shown in column (3) of Table 7) than the logit model with full controls (92.97 per cent, column (1)). Logit model 1 can instead better identify future Academy schools (98.35 per cent correctly predicted compared with a slightly smaller 97.80 per cent under logit model 2). Given that neither of the CSRs originating from logit models 1 or 2 exclude any Academy schools, it would appear that the somewhat stronger predictive capabilities of logit model 2 in relation to the non-Academies sample constitutes sufficient justification for the use of schools in the CSR relating to it. Thus regression estimation covers all Academy schools and a wider and more flexible comparison group of non-Academy schools than would be the case were the CSR of the full logit model used[50].

It is worthwhile to briefly highlight the value in the finding that the CSRs pertaining to logit models 1 and 2 both include the full set of 33 Academy schools. Accurate definition of the propensity scores used to define these CSRs requires that all factors affecting assignment to the treatment group are known, can be observed, and that data on these factors are available to the researcher. Inaccuracies in treatment probabilities will therefore reflect unobservable components and/or unavailable data on variables that may have contributed to determining treatment assignment. In the present case, the fact that propensity scores correctly predict actual Academy school status among all Academies featuring in the sample therefore suggests these probabilities are well-defined by the set of observable characteristics on schools that are available in the dataset.

4 Empirical Results: Main Findings

The outcome measure that most illustrates the extent to which schools that switched to Academy status became more inclusive and mixed ability – therefore having the potential to enhance

[49] More specifically, the statistically significant differences in the pre-treatment attributes of Academy and control schools shown in Panel A of Table 6 are reduced in the formation of a common support region under both logit model 1 and the logit specification with selected controls (see Appendix 6, including Tables A4 and A5).

[50] The 'Empirical Results: Main Findings' section (4) that follows includes as a robustness check the sensitivity of difference-in-differences estimation to variations in the CSR, where one such variation is to use the CSR established under the fully-specified logit model. It will be evident from this analysis that the sample ATT parameter is unaffected by changes to the CSR (see Table 10).

equality in educational opportunity – is that of the average KS2 performance of pupils entering year 7 of all sampled secondary schools in each year. As an indicator of the prior attainment of pupils joining the school, this outcome measure might be expected to be inversely correlated with Academy school conversion, given that Academy schools developed by the Labour government tended to be set up in areas of disadvantage often characterised by pupils with low levels of academic achievement. In the available data, changes to intake quality in predecessor versus Academy schools and in control schools compared to 'treated' Academies can be gauged from information on the average KS2 total points score of pupils joining each school across the 11 years of 1997 to 2007. This then forms the dependent variable y_{st} shown in equations (1) and (2) of section 3, 'Empirical Methodology'.

Table 8 shows the evolution of the average value of this indicator in each year for the 33 Academy schools overall, separate cohorts of Academies and the restricted control group of non-Academy schools contained within the CSR identified from logit model 2 in Table 7. According to each category of schools the Table also indicates the change in the outcome measure between the initial year (1997) and most recent year (2007) for which data was available at the time of empirical assessment (August 2008; see column 12). The difference-in-differences estimates of this change in the outcome measure between the first and last year are highlighted in column 13 of the Table. Here the progression in school-level KS2 intake quality in both grouped Academies and each Academy cohort is compared to that in the restricted counterfactual group of 326 non-Academy schools within the CSR. The estimation equation is given by:-

$$y_{st} = \beta A_s + \delta A_s * PolicyOn_{t \geq k} + \lambda_t + \varepsilon_{st} \qquad (3)$$

That is, the outcome measure is regressed against the academy dummy variable A_s (with associated coefficient β), an interaction term that distinguishes the Academy years from the predecessor years in each Academy school over the sample window (i.e. *PolicyOn* equals 1 in those years at and following the policy of conversion ($t \geq k$) in Academy school s), and a set of year dummies which control for within-year effects that are common to all schools and are denoted by λ_t.

In line with the notion that original Academy schools would frequently feature pupils with a relatively weaker background of educational achievement, Table 8 shows that the KS2 total points scores of pupils entering grouped Academies (which includes their predecessor

counterparts) were *consistently below* those for pupils joining the sample of non-Academy schools in each of the 11 years shown. Although the gap in the outcome measure between these two groups of schools narrowed over the period, by 2007 Academies still sat below non-Academies in their intake quality distribution. However, Academy schools as a whole experienced a sharper rise in their pupil intake quality across 1997 to 2007 than did non-Academies. Column 12 of the Table indicates that the prior attainment of year 7 pupils jumped up by 15.95 KS2 total points in all 33 Academies combined between the end-points of 1997 and 2007 as compared with an increase of 13.56 in the outcome measure among the restricted sample of control schools. The difference-in-differences estimates of column 13 reveal the relative change between the treated and comparison group to be statistically significant, with an estimated δ coefficient of 2.38 on the interaction expression of equation (3). When estimation used the full sample of 389 non-Academy schools, the outcome measure changed by 13.08 KS2 total points, from 66.97 in 1997 to 80.05 in 2007. The δ parameter increased to 2.87 (with a standard error of 0.89) in this case (note that these results are not reported in Table 8). Therefore the process of restricting the estimation sample to those Academy and non-Academy schools within the CSR results in a more precise and conservative estimation of the relative change in pupil intake quality because observable heterogeneity between the two groups of schools is reduced in this region.

Looking at individual cohorts of Academies, the prior academic performance of pupil entrants went up the most amid those schools opening under the new status in the school years 2002/03 (cohort 1) and 2004/05 (cohort 3), with their KS2 total points rising by 16.63 and 17.52 respectively. Changes in the outcome measure among these cohorts seem to be the main drivers of the grouped change, given that statistical significance only holds for their estimated coefficients on the interaction term. It is worthwhile to point out here that caution should be exercised in the reading of these findings. Cohort-by-cohort estimates in general, and those already mentioned in particular, have been based on a very small number of Academies (cohort 1 featured only three Academy schools; cohort 3 contained just two Academies). Thus difference-in-differences estimation that uses these small sample sizes possesses little informative statistical content as compared with results that pertain to the larger sample of grouped Academies.

Academy schools that opened in 2005/06 (cohort 4) stand out as the group for whom average KS2 intake quality was high throughout the 11 year period and in most years (except 1999 and 2002) this lay above that in non-Academy schools. As was noted in section 3, 'Academy Schools Sample' (see also Table 2) it was in this year that Academy school conversion was undertaken by

several former CTCs. The CTC scheme, as a forerunner to the Academies programme, involved much the same process of replacing underachieving schools in disadvantaged areas with refreshed set-ups specialising in technology that were independent of LEA control and were sponsored by private business. By 1994 this initiative reached its peak with a total of just 15 CTCs formed, half the original anticipated amount. CTCs are often reported to have out-performed other schools within their areas in terms of the number of pupils getting GCSE passes in the A*-C range (Astle and Ryan, 2008)[51]. While raised attainment may be a product of improved standards of teaching and learning in CTCs, the evidence presented here also points towards a more favourable policy of admissions into these schools of pupils with a stronger ability background, the upshot of which may be higher school performance in the long-run. Overall, as an initial step in the analysis of intake quality changes in Labour's Academies, the results of Table 8 suggest that these schools admitted a different quality of year 7 pupils once they switched status relative to both their predecessor school(s) and the non-Academies. It would appear that in general students of a higher academic ability have been more likely to enter into the renewed school.

In Table 9, the findings established so far from simple difference-in-differences regression estimation that used data from the end years of the sample period only are subjected to further testing. Here information contained in all 11 years of the sample frame is fully exploited, while stringent testing based on the restricted sample of schools contained within the CSR is upheld. In the first two columns of Table 9 the Academy dummy variable of equation (1) is broken down into cohort dummies that distinguish and group Academy schools by their academic year of opening. In this case the estimation equation becomes:-

$$y_{st} = \left\{ \sum_{c=1}^{5} \beta_c A_{sc} \right\} + \delta A_s * PolicyOn_{t \geq k} + \lambda_t + \omega_{sj} + \varepsilon_{st} \qquad (4)$$

Where c ranges from 1 to 5 depending on the cohort to which the academy school belongs; λ_t is the set of year dummies; and ω_{sj} are a set of LEA dummies, one for each of the 25 LEAs in the sample. These are included so as to capture unobservable factors that are specific to each LEA (j)

[51] In 2007 CTCs averaged 91% of pupils gaining 5 GCSEs in the A*-C range, compared to a 60% average among comprehensive state schools. Including the subjects of English and maths in this category, CTC performance dropped to 70%, though this was still much higher than that in other state secondary schools (45%) (Astle and Ryan, 2008).

and affect all schools (s) within the respective LEA in the same way over time[52]. With cohort dummies added to the regression equation the coefficient δ gives the average change in the dependent variable when the effective policy on period is allowed to vary by the Academy cohort.

As can be seen from columns (1) and (2) of Table 9, Academy schools and their predecessors have tended to intake year 7 pupils of a lower prior ability than non-Academy schools. Findings from the estimation of equation (4) show that almost all of the coefficients on the cohort dummies are negative and statistically significant, whether controls are added for year dummies only (column 1), or both year dummies and LEA dummies (column 2). The exception is the fourth Academy cohort, whose average KS2 intake quality over the 11 year period was above that of all other non-Academy schools in the sampled LEAs (though this difference is not significant). Estimation of how intake quality changed in schools once the Academy policy came into effect reveals there to be a sharp jump up in the outcome variable in the conversion years. The statistically significant and positive δ coefficient indicates that when schools switched to Academy status their KS2 total points score was on average 2.460 points higher than in their predecessor years and compared to non-Academy schools. Benchmarking this against the sample average value of the dependent variable in the pre-policy year that is common to all Academy cohorts of 2002, the interpretation of this result is that the average KS2 total points score increased from 73.577 to 76.037 when schools re-opened as Academies, a rise of some 3.34 per cent[53].

Further disaggregation of the cohort-by-cohort analysis to the level of the individual school is enabled through the inclusion of controls for school fixed effects and the results deriving from this estimation method are shown in the final two columns of Table 9. In this case the more detailed specification of equation (2) is followed (see section 3, 'Empirical Methodology'). Column 3 of Table 9 excludes the vector of observable school-level characteristics that are present in equation (2) from regression estimation, while column 4 takes these into account.

[52] With LEA dummies modelled, regression analysis estimates deviations of the dependent and independent variables for each school from the LEA-specific average of these variables across all schools in the LEA over the entire time period (see column (2) of Table 9). This represents a higher level of aggregation than when school fixed effects are added (columns (3) and (4) of Table 9), in which case the regression models deviations from school-specific means.

[53] This is an approximate effect since schools converted into Academies in different years; therefore there is variation in the actual final pre-policy year applying to each cohort and the 2002 benchmark value represents the true final predecessor school year for the first cohort of Academies only. Taking into account the differing final pre-policy year mean values of the outcome measure by cohorts just changes the level at which the average KS2 total points score sits for each cohort following their conversion to an Academy, but the end result that there is an average jump up in KS2 intake quality across all Academy cohorts still remains.

Assessment of the within-school effect of Academy status on KS2 intake quality reveals a largely unchanged sample ATT parameter from that estimated at the cohort level; the δ coefficient remains statistically significant throughout and is only marginally reduced by the inclusion of observable school-level controls, falling from 2.460 to 2.409. That this finding remains even after controlling for the size of the school (in terms of the numbers of pupils it contains) is significant, as it suggests that the result is not explained away by the potentially larger pupil capacity of Academy schools, as might have been expected. Schools that became Academies did not simply increase their admissions of pupils with a stronger ability background whilst maintaining constant intake numbers of pupils from the rest of the ability distribution as before. Instead the results found here are indicative of changes to the pupil profile in Academy schools, such that the entry of higher ability pupils to these schools was made possible by changes in the distribution of intake patterns elsewhere. Likewise even after consideration for the capability of Academies to have a lower pupil teacher ratio through their freedom to offer reward schemes that could attract more teachers to the school, the substantial increase in the prior attainment of year 7 entrants holds[54]. With the coefficient (standard error) on the school size standing at 0.002 (0.001) and that on the pupil-teacher ratio being 0.002 (0.032), only the first of these variables is statistically significant but neither of them add enough explanatory power to the estimation equation to change the end result[55].

Overall these regression findings tally with those from the descriptive analysis of Table 8, and reaffirm that Academy schools sat below non-Academies in their intake quality distribution throughout the 11 year period (except for the fourth Academy cohort) but there was a significant narrowing of the gap in the outcome measure between these two groups of schools. This is particularly evident in the effective years of Academy school status, as the more rigorous regression testing presented in Table 9 has now shown.

[54] The notion that Academy schools might be able to accommodate a larger pupil capacity than their predecessor version(s) is suggested in section 2, 'Aims and Objectives', and the flexibility that Academy schools have had to set their own pay and conditions and to offer reward packages to teachers according to aspects such as their performance is discussed in section 2, 'Key Features' (in particular see point (vi) on staffing).

[55] These coefficient estimates are not reported in Table 9. Further school-level controls for the percentage of pupils getting 5+ GCSEs in the A*-C range and for the percentage of pupils without any GCSE passes were added to estimation equation (2), both separately and together. Including the former variable reduced the Academy on effect (standard error) from 2.409 (0.575) to 2.249 (0.573), while including the latter variable reduced the policy on effect to 2.307 (0.563). Including both variables, the δ coefficient fell to 2.208 (0.563). In all cases the statistical significance of this coefficient estimate remained. This suggests that their inclusion adds little to the findings and, given that these GCSE performance indicators refer to a different cohort of pupils from those entering year 7 of the school, they have been omitted from further analysis where a vector of observable school-level controls is used.

Robustness checks

The existence of an Academy effect on KS2 intake quality found in the regression analysis discussed above may be due to the nature of the sample restrictions and methodological approaches applied to the sample of schools, or due to some as yet unaccounted for pre-policy differential trends in this outcome measure across treatment and control schools. In order to establish whether the impact on the outcome measure of school conversion into an Academy has been correctly identified various robustness checks are carried out and the findings from this process are presented in Table 10[56]. The specific equation on which robustness tests are conducted is that which delivers the most conservative estimate of the Academy effect, namely equation (2) (see section 3, 'Empirical Methodology'), where the regression results relating to this model are given in column 4 of Table 9. If rigorous testing leaves these results unaffected, then this gives assurance that the analytical procedure utilised here identifies the effect of the policy.

To begin with, column 1 of Table 10 explores the notion that the positive δ coefficient is biased downwards by the presence of CTCs that converted to Academies in the sample of Academy schools. The CTC programme of school conversion into an LEA-independent technology focused institution was developed in England in the late 1980s and early 1990s, and culminated in the creation of 15 CTCs by 1994. As an early take on what has since constituted the Academies programme, the Conservative government's CTC scheme and the schools that it established were to increasingly become an integral part of the Labour government's Academy schools agenda. A total of five CTCs changed to Academies between the school years 2002/03 and 2006/07. Of these, four remain in the restricted set of 33 Academy schools for which all observable data over the 11 year sample period is available, three of which switched to Academy status during 2005/06 (cohort 4). The discussion surrounding Table 8 drew attention to the relatively greater KS2 intake quality of this cohort, a pattern that is evident across 1997-2007, indicating that predecessor CTCs were already admitting pupils of a higher prior ability than other pre-Academy schools. This observation points towards the potential underestimation of the Academy effect achieved so far due to the sample incorporation of CTCs-turned-Academies; for these schools the change in

[56] Unless otherwise stated all robustness tests are based on Academy and non-Academy schools contained within the common support region determined by the logit regression as defined in Table 7, model 2 (see also Figure 2).

the outcome measure between predecessor and Academy school years appears to have been lower than that among other Academy schools[57].

Removing former CTCs and their respective Academies from the common support region sample of schools reduces the set of Academies from 33 to 29. Two such schools represent the only Academies in their separate LEAs over the sample period. Once they are dropped all other non-Academy schools also featuring in these LEAs and forming part of the control group subsequently become redundant to the analysis. Thus the sample of non-Academies falls from 326 to 294 schools (a loss of 34 schools) following this adjustment. Re-estimation of equation (2) on the smaller set of Academy and non-Academy schools produces a larger status change effect; the δ coefficient increases from 2.409 to 3.046 KS2 total points scores. While the larger sample size relating to the initial coefficient estimate is favoured over that with sample exclusions, this exercise has shown that the impact on the outcome measure of school renewal is actually stronger than that first estimated when CTCs that became Academies are left out of the sample. Overall, the move of the coefficient in the anticipated direction following sample redefinition of this kind indicates that the findings from evaluation achieved up to this stage are being consistently estimated throughout.

In columns 2 to 4 of Table 10 the main regression result is tested for sensitivity to changes in the groups of treatment and control schools, or, more precisely, consideration is made here for the impact on estimation of changes to the common support region from which these groups derive. Thus the target of these tests is to understand whether the obtained coefficient relies heavily on the structure of the particular sample of schools on which it is estimated. In column 2 of the Table, equation (2) is applied to the complete sample of Academy and non-Academy schools with a full set of observations in all 11 years of data, and not just to those schools falling within the overlapping region of common support. This is equivalent to removing from the methodological approach the procedure used to progress from an adequately determined to a well-defined comparison group of schools that was set out in section 3, ‘Empirical Methodology’.

[57] The average KS2 total points score of pupils entering CTCs during the pre-policy period that is common to all Academy cohorts (1997 to 2002) is 83.917, and in the Academy school years of these CTCs post-conversion (2003 to 2007) this average increases to 88.374, a rise of 5.312%. Among other Academy schools, their predecessor years average is 67.635 and this increases to 74.402 during the Academy years, a gain of 10.005%. Hence this reveals a potentially higher KS2 total points score level in CTCs compared to other Academy predecessors that is followed by a lower change in this dependent variable once CTCs converted into Academy schools relative to once other predecessor schools made the change.

As can be seen from the Table, relaxing this sample restriction leaves the set of Academy schools unaltered and increases the set of non-Academies by 63 schools, to 389 schools. The end results that this produces on the ATT parameter are to maintain its statistical significance and to increase its estimated size by 0.138 KS2 total points scores, from 2.409 to 2.547, so that there is an increase in the Academy effect implied by the differences in these two coefficients of 5.74 per cent[58]. That conditioning estimation to the sample of schools within the CSR generates a lower δ coefficient is a finding which is in line with expectations. The process of identifying a common support region aims to improve the precision with which the counterfactual scenario is defined, leading to the sample elimination of non-Academy schools differing greatly in their observable pre-policy characteristics (and hence their implied propensity of treatment) from Academies. The design of a more stringent sample frame that ensues delivers more conservative policy effect estimates because heterogeneity between treatment and control schools, in terms of variation in their observable attributes, is reduced by this method. Thus the outcome of this initial sensitivity analysis is in accordance with the main regression result.

The resilience of the Academy impact to variations in the common support region is tested in columns 3 and 4 of Table 10. Column 3 uses the propensity scores and CSR pertaining to the logit model with full controls, shown as model 1 in Table 7 (see also Figure 1). In column 4 the likelihood of conversion to Academy status for each school and the CSR are re-estimated using a non-linear probit model on the same set of selected controls as for logit model 2 in Table 7[59]. In both of these cases the overlapping region of common support includes fewer non-Academy schools than does the CSR associated with logit model 2, the preferred logit specification, while all 33 Academy schools remain. For the logit regression with full controls the CSR is smaller by 61 non-Academies, 60 of which feature in the CSR determined under logit model 2, and one of which does not. The probit model that uses selected controls is smaller by 57 non-Academy

[58] This percentage increase is determined as follows: (2.409/73.577)*100 = 3.274%; (2.547/73.577)*100 = 3.462%; and ((3.462-3.274/3.274)*100) = 5.74%. Here the value 73.577 is the average KS2 total points score in 2002, the common pre-policy year for all Academy cohorts (see the notes to Table 9); 3.274% is the percentage change in this average when the common support restriction is applied to the sample; 3.462% is the equivalent percentage change in this average when the common support restriction is dropped; and therefore 5.74% gives the percentage increase in the Academy effect as a consequence of the difference in the two estimated coefficients.

[59] The probit model, like logit model 2, only estimates a statistically significant marginal effect on the percentage of pupils getting no passes at the GCSE stage. The percentage effect contribution of this observable variable on predicting the probability of a school becoming an Academy is 9.42% using logit model 2; in the probit model the equivalent percentage effect is higher, at 12.06%. The logit and probit models are equally good at correctly predicting which schools remain as non-Academies (93.11% are correctly predicted under both models), but the probit model is marginally better at predicting which schools become Academies (98.35% versus 97.80% under logit model 2 – see also Table 7). In this respect, the results from probit model estimation support the notion of the relative importance of poor school performance in determining school conversion into an Academy, thus being in accordance with the original model of the scheme as was developed by the former Labour government.

schools, all of which are contained within the CSR of logit model 2. The distribution of the propensity scores derived under the probit model is illustrated in Figure 3.

Interestingly, the reduction in the number of schools in the comparison group of non-Academies that results from common support area changes makes little difference to the size of the estimated Academy effect and leaves the statistical significance of this effect unchanged. The use of a fully-specified logit model cuts the δ coefficient by just 0.009 KS2 total points scores. This suggests that employing a more parsimoniously expressed logit model that consumes less degrees of freedom by requiring the coefficients on fewer explanatory variables to be evaluated represents an effective technique. The δ coefficient relating to the probit model is smaller by 0.051 points, at 2.358. It was noted in section 3, 'Empirical Methodology', that the logit model produces a distribution of implied probabilities that exhibits wider tails than the probit model, so that the former non-linear specification is better able to estimate extreme propensity scores on the edges of the [0, 1] space. This aspect of the logit model makes it better suited to the schools sample used here, given the clear division in assignment to treatment status for Academy schools versus non-Academies. The logit model is more likely to group the probability of assignment to the treatment group around one for Academy schools and close to zero for non-Academies than the probit model, which instead generates a larger central distribution of treatment propensities. The fact that the logit regression identified more non-Academy schools in the CSR than did the probit, even if modelling used the same set of selected observable controls, provides evidence of the relatively stronger capabilities of the logit model in predicting extreme probability values, and hence the better application of this non-linear form to the current dataset. Overall the sensitivity tests carried out in columns 3 and 4 of Table 10 indicate that the estimated Academy effect is not responsive to variations in either the specification or the functional form of the non-linear model used, nor to the resultant changes in the CSR that re-estimation of propensity scores produces. Given that a smaller sample of comparison schools is contained in both of the alternative non-linear expressions, the preferred logit model has the comparative advantage of allowing estimation to utilise a greater number of observational units.

The final three columns of Table 10 assess whether the witnessed Academy effect is attributable to the nature of the trends that the outcome measure was following in schools in the years prior to Academy status introduction. Column 5 looks for differential trends in KS2 intake quality between Academy and non-Academy schools in the pre-policy period that continue into the effective years of the Academy policy and that can account entirely for the estimated ATT

coefficient. The difference-in-differences regression models the policy impact assuming that a discernable gap in the outcome measure between Academy and non-Academy schools displays a common and parallel trend across all 11 years of data. In the effectual policy years the expression (δA_s*$PolicyOn_{t\geq k}$) in the difference-in-differences equation allows for the size of this gap to change, but the parallelism of the outstanding distance in KS2 intake quality between treated and control schools is assumed to remain. If instead there is evidence of differential trends in the outcome measure between the two groups, then the estimated δ coefficient may just be capturing these. Hence this part of the robustness analysis amounts to an explicit test of the validity of the common trends assumption on which identification of the ATT parameter using the difference-in-differences estimation procedure relies. If the common trends assumption does not hold then this introduces bias into the ATT parameter so that the difference-in-differences method does not consistently estimate the ATT coefficient (Blundell and Costa Dias, 2008)[60]. Differential trends can be accounted for by including in equation (2) additional controls that interact the individual school fixed effects (modelled as school dummy variables[61]) with a term that counts the school years (m), where m equals 1 to 11 for each year of data (1997 to 2007) pertaining to school s. The regression equation then becomes:-

$$y_{st} = \delta A_s * PolicyOn_{t\geq k} + \Psi Z_{st} + \xi_s + \left\{ \sum_{s=1}^{359} \theta_s \xi_s * m_s \right\} + \lambda_t + \varepsilon_{st} \qquad (5)$$

As shown in column 5 of Table 10, the δ coefficient is robust to the inclusion of school-specific trends in the difference-in-differences regression; the Academy effect is positive (at 2.136 KS2 total points scores) and statistically significant. This means that there is no evidence of differential trends in the outcome measure between Academy and non-Academy schools that can account for the policy effect. The common trends assumption is not violated here and as a consequence the sample ATT is consistently estimated using the difference-in-differences approach.

In columns 6 and 7 of the Table a falsification exercise takes place that involves testing the robustness of the main regression result to the notion of trends in the outcome measure in treated

[60] Consistency is a large sample property. The sample ATT parameter will be a consistent estimator if in the limit of the sample size (that is, when the sample size increases indefinitely) the distribution of this estimator collapses to a single point (with zero variance around that point) that represents the true ATT value (Gujarati, 1995).
[61] Notice that coefficients on a total of 359 school dummies interacted with the school year count (m) are estimated, corresponding to the sum of 326 non-Academies and 33 Academies contained within the common support region.

and control schools exhibiting a similar historical pattern in the years prior to the Academies scheme as that displayed by the two groups in the pre-post policy period. If there is evidence of an analogous evolution in the dependent variable occurring at some previous time interval, then the jump up in KS2 intake quality that is attributed to the impact of school change to Academy status simply reflects unaccounted for pre-existing variations in the outcome measure between treated and control schools. An effective way to assess whether this is the case is to run an experiment where, for each Academy cohort, their total number of years of school status as an Academy are shifted to an earlier time period. If re-estimation of the Academy effect in this 'fake' policy set-up gives a similar result to that in the true policy framework then the measured impact is fully accounted for by historical trends. In this test the policy period should be moved so that the alternative Academy school era does not overlap with the real policy on phase of any of the cohorts. If overlap does happen then the fake experiment may contain treatment contamination in the explanatory variables. Also, the experimental scenario should include observational points in which schools were not Academies, to allow a pre-versus-post policy evaluation to take place. Given the abundance of historical information on schools contained within the dataset used here, there are enough years of data available to make this testing method viable. In particular, the six years 1997 to 2002 represent a universal pre-policy period across all sampled Academy cohorts to which the experimental setting can be applied. Table 11 indicates the practicalities behind this testing process and how the 'fake' trial situation compares with that which has actually existed for each wave of Academy schools.

As can be seen from the Table, the fake policy experiment does not use data from any years corresponding to those where schools had converted to Academies (2003 to 2007). Instead difference-in-differences estimation is based on the six pre-policy years that are common to all Academy waves. In this respect the experimental setting uses a reduced number of predecessor annual observations for each Academy cohort with respect to previously. Two issues relating to this change in the sample frame warrant discussion here. The first is whether the actual Academy effect that was estimated on the full set of 11 years of data is also evident if only 6 years of data are utilised. The second is whether this Academy effect exists if the pattern of predecessor and Academy school observations on which it is based is made to resemble that in the falsification exercise. If these conditions are satisfied then the outcome of the fake test can be directly compared to the actual case, since the difference in the number of years used in each regression and the change in the pre-post policy set-up do not affect the estimated result of the policy.

The outlined sections of the 'actual' rows in Table 11 illustrate how the pre-post policy pattern and number of annual observations in the experimental test can be mirrored in the actual situation. It can be seen that the years 1997 to 2001 are no longer drawn on in this shortened sample period. Column 6 of Table 10 shows what happens to the sample ATT parameter in the true policy period when it is re-estimated using just 6 annual observations covering 2002 to 2007. This reveals there to be a positive and statistically significant change in KS2 intake quality among Academy schools even when a reduced number of years of data are employed ($\delta = 2.388$). This means that the outcomes from the falsification experiment and the actual result are comparable. Column 7 of Table 10 presents the change in the dependent variable arising from school conversion into an Academy when consideration is made for a similar evolution in trends in this indicator between treatment and control schools in an earlier time period. The finding from this falsification test is that the Academy effect is not evident in the pre-policy interval; the δ coefficient stands at a small and statistically insignificant 0.148 KS2 total points scores in the experimental scenario. Therefore the rise in pupil intake quality in Academy schools relative to both their predecessors and non-Academies that is found in the actual policy setting reflects a genuine impact of school conversion into an Academy rather than a repeat of historical patterns.

To summarise, all of the robustness checks carried out in Table 10 provide qualification for the correct identification of the impact of Academy school status on patterns of intake ability, where the measured effect is indicated in column 4 of Table 9. The outcome of re-estimating this effect using only 6 years of data (as discussed above and shown in Table 10, column 6) also provides assurance about one particular aspect of the evaluation process. It was noted in section 3, 'Dataset Construction', that pupils joining year 7 of Academy schools, their predecessors and other non-Academy schools (featuring in the same LEAs as Academies) in each year from 2002 to 2007 could be identified using PLASC data that has been available annually from 2002 onwards. The academic quality of these pupils could be established from their record of prior attainment in KS2 exams taken at the end of the primary school stage, and these were linked to the PLASC data using a pupil identifier. Over these 6 years a complete record of the academic ability of pupils entering the sample of secondary schools could thus be determined from the available PLASC data. In order to establish which pupils were entering this set of secondary schools in the years prior to PLASC a process of extrapolation that exploited KS3 pupil-level records was employed, as discussed in section 3, 'Dataset Construction'. More specifically, the code of the school attended by the pupil at KS3 (when pupils are aged 13/14) was used to infer which pupils were in the schools two academic years earlier as new entrants (aged 11/12), and KS2 records of the prior

attainment of these pupils were then linked in. This method of extrapolation enabled the sample window to be lengthened from the 6 PLASC years of data covering 2002 to 2007 to an eleven year period, that of 1997 to 2007.

One concern about this extrapolation procedure was the potential for pupil mobility between the start of secondary school and the time when KS3 exams were taken to generate inaccuracies in the inferred records of pupil entry into the secondary schools of interest. A plausible way to check whether pupil mobility is an issue is to compare difference-in-differences regression estimation of the Academy effect when all 11 years of the data are used with that derived from a sample window based around only the 6 years of PLASC data (2002 to 2007). The outcome of the latter regression using the 6 PLASC years is exactly that shown in the robustness exercise of column 6 in Table 10, and, as was discussed, this yields only a fractional downwards change in the estimated policy effect in comparison to regression analysis that exploits the full sample period. Hence estimation that uses all eleven data points is reliable according to the checking approach carried out here. Pupil mobility does not appear to have impacted on records of intake into secondary schools in the years 1997 to 2001 and the KS3-derived part of the sample acts as a valid proxy for actual pupil entry into each secondary school in the years before PLASC.

A further point that warrants discussion at this stage is the potential for changes in intake behaviour among Academy schools to have affected the intake patterns of other non-Academies, so that the measured Academy effect stems from the use of an inappropriate comparison group. In particular, if Academy schools competed with non-Academies for pupil intake from the same supply pool, then the increased entry of more academically able pupils into Academies may have come at the expense of a reduced quantity of this pupil type for non-Academy schools to admit. In this case, the introduction of the Academies programme in an area would have resulted in a 'crowding out' effect in the pupil admissions supply for other local schools. Then this raises the issue of the validity of using similar schools in the LEA that did not become Academies as a comparison group, given that they may not have been unaffected by the programme.

There are two lines of argument to suggest that policy spillovers are not a major cause for concern in the present scenario. Firstly, of the 25 LEAs sampled here, there is on average one Academy school featuring in a single LEA, with the highest number being three. In terms of the

control group of non-Academies, the mean number per LEA is 13 schools[62]. Given these statistics, it is unlikely that intake behaviour changes in one post-conversion Academy school could have had an impact on pupil admissions in all 13 control schools within the LEA of that Academy. Therefore any contamination effects of treatment on the untreated group are likely to be too minor to cause concern. Secondly, the average annual KS2 total points scores of pupils entering year 7 of the set of non-Academies were reported in Table 8, where it was shown that the comparison group still experienced intake quality growth between 1997 and 2007 but to a lesser degree than did all predecessor-turned-Academies. It can be seen from inspection of the figures shown in this Table that year-on-year changes in intake quality in the non-Academy group are always positive, even in the period of conversion into Academy status by other schools (2003 to 2007). The fact that pupils entering non-Academy schools were of an increasingly stronger academic quality throughout the 11 year window implies that intake into these schools was not substantially altered by the presence of competing Academies in the local area. Taken together, the arguments raised here provide justification for the use of non-Academies as an effective control group, given that there appear to have been no significant indications of policy spillovers occurring from Academy to non-Academy schools that might have affected pupil admissions for both parties.

[62] Inspection of the data revealed there to be on average one Academy school within an individual LEA, and only 2 LEAs feature a maximum total of 3 Academy schools. The per-LEA control school averages reported in the text are calculated by dividing the total number of non-Academy schools within the CSR (326) by the total number of 25 LEAs. Without the common support region restriction applied, there are on average 16 non-Academy control schools within the LEA of one Academy school (389 non-Academy schools are present in the full sample). In fact, the original dataset contained even more non-Academy schools relative to the sample of Academies, some of which were dropped in the process of deriving a balanced panel of school-level observations (see Appendix 2, including Table A1). Thus all figures discussed here understate the actual number of control schools within the LEA of an Academy.

Dynamic effects

School conversion to Academy status has thus far been shown to be *generally* characterised by these schools having admitted year 7 pupils with a higher record of prior attainment. The stringent model estimated in column 4 of Table 9 revealed a statistically significant 2.409 rise in the KS2 total points scores of pupils entering Academy schools, a finding that stands up to a whole host of robustness checks. This policy effect estimate is assumed to be *unchanging* over time in the Academy years and it indicates the *average instantaneous response* of all 33 Academy schools to treatment. In Table 12 tests are carried out which look for evidence of dynamic reactions to the Academy schools policy, such that the outcome measure may have continued to change among Academies as the length of exposure to the scheme increased with time. Testing also asks whether any dynamic or otherwise static effects are coupled with heterogeneous impacts of school conversion by each Academy cohort. Here the aim is to understand if the estimated ATT coefficient is attributable to the policy responses of a particular cohort or cohorts of Academy schools.

In the first column of Table 12 all schools that became Academies are assumed to have had the same initial change in their KS2 intake quality on average (as per column 4 of Table 9), but this immediate policy reaction is additionally tested for further changes over time. A non-flat slope in the effective policy years would suggest that gradual year-on-year changes in intake quality occurred and these added to the instantaneous post-conversion rise. Column 1 of the Table preliminarily models this growth rate as being identical for all Academy schools, such that estimation follows equation (2) but with a control for time effects inserted as follows:-

$$y_{st} = \delta A_s * PolicyOn_{t \geq k} + \eta\left[A_s * PolicyOn * (t - k + 1)\right] + \Psi Z_{st} + \xi_s + \lambda_t + \varepsilon_{st} \qquad (6)$$

Here the coefficient η measures the average change in the outcome measure for each incremental year of Academy school status (t-k+1, where t is the year and k is the year in which the school became an Academy). The results of regression estimation suggest that accounting for more adjustments in KS2 intake quality as schools continued their Academy experience does little to change the average treatment effect, with the δ coefficient remaining statistically significant and just above 2 KS2 total points scores, at 2.009. This unchanging result arises because there is no

significant time-on effect (η = 0.208; standard error on η = 0.240), with the implication being that the null hypothesis of an initial average rise followed by flat growth in the dependent variable as Academy school exposure carried on cannot be rejected. Thus it would appear that there is only a one-off augmentation in pupil quality that happened as soon as schools re-opened as Academies.

The notion that different cohorts of Academies may exert varying degrees of influence on the δ coefficient is considered in column 2 of Table 12, where this average initial policy response is allowed to differ by the cohort. In this case some Academy waves may have changed the intake quality of their new entrants by more than others once they became Academies, so that they have driven the immediate jump up in the outcome measure. Estimation of the following equation establishes a separate δ sample parameter for each Academy cohort, c, where c ranges from 1 to 5:-

$$y_{st} = \left\{ \sum_{c=1}^{5} \delta_c A_{sc} * PolicyOn_{t \geq k} \right\} + \Psi Z_{st} + \xi_s + \lambda_t + \varepsilon_{st} \qquad (7)$$

As can be seen from the findings in column 2, Academy cohorts responded in much the same way to the policy, with a per cohort effect ranging between positive KS2 total points score changes of 1.596 (cohort 4) and 3.701 (cohort 3). While the former estimate is not statistically significant, there is sufficient overlap in the confidence intervals on these sample coefficients to suggest similarity in cohort reactions to Academy status on KS2 intake quality changes. This cohort-common policy consequence is formally checked through F-tests that set two separate null hypotheses, one of a zero effect on the outcome measure from conversion to an Academy, where this non-effect is equal for all Academy cohorts (δ_c = 0 for all c), and the other of a cohort equal effect ($\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5$). These F-tests reconfirm the findings that there was a positive, non-zero equal initial change in the outcome measure among the five Academy groups, suggesting that no Academy cohort or cohorts in particular generated the average response over and above others (see the rows in italics in Table 12, where the p-value on the first F-test in column 2 is 0.000 so that the null hypothesis is rejected and that on the second F-test is 0.824, so that the null cannot be rejected).

Taking the analysis of column 2 to the next level, column 3 of Table 12 combines heterogeneous policy impacts with a non-flat growth in the outcome measure that is common to all Academy

schools during the post-policy period. Thus the testing procedures of columns 1 and 2 are combined and jointly assessed in this evaluation stage, so that the estimation equation becomes:-

$$y_{st} = \left\{ \sum_{c=1}^{5} \delta_c A_{sc} * PolicyOn_{t \geq k} \right\} + \eta \left[A_s * PolicyOn * (t - k + 1) \right] + \Psi Z_{st} + \xi_s + \lambda_t + \varepsilon_{st} \quad (8)$$

In line with the findings from the earlier tests, there is no evidence of either prolonged responses to treatment among all Academy cohorts or differential impacts of status change on the dependent variable by the Academy cohort. The η coefficient is not statistically significant and the F-statistics suggest a rejection of the null hypothesis that $\delta_c = 0$ for all c, instead indicating that $\delta_c > 0$ and is equal for the sample of 33 Academies.

In the final column of Table 12 the most flexible pattern of responses to Academy conversion is considered, in which all possible facets of cohort heterogeneity are allowed to occur; Academy cohorts are tested for differential initial changes in the outcome measure upon switching to Academy status as well as for further policy reactions through time that likewise vary by the cohort. Then equation (8) shown above is adapted slightly and is written as:-

$$y_{st} = \left\{ \sum_{c=1}^{5} \delta_c A_{sc} * PolicyOn_{t \geq k} \right\} + \left\{ \sum_{c=1}^{5} \eta_c \left[A_{sc} * PolicyOn * (t - k + 1) \right] \right\} + \Psi Z_{st} + \xi_s + \lambda_t + \varepsilon_{st} \quad (9)$$

It should be emphasised that estimation of all of the parameters in equation (9) using a sample of just 33 Academy schools is a very demanding exercise. Nevertheless, regression findings reveal that the results pertaining to all other columns of the Table remain; there has been a homogenous cohort response to the Academy policy and no changes to the outcome measure after the average positive change which happened initially when schools converted to Academies. Conclusions deriving from the F-tests on the δ coefficients of column 3 are unchanged when extended model specification (9) is estimated in column 4. Further tests for joint significance of the η coefficients across Academy waves indicate that time-on effects take the value of zero and are equal in all five cohorts; the p-value on H0: $\eta_c = 0$ for all c is 0.227 so that the null hypothesis is not rejected

and that on H0: $\eta_1 = \eta_2 = \eta_3 = \eta_4 = \eta_5$ is 0.438, again suggesting that the null hypothesis holds (see the last two rows of Table 12).

Overall, the dynamic equation models (6) to (9) estimated in Table 12 give weight to the persistent regression finding that there was an immediate increase in KS2 intake quality once schools became Academies. Beyond this initial rise there have been no more changes in this outcome measure over the sample period, though the jump up is a constant impact that has neither reversed nor reduced over time in the effective policy years. Moreover, this pattern of behaviour has not been witnessed among non-Academy schools, nor was it evident at some earlier point in time, as the pre-policy robustness test results in column 7 of Table 10 showed. Thus the estimated Academy conversion effect shown in column 4 of Table 9 and derived using regression equation (2), which excludes cohort-specific controls, binds in all tested circumstances. All Academy schools changed their intake of pupils to those with an average 2.409 higher KS2 total points score as soon as they opened as Academies, and this sample ATT coefficient is statistically significant and robustly identified. The lack of evidence of dynamic effects may reflect the small size of the Academy schools sample utilised here. A useful future research exercise would be to determine whether heterogeneous cohort responses to the policy can be found in a larger sample. This could be assessed using data spanning the academic years 1996/1997 to 2009/2010 and involving Academies that were set up according to Labour's model of the scheme – that is, encompassing those Academies which were established before the Coalition government's change in the Academy policy upon their coming to power in May 2010.

Possible mechanisms behind changing intake quality

In the final part of the evaluation process to be concerned with KS2 intake quality changes, Table 13 presents findings from analysis that looks into the mechanisms behind the positive jump in this dependent variable among schools that became Academies as compared to other schools in the sample. To start with, in the first four columns of Table 13 regression estimation exploits available information on the pre-KS2 performance of pupils. Data on the KS1 test outcomes of the sample of year 7 pupils were linked in to the pupil-level file already containing their KS2 attainment scores prior to the collapsing of the pupil-level dataset to the level of the individual school. KS1 tests scores are available in the NPD from the academic year 1997/98 onwards; KS1 tests are taken in primary school when pupils are aged 6/7, and are followed up by KS2 tests

which are taken four school years later in the final year of primary school when pupils reach the age of 10/11.

Further details on the historical academic ability of pupils entering the secondary schools sample are added in because much can be learnt about the types of higher ability pupils that entered Academy schools from their KS1 records combined with their KS2 outcomes. It may be, for example, that Academy schools have admitted pupils showing signs of improved learning over time, so that their value-added test score gains between KS1 and KS2 are high. Or pupil intake into Academy schools may have comprised of pupils showing consistently strong levels of attainment, in which case their KS1 and KS2 total points scores may be high but remained at a similar level between the two tests so that value-added gains are low. If intake patterns are more reflective of stronger growth in value-added then this suggests that Academy schools have preferred to admit pupils who attended primary schools that are more likely to have been effective in raising educational performance and attainment. On the other hand, higher KS levels (and lower value-added increases) among new entrants to Academies implies that admissions have been geared more towards pupils with a higher 'innate ability'. This is true if early measures of attainment, such as KS1 test score outcomes, are perceived to capture pre-determined learning capacity that derives from factors like the influence of family background on the pupil rather than academic skills acquired in the immediate years of exposure to primary school education. Hence further analysis of this kind helps in understanding more about the nature of the KS2 intake changes shown to have taken place among Academy schools.

The addition of KS1 records of attainment to the dataset reduces the number of pupils in each secondary school in the sample because details on both KS1 and KS2 performance are not available for every pupil that entered these schools[63]. Records of the year-on-year school-level average KS2 total points scores are consequently raised or lowered, depending on the implications that missing combined KS1-KS2 data has on changes to the pupil intake sample for secondary schools. Also, the number of annual observations on the secondary schools sample is reduced because KS1 data records existing from 1998 link to KS2 records from 2002, and pupils who took their KS2 tests in this year began secondary school in 2003. The starting point of KS1 to KS2 analysis is therefore cut to 2003 among all secondary schools and the years 1997 to 2002 can no longer be exploited for their pre-policy informative content on historical intake patterns in

[63] Table A1 in Appendix 2 shows the annual drop in the sample of year 7 pupils when records on both KS1 and KS2 attainment are required, as well as the percentage of the year 7 sample with a matching KS1 record in each year, over the period 2003 to 2007.

these schools. This means that for the first cohort of Academy schools opening from September 2002 and completing their first academic year in 2003, there is no KS1 data available to match to the KS2 outcomes of pupils entering their pre-policy, predecessor schools in the years before 2003. This makes pre-post difference-in-differences analysis infeasible for the initial Academy cohort and for this reason the three Academy schools in the cohort are dropped from the sample. All other non-Academy schools featuring in the LEA of a dropped Academy school are also excluded so long as that Academy school represents the only one in the LEA within the utilised sample.

Columns 1 and 2 of Table 13 check the sensitivity of the estimated impact of Academy school conversion on KS2 intake quality to changes in the sample structure associated with the use of KS1 data matched to KS2 records. In column 1 the trimmed nature of the changed sample structure is imposed on the original schools sample. Hence this testing procedure amounts to re-estimating equation (2) using the original form of school-level annual average KS2 total points scores (in which not all pupils have a matching KS1 record), a reduced number of years (2003 to 2007), and a smaller set of Academy and non-Academy schools (cohort 1 Academies and associated control schools for sole Academies in the LEA of this cohort are dropped). The δ coefficient falls marginally from 2.409 to 2.339 KS2 total points scores in this case, so that the smaller sample frame has little effect on the estimated policy impact.

In column 2 of the Table, equation (2) is again estimated on the reduced sample structure that uses fewer annual observations and secondary schools, but this time all pupil entrants are required to have a full record of KS1 and KS2 outcomes. Thus here the dependent variable has differing average annual values from the original case depending on how many pupils had to be dropped from each school in the sample because they lacked both KS1 and KS2 records. As can be seen from the Table, the Academy effect estimate is lower when this sample is used: δ drops by 0.651 KS2 total points scores to 1.758. So the dependent variable has changed to an extent where the estimated policy impact has fallen by more than when the number of years and schools on which estimation is based are reduced (as can be seen by comparing the coefficient results shown in columns 1 and 2 and the Academy school dependent variable averages in the pre-policy year of 2003). It is likely that some of this reduction in the estimated effect stems from conditioning the sample of pupils within schools to have both KS1 and KS2 outcomes. Pupils of this kind may be of stronger academic ability, to the extent that a regular record of attainment indicates greater motivation and commitment to learning. The KS1-KS2 sample also excludes

recent immigrants who, by definition, do not have a continuous record of education in the country, and who may account for a large share of the lower levels of KS2 attainment. Indeed, higher standards of attainment in the group of pupils with KS1 and KS2 outcomes are evident from the higher level of pre-policy KS2 intake quality in this sample, resulting in a decrease in the measured policy impact[64]. Although the coefficient estimate is lower in column 2, a positive and statistically significant jump up in KS2 intake quality among Academy schools remains the dominant finding, suggesting that, in general, this result is not sensitive to sample structure alterations.

Having tested whether the estimated Academy effect persists following sample changes, the next 2 columns of Table 13 use the matched KS1 and KS2 sample to consider if schools admitted more of a particular pupil type once they became Academies: either pupils with a stronger innate ability background or improved learners who likely attended more effective primary schools. Regressing school-level annual average KS1 levels in the first case and school-level value-added in the second case on the right hand side components of equation (2) produces δ estimates as shown in columns (3) and (4) respectively. The findings suggest that Academy school admissions steered marginally towards the direction of inherent pupil academic ability over and above the incorporation of pupils with strong value-added gains between the key stages. While the δ coefficient on KS1 to KS2 value-added is positive but not statistically significant, that on KS1 levels is higher and has statistical significance at the 10 per cent level (t = 1.70, compared with a t-value of 1.645 at the 10 per cent level of significance). This is not a result that stands out and it is important to note that, generally-speaking, it is not clear how well informed state secondary schools are about the prior attainment of pupils applying for (year 7) entry to their school. Nevertheless, this finding has raised the issue of a potential change to the types of pupils comprising Academy school intake relative to what went before.

Exploration of the processes governing intake quality changes in Academy schools now moves on to look at variations surrounding the sources of pupil intake into these schools. In column 5 of Table 13, consideration is made for whether the number of primary schools from which secondary schools got their pupil admissions differs among schools that converted to Academy status versus non-Academies. Then column 6 asks if schools that received Academy 'treatment' subsequently took their intake of pupils from relatively higher performing primary schools than did their predecessors or the comparison group of schools. These issues are examined by re-

[64] The mean of the dependent variable for Academy schools in the pre-policy year of 2003 is 75.01 KS2 total points under column (2) of Table 13, which is greater than that under column (1), of 73.69 points.

estimating equation (2) using as a dependent variable the number of intake primary schools or the average annual KS2 performance of these intake primary schools respectively. The results shown in column 5 indicate that Academies featuring in the sample increased their primary school supply pool following their status switch relative to control schools[65]. The size of the δ coefficient in this case is estimated as a statistically significant 4.427 intake primary schools. Thus the mean number of primaries from which predecessor Academies got their intake in the common pre-policy year of 2002 is 33 schools and after conversion this rose to almost 38 schools, a gain of 13.42 per cent. This increase is found even though the regression equation includes a control for the potentially larger pupil capacity of each Academy school compared to their predecessor(s)[66], therefore it is not simply a reflection of school size changes. Turning now to primary school performance, the findings in column 6 of the Table show that those pupils entering Academies also came from academically stronger primary schools. The average school-level KS2 performance of intake primaries is 0.865 total points higher in the Academy school years, suggesting that while predecessor schools got their intake from primary schools with an average performance of 75.62 KS2 total point scores (in 2002), the quality of primary schools from which admissions came once these schools switched to Academies is about 1.2 per cent higher, at 76.49 total points.

In columns 7 and 8 of Table 13 the auxiliary informative content provided by the above lines of enquiry into changes in the sources of pupil entry is explicitly modelled in the main difference-in-differences regression (equation (2)) with average annual KS2 total points scores as the outcome measure. Column 7 highlights what happens to the estimated δ coefficient when the indicators used to measure these issues are included as supplementary explanatory variables in the regression and column 8 adds to this further controls for observable primary school-level characteristics, listed in the notes to the Table.

As can be seen from the results presented in Table 13, these extra regressors do help in explaining which factors shaped the rise in pupil intake quality among schools that converted into Academies. About 34.70 per cent of the measured boost in KS2 intake ability can be accounted

[65] The number of primary schools from which secondary schools got their year 7 intake in each year is determined using information on the code of the school attended by each intake pupil at the time that they took their KS2 tests (where these are taken in the last year of primary school). Each different primary school code was assigned the value of 1 and values were then summed at the secondary school level. The average annual performance of the primary school attended by each pupil entering year 7 of secondary school was averaged again at the secondary school-level in order to establish the mean quality of intake primary schools.

[66] Note that school size changes in the sample of secondary schools are captured in the vector of observable school-level controls that are expressed in equation (2) by the term ΨZ_{st}.

for by the fact that post conversion, and with school capacity changes controlled for, Academy schools in the sample tended to admit pupils from a larger number of primary schools and from primary schools that performed better on average at KS2 than did either their predecessors or other non-Academy schools. This shows that the Academy effect partially reflects changes to intake sampling among Academy schools. The policy effect estimate drops from 2.409 to 1.573 KS2 total points scores once consideration is made for the influence of these extra controls (see column 4 in Table 9 and column 7 in Table 13 respectively). With the characteristics of primary schools added, the estimated δ coefficient is marginally reduced again, to 1.567 KS2 total points scores[67]. While these changes in the measured Academy effect are important, the δ coefficient is still positive and maintains its statistical significance even after all of these factors have been taken into account. This is a result that has substantial implications. In particular, the sustained finding of an increase in intake quality among Academy schools once average primary school performance has been conditioned out suggests that these schools not only admitted more academically able pupils once they switched status, but some of these pupils attained KS2 standards of achievement that were above the average for their primary school. As has been the case for all previous regression analyses, this outcome remains even after controlling for potential pupil capacity increases in Academy schools. Therefore, this provides further evidence of a changing intake ability profile in the sample of Academies that appears to reflect more pupil entry by higher ability pupils, including those with above (their primary-school) average test performance, at the expense of changes to pupil intake at other points in the attainment distribution.

The crucial question that has yet to be answered is where along the ability distribution intake changes into Academy schools have taken place, with these adjustments having then enabled their intake to include more pupils of a relatively stronger average prior ability. In the final column of Table 13 results from an attempt to evaluate this issue are presented. Here estimation considers how the annual dispersion of KS2 intake ability into Academy schools compares with that in predecessor and control schools. In other words regression analysis assesses whether the year-on-year KS2 attainment range of pupils entering Academy schools looks narrower or wider than it was for their pre-Academy counterparts and for non-Academies. Given that the sample of Academies raised their admissions of pupils with higher prior attainment without this effect being fully absorbed by school size growth, then mean intake quality could have been pushed up in one

[67] Adding observable primary school characteristics to the regression leads to only a slight change in the coefficient because it is likely that the annual average KS2 performance of the primary school captures much the same information as is contained in the school-level attributes, since attainment is influenced by school-level contextual factors.

of two ways. Either Academy schools may have shifted towards an *intake of pupils of a wider ability range* once they switched status. In this case they might have raised their mean intake ability by sampling different fractions of pupils along the ability distribution, with a likely increase in the percentages admitted from the mid-points and above. Otherwise, following conversion, Academies may instead have *lowered the spread of their pupil intake ability*, cutting the proportion of pupil intake from the bottom end of the attainment distribution in particular, resulting in a rise in average intake ability into the school. In the second case, raising average pupil entry quality through reducing the intake ability spread will *always* be associated with a cut in the proportion of lower attaining pupils entering the school, while at the higher end of the performance distribution different scenarios could have taken shape. More specifically, one of three situations might have occurred that would allow for a reduced dispersion and higher mean ability among pupil admissions in post-conversion Academy schools. These are: (i) Academies could have cut only the proportion of lower-attaining pupils admitted to the school, leaving the intake composition along all other parts of the ability distribution unchanged; (ii) Academies could have reduced intake ability proportions at both ends of the performance spread, but they may have cut off relatively more pupils from the bottom than the top end; or (iii) Academies could have lowered admission shares at the bottom end and raised the pupil entry proportion at the upper end of the attainment distribution, but with an increase at the top end being of relatively smaller magnitude than the cut at the bottom end. In all cases, a rise in mean intake quality *and* a reduction in intake ability dispersion is the end result, an outcome brought about by slicing the entry share of pupils into the Academy school that are of an academically weaker background.

In practice, dispersion changes can be assessed by re-estimating equation (2) using the annual standard deviation in KS2 total points scores as the outcome measure, rather than the annual average of this variable. The results derived from this process are given in column 9 of the Table. It is interesting to find that once schools converted into Academies they reduced their intake ability dispersion: the δ coefficient estimated on the effective years of Academy school status is measured as -0.514 standard deviation units and is statistically significant at the 10 per cent significance level. Thus it would appear that there are proportionally fewer pupils with poor prior attainment in the Academy schools than in their predecessors, a situation that will have been reached by one of the three means set out above. Determination of the exact way in which this change in intake ability dispersion has happened is beyond the scope of the current analysis, but forms an interesting area for future research exploration.

This important result goes some way towards answering the key question behind this research, namely whether Academy schools created under the Labour government evaluate towards being more inclusive or more 'exclusive' than their pre-treatment counterparts. The evidence shown here suggests that the attainment profile of pupils entering Academy schools reflects a more 'exclusive' intake, in which there has been a reduction in the admission of pupils with a weaker KS2 performance record in Academies relative to in their pre-Academy versions. Empirical assessment has also revealed that existing Academy schools are catering for pupils of above average ability in the primary school from which they came and there is some indication that innate ability has featured more among admitted pupils than has learning progression. Thus it seems that school conversion into an Academy has been characterised by stratification in intake along the lines of the ability distribution relative to the prior situation. However, the raised academic quality of pupil admissions into Academy schools represents just one dimension of their changing pupil profile. In the section that follows further categories of composition are assessed in order to gain a fuller picture of the impact that this particular policy of institutional reform has had on the constitution of schools to which it was applied in contrast to other 'untreated' schools.

5 Empirical Results: Further Findings

Assessing other dimensions of intake quality and examining changes in whole-school composition

Panel A of Table 14 presents findings from difference-in-differences regression estimation in which various attributes of pupils entering year 7 of Academy schools are compared with those among pupils joining predecessor and non-Academy schools. Information on aspects of pupil background pertaining to new secondary school joiners is contained within PLASC, a data source that has been collected annually since January 2002 with a total of 6 waves available at the time of empirical analysis (August 2008), covering 2002 to 2007. Panel B of the Table looks at whole school compositional changes in the effective policy years and not just variations at the year 7 entry level. These details are given in the school-level files (as described in section 3, 'Data Description'), which stretch further back than PLASC and here 11 years of data on secondary schools comprising the period 1997 to 2007 are used. The shorter time-frame of PLASC

availability reduces the window of pre-policy observations that can be utilised to determine changes in the intake composition of Academies by 5 years (1997 to 2001). Therefore for the first cohort of Academies only one year of pre-policy data on the characteristics of pupil entrants exists. Throughout the entire analysis equation (2) is estimated on a different dependent variable as shown in the column headings to Table 14.

Column 1 begins by looking at changes in the fraction of pupil intake that is eligible for Free School Meals (FSM) in schools that turned into Academies. This indicator is frequently used as a proxy for social disadvantage, given that eligibility is means-tested and depends on family earnings falling below a certain minimum income threshold (see Appendix 1 for further details). As can be seen from the findings of this regression, intake into Academy schools has consisted of a lower proportion of FSM eligible pupils than was previously the case. In the common pre-policy year of 2002 the average percentage of FSM eligible pupils in year 7 of predecessor schools was 44.17 per cent. In the Academy years of these schools, the mean fell by 5.563 percentage points to take the benchmark average to 38.61 per cent, a drop of 12.59 per cent. This suggests that the intake composition of Academy schools moved away from consisting of pupils from relatively deprived backgrounds to quite an extent, a finding that is statistically significant and occurs even though school size changes in Academies have been controlled for.

In columns 2 to 6 of Table 14 (Panel A) consideration is made for whether other aspects of pupil characteristics differ in the Academy school years for pupils who started their secondary phase of education in the sample window. Columns 2 and 3 look for changes in the percentages of pupils with Special Educational Needs in Academies, either with or without a statement respectively. Column 4 assesses variations in the ethnic mix of pupil intake and in column 5 changes in the proportion of pupils with English as an additional language in Academy schools are evaluated. Column 6 looks at how the gender balance of Academies compares with that in predecessor and control group schools. The results of regression estimation reveal that none of these dimensions of intake composition changed to a discernable or statistically valuable degree in the years since the policy period has been in place. The same general finding stems from the analysis of changes in whole school features. Panel B of Table 14 shows that the percentages of pupils eligible for free school meals, those with SEN of any status and those classified as white ethnic origin in predecessor schools were left unaltered by the application of the Academies programme to these schools.

At this stage, empirical evaluation has highlighted that, apart from prior attainment, the only characteristic of pupil intake that has changed in a significant and substantial way in the Academy school years is FSM eligibility. Columns 7 and 8 in Panel A of Table 14 gauge whether there is any relation between these two intake categories that can enhance knowledge of the policy outcome, and the direction in which any association flows. Column 7 repeats the estimation procedure of column 1 and adds to this a control for the school-level average annual KS2 attainment of year 7 pupils, or in other words, KS2 intake quality. What this shows is that the large negative and statistically significant change in the percentage of pupils eligible for FSM in year 7 of Academy schools in comparison to predecessor schools that was found in column 1 remains. The coefficient (standard error) on KS2 intake quality (not shown in the Table) stands at -0.572 (0.089) and is of high statistical content. The way to interpret this result is that a FSM eligible pupil with equivalent prior attainment to another pupil who is not eligible for FSM is statistically significantly *less* likely to have entered a school that converted into an Academy. Column 8 goes back to the estimated regression shown in column 4 of Table 9 and includes as another explanatory variable the percentage of year 7 pupils who are eligible for FSM. The addition of this further regressor does little to change the estimated δ coefficient, which remains positive and statistically significant, at 2.049 KS2 total point scores. The percentage of pupils in year 7 who are eligible for FSM has high predictive power, with a coefficient (standard error) of -0.061 (0.011) (not reported in the Table). The interpretation of this outcome is that if two FSM eligible pupils differ by their KS2 attainment, the pupil who achieved a higher mean result in these tests is statistically significantly *more* likely to have entered a school that switched to Academy status. Overall, analysis into further intake composition changes in Academies relative to predecessor and non-Academy schools has revealed that these schools have not only shifted their intake towards academically stronger pupils and reduced their admission of weaker-attaining students, but they have also tended to feature fewer pupils from deprived backgrounds. These findings are in direct contrast to a principal stated objective of the scheme established from its outset: that of Academy schools having a more inclusive and mixed ability pupil profile (see section 2, ‘Aims and Objectives’).

6 Summary and Discussion

Over the lifetime of the former Labour government, education policy in the UK increasingly sought to raise school standards and the performance of individual pupils through the introduction of school renewal programmes that have targeted institutions at the lower end of the attainment distribution. Under these schemes schools deemed to be failing in their delivery of education have experienced a complete overhaul in their operations in order to generate their revival and subsequent return to the education market place as viable competitors. A reform strategy that has been progressively applied to state secondary schools since the early 2000s is that of the Academies Programme, where underachieving schools have been granted autonomy from LEA control and are guided towards better functioning by an external sponsor. The first wave of Academies opened from September 2002 and by the change of government (May 2010) there were 203 Academy schools in existence. Labour's plans to extend the scheme to 15 per cent coverage of the secondary education phase by 2015 would have made this the most prominent form of school reconstitution in the education arena.

School improvement in the shape of the Academies Programme started out in deprived inner city areas, aiming to tackle the legacy of access to poor quality schooling among underprivileged pupils and the subsequent inequalities in educational opportunities. The broadening geographical coverage of Academy schools during Labour's time in power reflects an understanding of the lack of confinement of this scenario to urban areas. Though they became more widespread, there is a distinct shortfall in knowledge on the effectiveness of these renewed schools in turning around the circumstances of the pupils for whom they have meant to cater in the areas in which they have been set up. Evaluation carried out in this paper has sought to examine the issue of the inclusiveness of Labour's Academies scheme using information on schools that underwent conversion to the renewed status between 2003 and 2007. The analytical stance taken here has focused on compositional changes in these schools relative to their predecessors and to other schools within the LEA of Academies who have shared a similar historical evolution in their characteristic make-up but have differed by their non-participation in the strategy of school reform. Two different angles of composition have been investigated, these being relative changes in both the intake composition and the whole school pupil profile of Academy schools.

The results of empirical difference-in-differences evaluation undertaken here offer up interesting findings with regard to the initial period of this particular programme of school reform. The dimensions of intake that appear to have changed the most in Academy schools are the prior attainment distribution of pupils joining these schools and the percentage of new entrants with eligibility for free school meals. There has been a distinct and robustly estimated rise in intake ability among Academies as soon as they have re-opened under their revived status and a significant drop in the number of new pupils from deprived social backgrounds, patterns of change that did not occur in predecessor schools and that have not shown up in non-Academy control schools. Growth in the pupil capacity of these schools does not explain away these measured effects, implying that composition changes have been achieved through re-drawing the fractions of pupils admitted to the school from within the ability and social background ranges. Evidence presented here suggests that Academy schools have raised the average quality of their intake by lowering their admissions of weaker attaining students. Accordingly, school renewal of this kind appears to have resulted in a more 'exclusive' pupil profile within Academies and reduced entry into these schools of pupils that may have otherwise lowered the general academic performance of the school. In this respect education inequalities and schooling stratification along the lines of ability and social background have increased as a result of the compositional changes that Academy schools have made. This suggests that the "ultimate" objective of raising levels of achievement in the school (aim (1)) has taken precedence, to the detriment of aim (3) of the scheme, which seeks to raise the life chances of cohorts of deprived pupils through inclusive access to the renewed school (see section 2, 'Aims and Objectives').

Further analysis of the outcomes of the original Academies programme beyond the years analysed here (1997 to 2007) – to incorporate all data on the scheme up to the point where the policy change of the Coalition government came into effect, that is, up to the academic year 2009/2010 – would be beneficial for determining the extent to which these findings are a consequence of a small sample size. If the popularity of Academy schools gained further momentum after 2007, physical capacity constraints may have prevented the ability of these schools to admit an ever growing number of pupils. This may have furthered the degree and types of compositional change occurring in these schools over time. The difficult issue to *empirically* pinpoint from the analysis undertaken so far is whether the driver of exclusivity through compositional change has been the school or parents. Academies are their own admissions authority and therefore control the allocation of admissions, while in LEA-governed schools pupil entry is decided by the LEA. This characteristic also allows Academies to set their own

admissions rules, including those to be used in the event of oversubscription, so long as all rules applied comply with the mandatory requirements of the School Admissions Code. Research has suggested the need to establish whether relative admissions autonomy is responsible for compositional change. As West *et al.* (2009, pp. 5) note, "[k]ey questions remain in relation to the link between admissions criteria and practices and school composition....it is still unclear whether school autonomy in relation to school admissions may be a factor in determining which pupils apply to which schools and which are offered places." Meanwhile, Tough and Brooks (2007) cite research by the Sutton Trust which implicates admissions autonomy as the instrument for compositional change. The authors write that "[s]chools within the top 200 comprehensives that are their own admission authorities are also highly unrepresentative of the postcode sector in which they are located. Within these schools just 5.8 per cent of pupils are eligible for free school meals compared to 13.7 per cent of the pupils in their local area. By contrast, the other schools in the top 200 whose admissions are run by the local authority are roughly representative of their area" (*ibid.*, pp. 16). To the extent that the ability of a school to set rules of entry changes the types of parents who apply to the school, compositional change reflects the interdependence of parental and school selection processes.

As an initial detailed study into the effectiveness of the Academy model of school reconstitution in delivering its objective of raised inclusion, this work flags up concerns about the benefits of the original policy and also suggests the need for a thorough evaluation of the consequences of the scheme going forward. The Coalition party has shifted the focus of the Academies programme away from underperforming secondary schools and towards all institutions, with a particular emphasis on status switch among those schools with an outstanding record of academic achievement in the first instance. The revised policy offers some specific help for failing schools, insofar as outstanding schools that become Academies are required to mentor struggling schools within their area and steer them in the direction of improved standards. Additionally, to help underachieving and disadvantaged pupils, the government is pushing forward a more effective and targeted system of pupil-led funding through their 'pupil premium' policy, in which the extra monies that schools receive for admitting disadvantaged students will be made to more closely follow each pupil to whichever school they attend. This should enable schools that teach these students to directly acquire extra funds according to the numbers they admit, and to use these funds to raise entrenched low levels of attainment among this group. However, it remains to be seen whether these policy scenarios will generate any specific or indeed general improvements in circumstances for underprivileged students who frequently comprise the majority group at the

References

Adonis, A. (2008). Academies and Social Mobility. Speech to the *National Academies Conference*, 7th February, London.
http://www.standards.dfes.gov.uk/academies/software/Andrew_Adonis_Speech_feb08.doc?version=1
Accessed 26 January 2009.

Astle, J. and Ryan, C. (eds) (2008). *Academies and the Future of State Education.* CentreForum, London.

Blundell, R. and Costa Dias, M. (2008). Alternative Approaches to Evaluation in Empirical Microeconomics. *Institute for the Study of Labor (IZA) Discussion Paper No. 3800*. Bonn, Germany.

Croft, J. (2003). Gating Communities for Children? The Perennial Problem of School Choice, Residential Location & Their (Continuing) Relationship with Neighbourhood. *ESRC Centre for Neighbourhood Research (CNR) Paper No. 14.*

Curtis, A., Exley, S., Sasia, A., Tough, S. and Whitty, G. (2008). *The Academies Programme: Progress, problems and possibilities.* A report for the Sutton Trust, produced by the Institute of Education, University of London.
http://www.suttontrust.com/annualreports.asp
Accessed 19 December 2008.

Department for Children, Schools and Families **(DCSF)** (2008). *Promoting Excellence for All – School Improvement Strategy: raising standards, supporting schools.* DCSF Publications, Nottingham.
http://www.dcsf.gov.uk/nationalchallenge/downloads.shtml
Accessed 6 February 2009.

Department for Education and Skills **(DfES)** (2000). Blunkett Sets Out Radical New Agenda for Inner City School Diversity and Improvement. *DfES Press Notice 2000/0106.*
http://www.dcsf.gov.uk/pns/DisplayPN.cgi?pn_id=2000_0106
Accessed 26 January 2009.

DfES (2003). *School Admissions Code of Practice*, DfES Publications.
http://publications.teachernet.gov.uk/eOrderingDownload/DfES-0031-2003.pdf
Accessed 29 April 2008.

DfES (2004). *Five Year Strategy for Children and Learners.* The Stationery Office, Norwich.
http://publications.dcsf.gov.uk/eOrderingDownload/Cm-6272.pdf
Accessed 26 January 2009.

Education Act (2002). School Organisation: Academies and city colleges. *Chapter 32, Part 5.*
http://www.opsi.gov.uk/ACTS/acts2002/ukpga_20020032_en_8#pt5
Accessed 28 January 2009.

Emmerson, C., Frayne, C., McNally, S. and Pelkonen, P. (2003). Evaluation of Excellence in Cities Primary Extension – Economic Evaluation of Excellence in Primary Schools: a preliminary report. *National Foundation for Educational Research*.
http://www.nfer.ac.uk/publications/other-publications/downloadable-reports/pdf_docs/edeconomicevaluationjan2004final.PDF
Accessed 12 February 2009.

Gadkowski, L. B., (2007). Britain's City Academies: Can Corporate Citizenship Strengthen State-Supported Education? *Unpublished dissertation, Masters in Public Administration (Public and Economic Policy Programme)*, London School of Economics and Political Science.

Goodwin, S. (2007). *Characteristics of Different Categories of Schools in England: Outcomes from ADCS/EMIE School Organisation Conferences 16 and 23 March 2007*. EMIE at NFER, Slough.

Gujarati, D. N. (1995). *Basic Econometrics*. 3rd edition. McGraw-Hill International Editions: Economic Series.

Hansard (2008a). House of Commons – Daily Hansard: Written answers. 15th May, Column 1784W.

Hansard (2008b). House of Commons – Daily Hansard: Written answers. 9th October, Column 806W.

Hansard (2008c). House of Lords – Daily Hansard: Written answers. 19th November. Column WA218.

Hansard (2008d). House of Commons – Daily Hansard: Written answers. 26th November, Column 1862W.

Harland, K. and Stillwell, J. (2007). Commuting to Schools in Leeds: How useful is the PLASC? *Working paper 07/02*, School of Geography, University of Leeds, Leeds.

Hobbs, G. and Vignoles, A (2007). Is Free School Meal Status a Valid Proxy for Socio-Economic Status (in Schools Research)? *Centre for the Economics of Education Discussion Paper No. 84*, London School of Economics and Political Science.
http://cee.lse.ac.uk/cee%20dps/ceedp84.pdf
Accessed 2 September 2009.

Holmlund, H., McNally, S. and Viarengo, M. (2009). Does Money Matter for Schools? *Centre for the Economics of Education Discussion Paper No. 105*, London School of Economics and Political Science.
http://cep.lse.ac.uk/_new/publications/series.asp?prog=CEE
Accessed 6 February 2009.

House of Commons **(HC)** (2008). Public Expenditure Annex A - Maintained Schools, Academies and City Technology Colleges: Full-time equivalent pupil numbers. *Children, Schools and Families Committee – Minutes of Evidence*, 25th June.
http://www.publications.parliament.uk/pa/cm200809/cmselect/cmchilsch/46/8062508.htm#a1
Accessed 12 February 2009.

Labour Party (1997). The Labour Party's Manifesto. The Labour Party, London.
http://www.bbc.co.uk/election97/background/parties/manlab/3labmaneduc.html
Accessed 7 February 2009.

Local Government Finance Statistics England No. 18 (2008). *Annex A - Local government geography and history*. Department for Communities and Local Government, London.
http://www.local.communities.gov.uk/finance/stats/lgfs/2008/lgfs18/annexA.pdf
Accessed 26 February 2009.

Machin, S. and Vignoles, A. (eds) (2005). *What's the Good of Education?* Princeton University Press, Princeton.

Machin, S., Telhaj, S. and Wilson, J. (2006). The Mobility of English School Children. *Fiscal Studies*, 27(3): 253-280.

Machin, S., McNally, S. and Meghir, C. (2007). Resources and Standards in Urban Schools. *Institute for the Study of Labor (IZA) Discussion Paper No. 2653*. Bonn, Germany.

Machin, S. and Wilson, J. (2008). Public and Private Schooling Initiatives in England. Chapter 10: 219-240 in Chakrabarti, R. and Peterson, P.E. (eds) *School Choice International: Exploring Public-Private Partnerships*. The MIT Press, Massachusetts.

Machin, S. and Vernoit, J. (2010a). CEP Briefing – A Note on Academy School Policy. *Centre for Economic Performance Policy Analysis*, London School of Economics and Political Science.
http://cep.lse.ac.uk/pubs/download/pa011.pdf
Accessed 12 April 2011.

Machin, S. and Vernoit, J. (2010b). Academy Schools: Who Benefits? Centre for Economic Performance magazine, *CentrePiece*, 15(2): 19-21.
http://cep.lse.ac.uk/pubs/download/cp325.pdf
Accessed 12 April 2011.

Machin, S. and Vernoit, J. (2011). Changing School Autonomy: Academy Schools and their Introduction to England's Education. *Centre for the Economics of Education Discussion Paper No. 123*, London School of Economics and Political Science.
http://cee.lse.ac.uk/cee%20dps/ceedp123.pdf
Accessed 19 April 2011.

Matthews, S. and Kinchington, F. (2006). Fresh Start: a model for success and sustainable change. *Forum*, 48(1): 102-112.

National Audit Office **(NAO)** (2007). The Academies Programme. *House of Commons (HC) 254 Session 2006-2007*. The Stationery Office, London.

PricewaterhouseCoopers **(PwC)** (2003). *Academies Evaluation – Annexes*. DfES Publications, Nottingham.
http://www.standards.dfes.gov.uk/academies/publications/?version=1
Accessed 14 January 2008.

Public Service Agreements **(PSA)** Delivery Agreements (2008). *Delivery Agreement 10: Raise the educational achievement of all children and young people*; and *Delivery Agreement 11: Narrow the gap in educational achievement between children from low income and disadvantaged backgrounds and their peers.* HMSO Publications, Norwich.
http://www.hm-treasury.gov.uk/pbr_csr07_psaopportunity.htm
Accessed 22 January 2009.

Rogers, M. and Migniuolo, F. (2007). *A New Direction: A Review of the School Academies Programme*. Trades Union Congress, London.
www.tuc.org.uk/extras/academies.pdf
Accessed 4 August 2007.

Sibieta, L., Chowdry, H. and Muriel, A. (2008). Level playing field? The implications of school funding. *CfBT Education Trust Research Paper*, Berkshire.
http://www.cfbt.com/evidenceforeducation/Default.aspx?page=398
Accessed 25 January 2009

Smithers, A. and Robinson, P. (2009). *Specialist Science Schools.* Centre for Education and Employment Research, University of Buckingham.
http://www.buckingham.ac.uk/education/research/ceer/pdfs/science-schools.pdf
Accessed 22 January 2009.

The English Indices of Deprivation (2007). *Summary*. Department for Communities and Local Government, London
http://www.communities.gov.uk/documents/communities/pdf/576659.pdf
Accessed 3 March 2009.

The Times Educational Supplement **(TES)** (2006). *Academy Facts and Figures.* 10th February.
http://www.tes.co.uk/article.aspx?storycode=2193247
Accessed 20 January 2009.

Tough, S. and Brooks, R. (2007). School Admissions: Fair Choice for Parents and Pupils. *Institute for Public Policy Research (IPPR),* London.

West, A. and Pennell, H. (1997). Educational Reform and School Choice in England and Wales. *Education Economics*, 5(3): 285-305.

West, A., Barham, E., and Hind, A. (2009). *Secondary School Admissions in England: Policy and Practice.* A report for the Research and Information on State Education (RISE) Trust, produced by the Education Research Group, Department Of Social Policy, London School of Economics and Political Science.
http://www.risetrust.org.uk/Secondary.pdf
Accessed 16 April 2009.

Wilson, J. (2009). *Mobility and School Choice in England*. Unpublished PhD thesis: Institute of Education, University of London, Faculty of Policy and Society.

Table 1: School-level Difference-in-Differences Estimates of Academy Status on GCSE Performance, 1995/96 to 2005/06

Panel A: Comparison with matched schools								
	Academies opening in September 2002		Academies opening in September 2003		Academies opening in September 2004		Academies opening in September 2005	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Becomes Academy	-0.49	1.57	3.80	0.01	10.00**	8.95*	1.86	-0.15
	(3.56)	(3.88)	(3.11)	(3.42)	(4.18)	(5.01)	(3.73)	(3.85)
School fixed effects	Yes (6)	Yes (6)	Yes (18)	Yes (18)	Yes (6)	Yes (6)	Yes (19)	Yes (19)
Year dummies	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)
Tine-varying controls	No	Yes	No	Yes	No	Yes	No	Yes
R-squared	0.80	0.85	0.68	0.81	0.64	0.66	0.95	0.94
Number of schools	7	7	21	17	6	6	19	17
Panel B: Comparison with all other state schools in LEA								
	Academies opening in September 2002		Academies opening in September 2003		Academies opening in September 2004		Academies opening in September 2005	
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Becomes Academy	3.02	3.58	8.45**	4.12	8.27**	4.58	3.01	2.86
	(3.01)	(3.44)	(2.52)	(2.71)	(2.67)	(3.36)	(2.24)	(2.14)
School fixed effects	Yes (27)	Yes (27)	Yes (116)	Yes (116)	Yes (89)	Yes (89)	Yes (201)	Yes (201)
Year dummies	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)	Yes (9)
Tine-varying controls	No	Yes	No	Yes	No	Yes	No	Yes
R-squared	0.84	0.85	0.84	0.87	0.87	0.89	0.87	0.88
Number of schools	26	26	110	94	81	81	186	120

Source: Adapted from Machin and Wilson (2008).

Notes: Coefficient estimates pertain to difference-in-differences regression equations in which the dependent variable is the school-level percentage of pupils getting 5 or more GCSEs graded A*-C. Robust standard errors are shown in parentheses. Control variables are time-varying school characteristics as follows: log(school size), proportion of pupils eligible for free school meals, proportion of pupils of non-white ethnic origin. School fixed effects control for characteristics of schools that are unchanging over time. ** indicates statistical significance at the 5% significance level, or better; * indicates significance at the 10% level.

Table 2: Academy Schools Opening Between 2002 and 2006

Academy (1)	**Date of opening** (2)	**Local Authority District (LAD) and region** (3)	**LAD deprivation ranking** (4)	**Sponsor(s) and contribution pledged (£ million)** (5)	**Subject specialism(s)** (6)	**Other details** (7)
Bexley Business Academy	2002: September 1st	Bexley; Outer London	194	Sir David Garrard (2.41)	Business & Enterprise	-
Greig City Academy	2002: November 6th	Haringey; Outer London	18	Greig Trust and the Church of England (2.0)	Technology (especially (ICT)	-
Unity City Academy	2002: July 31st	Middlesbrough; North East	9	Amey plc (2.0)	Applied Enterprise	Replaced 2 predecessor schools
Capital City Academy	2003: June 12th	Brent; Outer London	53	Sir Frank Lowe (2.0)	Sports and The Arts	New building
City of London Academy	2003: June 2nd	Southwark; Inner London	26	Corporation of London (2.0)	Business & Enterprise and Sports	New school
Djanogly City Academy	2003: July 2nd	Nottingham; East Midlands	13	Sir Harry Djanogly (contributed £2 mn to the school when it was a CTC – no extra contribution made in Academy conversion)	ICT	Replaced 2 predecessor schools, including Djanogly CTC
The King's Academy	2003: June 3rd	Middlesbrough; North East	9	Emmanuel Schools Foundation (2.0)	Business & Enterprise	Replaced 2 predecessor schools; 2nd Academy to open in LEA
Manchester Academy	2003: September 1st	Manchester; North West	4	United Learning Trust and Manchester Science Park Ltd (2.0)	Business & Enterprise and Art	-
The City Academy	2003: June 3rd	Bristol; South West	64	John Laycock and the University of the West of England (2.499)	Sports	-
The West London Academy	2003: May 2nd	Ealing; Outer London	84	Alec Reed (2.0)	Sports and Enterprise	New building
The Academy at Peckham	2003: June 3rd	Southwark; Inner London	26	Harris Federation of South London Schools Trust (2.0)	Business and Enterprise and the Performing Arts	New building; 2nd Academy to open in LEA

Table 2 (continued): Academy Schools Opening Between 2002 and 2006

Academy (1)	**Date of opening** (2)	**Local Authority District (LAD) and region** (3)	**LAD deprivation ranking** (4)	**Sponsor(s) and contribution pledged (£ million)** (5)	**Subject specialism(s)** (6)	**Other details** (7)
Walsall City Academy	2003: September 1st	Walsall; West Midlands	45	Thomas Telford Online and the Mercers' Company (2.5)	Technology	New building
Lambeth Academy	2004: September 1st	Lambeth; Inner London	19	United Learning Trust (2.0)	Business & Enterprise and Languages	New school
London Academy	2004: September 1st	Barnet; Outer London	128	Peter Shalson (1.5)	Business & Enterprise and Technology	-
Mossbourne Community Academy	2004: September 1st	Hackney; Inner London	2	Sir Clive Bourne (2.15)	Technology	New school
Northampton Academy	2004: September 1st	Northampton; East Midlands	129	United Learning Trust (2.0)	Sports, Business & Enterprise	New building
Stockley Academy	2004: September 1st	Hillingdon; Outer London	157	Barry Townsley and others (2.0)	Science and Technology	-
Dixons City Academy	2005: September 1st	Bradford; Yorkshire and The Humber	32	Dixons Academy Trust (0.651)	Performing Arts and Product Design	Replaced Dixons CTC
Haberdashers' Aske Hatcham College	2005: September 1st	Lewisham; Inner London	39	Haberdashers Livery Company (0.705)	ICT and Music	Replaced Haberdashers' Aske's CTC
Haberdashers' Aske Knights Academy	2005: September 1st	Lewisham; Inner London	39	Haberdashers Livery Company (0.296)	ICT and Sports & Science	2nd Academy to open in LEA
Harefield Academy	2005: September 2nd	Hillingdon; Outer London	157	David Meller/Haig Oundjian/Jonathon Green (1.5)	Sports	2nd Academy to open in LEA

Table 2 (continued): Academy Schools Opening Between 2002 and 2006

Academy (1)	**Date of opening** (2)	**Local Authority District (LAD) and region** (3)	**LAD deprivation ranking** (4)	**Sponsor(s) and contribution pledged (£ million)** (5)	**Subject specialism(s)** (6)	**Other details** (7)
MacMillan Academy	2005: September 1st	Middlesbrough; North East	9	Macmillan Academy Trust (1.25)	Science & PE & Outdoor Education	Replaced MacMillan CTC; 3rd Academy to open in LEA
Marlowe Academy	2005: September 1st	Kent; South East	n/a	Roger De Haan & Kent County Council (2.735)	Business & Enterprise and the Performing Arts	-
Salford City Academy	2005: September 1st	Salford; North West	15	United Learning Trust and Manchester Diocese (1.6)	Business & Enterprise & Sports	-
St Paul's Academy	2005: September 1st	Greenwich; Inner London	24	Roman Catholic Archdiocese of Southwark (2.0)	Sports and Enterprise	-
The Academy of St Francis of Assisi	2005: September 1st	Liverpool; North West	1	Diocese of Liverpool/RC Archdiocese of Liverpool (2.0)	The Environment	New building
Trinity Academy	2005: September 1st	Doncaster; Yorkshire and The Humber	41	Emmanuel Schools Foundation (2.0)	Business & Enterprise	New building
Barnsley Academy	2006: September 1st	Barnsley; Yorkshire and The Humber	43	United Learning Trust (1.5)	Science with Business & Enterprise	-
Burlington Danes Academy	2006: September 1st	Hammersmith & Fulham; Inner London	59	Absolute Return for Kids (ARK) (1.5)	Expressive Arts & Maths	-
David Young Community Academy	2006: September 1st	Leeds; Yorkshire and The Humber	85	Diocese of Ripon and Leeds (1.5)	Design and the Built Environment	Replaced 2 predecessor schools
Gateway Academy	2006: September 1st	Thurrock; East of England	124	The Ormiston Trust (unknown)	Arts and Engineering	-

Table 2 (continued): Academy Schools Opening Between 2002 and 2006

Academy (1)	**Date of opening** (2)	**Local Authority District (LAD) and region** (3)	**LAD deprivation ranking** (4)	**Sponsor(s) and contribution pledged (£ million)** (5)	**Subject specialism(s)** (6)	**Other details** (7)
Grace Academy	2006: September 1st	Solihull; West Midlands	199	Bob Edmiston (2.0)	Business & Enterprise	-
Harris Academy	2006: September 1st	Merton; Outer London	222	Harris Federation of South London Schools Trust (0.5)	Sports & Enterprise	-
Harris Girls Academy	2006: September 1st	East Dulwich; Inner London	n/a	Harris Federation of South London Schools Trust (0.5)	Sports & PE Health	-
Landau Forte College	2006: November 30th	Derby; East Midlands	69	Landau Charitable Foundation and Rocco Forte Hotels Plc (0.46)	Technology & Business Enterprise	Replaced Landau Forte CTC
North Liverpool Academy	2006: September 1st	Liverpool; North West	1	Liverpool University & Granada Learning (1.0)	Business & Enterprise	Replaced 2 predecessor schools; 2nd Academy to open in LEA
Paddington Academy	2006: September 1st	Westminster; Inner London	72	United Learning Trust (1.5)	Media & Performing Arts with Business & Enterprise	Replaces same predecessor school as Westminster Academy
Sandwell Academy	2006: September 1st	Sandwell; West Midlands	14	Mercers Company, Thomas Telford Online, HSBC, West Bromwich Football Club (2.794)	Business & Enterprise & Sports	New school
Sheffield Springs	2006: September 1st	Sheffield; Yorkshire and The Humber	63	United Learning Trust (1.5)	Performing Arts and Technology	-
Sheffield Park	2006: September 1st	Sheffield; Yorkshire and The Humber	63	United Learning Trust (1.0)	Business & Enterprise	2nd Academy to open in LEA
St Mark's Church of England School	2006: September 1st	Merton; Outer London	222	Southwark Diocese/CfBT Education Trust/Toc H charity (unknown)	Science, Enterprise & Technology	2nd Academy to open in LEA

Table 2 (continued): Academy Schools Opening Between 2002 and 2006

Academy (1)	**Date of opening** (2)	**Local Authority District (LAD) and region** (3)	**LAD deprivation ranking** (4)	**Sponsor(s) and contribution pledged (£ million)** (5)	**Subject specialism(s)** (6)	**Other details** (7)
The John Madejski Academy	2006: September 1st	Reading; South East	151	John Madejski (2.0)	Sports	-
The Harris Bermondsey Academy	2006: September 1st	Southwark; Inner London	26	Harris Federation of South London Schools Trust (1.5)	Enterprise & Media	3rd Academy to open in LEA
The Petchey Academy	2006: September 1st	Hackney; Inner London	2	Jack Petchey Foundation (2.0)	Health Care and Medical Sciences	New school; 2nd Academy to open in LEA
Walthamstow Academy	2006: September 1st	Waltham Forest; Outer London	27	United Learning Trust (1.5)	Business & Enterprise and Science & Maths	-
Westminster Academy	2006: September 7th	Westminster; Inner London	72	Exilarch's Foundation (2.0)	International Business & Enterprise	Replaces same predecessor school as Paddington Academy; 2nd Academy to open in LEA

Sources: Machin and Wilson (2008); DCSF Standards Site "Current Projects of the Academies Programme" (see spreadsheet on "Open Academies" as at January 2009: http://www.standards.dfes.gov.uk/gas_test/jan09acadslist.xls); and author's own searches into individual Academy school websites. Column 3 uses DCSF-provided Edubase dataset on the Register of Educational Establishments (REE) in England in 2006/2007, and Local Government Finance Statistics England No. 18 (2008; Map A1f, pp. 134). Column 4 uses Indices of Deprivation 2007, LA Summaries ID 2007 (see http://www.communities.gov.uk/documents/communities/xls/576504.xls (accessed 1 March 2009)). Column 5 uses Hansard (2008c) and The TES (2006) for details on sponsor(s) pledged contributions. For columns 3 and 4, there are 354 LADs in England. For column 7: unless otherwise stated, each Academy replaces one predecessor school.

Table 3: Share of Academy Schools in All State Secondary Schools, 2006/07

	All state secondary	Academies	Academies share
Number of schools	3,178	46	0.014
Number of FTE pupils	3,110,347	41,437	0.013
Number of FTE teachers	188,794	2,751	0.015
Pupil-teacher ratio	16.47	15.06	n/a

Sources: DCSF-provided Edubase dataset (on the Register of Educational Establishments (REE) in England) and Annual School Census (ASC) dataset, both for 2006/07. The abbreviation FTE stands for full-time equivalent.

Table 4: Number of Pupils Entering Year 7 of the Secondary Schools Sample and Their Match to KS2 Prior Attainment

Data source and academic year	**Key Stage 3**					**PLASC**					
	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Year of entry into secondary school (year 7)	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
No. of pupils in year 7	121,829	123,397	125,962	129,134	127,862	128,316	128,453	128,057	124,012	121,867	120,486
No. of pupils in year 7 with linked KS2 attainment	109,124	114,220	118,679	121,511	121,448	124,829	125,393	125,004	120,469	118,593	117,160
Percentage linked	89.57%	92.56%	94.22%	94.10%	94.98%	97.28%	97.62%	97.62%	97.14%	97.31%	97.24%

Notes: KS3 exams are taken when pupils are aged 13/14, in year 9 of secondary school. Assuming no school mobility over the period, pupils who took their KS3 exams in a particular secondary school should have entered the same secondary school two academic years earlier, aged 11/12 (year 7). KS2 tests are taken one school year prior to year 7 entry into secondary school, when pupils are in the last year of Primary school and are aged 10/11.

Table 5: Number of Academy and Non-Academy Secondary Schools and the Structure of Academy Cohorts

Panel A: School sizes and number of LEAs in the original sample and final balanced panel sample (1997-2007)											
Category			Academy schools			Non-Academy schools			LEAs		
Original sample size			46			1,699			34		
Balanced panel sample size			33			389			25		
Panel B: Structure and size of the Academy school cohorts; structure of the non-Academy group of schools (1997-2007)											
Year of entry into secondary school (year 7)	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Academy Cohort 1	P	P	P	P	P	P	A	A	A	A	A
Original number of Academy schools in cohort 1 = 3; Balanced panel number of Academy schools in cohort 1 = 3											
Academy Cohort 2	P	P	P	P	P	P	P	A	A	A	A
Original number of Academy schools in cohort 2 = 9; Balanced panel number of Academy schools in cohort 2 = 6											
Academy Cohort 3	P	P	P	P	P	P	P	P	A	A	A
Original number of Academy schools in cohort 3 = 5; Balanced panel number of Academy schools in cohort 3 = 2											
Academy Cohort 4	P	P	P	P	P	P	P	P	P	A	A
Original number of Academy schools in cohort 4 = 10; Balanced panel number of Academy schools in cohort 4 = 10											
Academy Cohort 5	P	P	P	P	P	P	P	P	P	P	A
Original number of Academy schools in cohort 5 = 19; Balanced panel number of Academy schools in cohort 5 = 12											
All other schools in Academy LEAs	U	U	U	U	U	U	U	U	U	U	U

Notes: 'P' in the Table indicates the predecessor school years (prior to the switch to Academy school status) for each cohort. 'A' indicates the initial year in which the schools in each cohort became Academies and all subsequent years of Academy school status thereafter. 'U' stands for unchanged, to represent all other state secondary schools located in an LEA containing at least one Academy, where these other schools did not become Academies themselves.

Table 6: Descriptive Statistics of School-Level Characteristics

Panel A: School-level characteristics of predecessor and non-Academy secondary schools, 1997-2002 averages

Variable	(1) Predecessor schools	(2) Non-Academy schools	(3) Difference (1)-(2)	(4) T-statistic of difference
% eligible for Free School Meals	41.31 (15.81)	25.18 (15.19)	16.13	5.84*
% with SEN, with statement	3.21 (1.78)	3.89 (4.59)	-0.68	-0.85
% with SEN, no statement	24.40 (9.00)	19.57 (8.19)	4.83	3.23*
% white	69.18 (27.19)	77.53 (26.51)	-8.35	-1.73
School size (number of pupils)	910 (345)	1020 (312)	-110	-1.93
Pupil-teacher ratio	15.13 (1.59)	15.60 (1.32)	-0.47	-1.93
% 5+ GCSEs, A*-C	25.45 (19.61)	38.34 (16.11)	-12.89	-4.33*
% no passes at GCSE	22.25 (11.98)	12.46 (7.85)	9.79	6.55*
Number of secondary schools	*33*	*389*	-	-

Panel B: Characteristics of Primary schools attended by pupils entering into predecessor and non-Academy schools, 1997-2002 averages

Variable	(1) Predecessor schools	(2) Non-Academy schools	(3) Difference (1)-(2)	(4) T-statistic of difference
% eligible for Free School Meals	39.14 (10.46)	26.83 (12.25)	12.31	5.60*
% with SEN, with statement	3.40 (1.96)	2.50 (1.58)	0.90	3.07*
% with SEN, no statement	22.76 (5.58)	20.35 (5.69)	2.41	2.35*
% white	70.04 (23.69)	78.10 (23.78)	-8.06	-1.87
School size (number of pupils)	398 (153)	343 (62)	55	4.16*
Pupil-teacher ratio	21.34 (2.03)	21.66 (2.17)	-0.32	-0.80
Average KS2 performance (points score)	71.00 (2.95)	74.56 (4.10)	-3.56	-4.89*
Mean number of primary schools	*36*	*34*	-	-

Note: The standard deviation of each variable is shown in parentheses. * indicates statistical significance at the 5% level, or better. SEN stands for Special Educational Needs.

Table 7: Models of Academy School Probability: Pr(Academy) = 1, logit marginals and percentage effects, 1997-2002 averaged characteristics

	Model 1 : Full Controls		Model 2 : Selected Controls	
	(1)	(2)	(3)	(4)
Variable	Marginal effects	% effect on Pr(Academy)=1	Marginal effects	% effect on Pr(Academy)=1
% eligible for Free School Meals	0.0016 (0.0011) *[0.0013]*	5.39	0.0013 (0.0009) *[0.0012]*	3.90
% with SEN, with statement	-0.0037 (0.0027) *[0.0027]*	-12.94	-	-
% with SEN, no statement	0.0004 (0.0013) *[0.0015]*	1.47	-	-
% white	0.0005 (0.0005) *[0.0005]*	1.90	0.0005 (0.0005) *[0.0005]*	1.67
School size (number of pupils)	0.0000 (0.0000) *[0.0000]*	0.00	0.0000 (0.0000) *[0.0000]*	0.01
Pupil-teacher ratio	-0.0077 (0.0068) *[0.0073]*	-26.82	-0.0080 (0.0084) *[0.0086]*	-24.75
% 5+ GCSEs, A*-C	0.0008 (0.0012) *[0.0013]*	2.79	-	-
% no passes at GCSE	0.0034* (0.0017) *[0.0017]*	11.64	0.0031* (0.0014) *[0.0014]*	9.42
Pseudo R-Squared	*0.2692*	-	*0.2560*	-
% correctly predicted, Academy schools	*98.35*	-	*97.80*	-
% correctly predicted, Non-Academy schools	*92.97*	-	*93.11*	-

Notes: The Table shows marginal effects from logit models based on whole school-level controls averaged over 1997-2002; robust standard errors are shown in round parentheses, clustered standard errors (clustered at the LEA level) are shown in square brackets. Models are based on 422 schools, of which 33 are Academy schools and 389 are non-Academies. * indicates a statistically significant marginal effect at the 5% level of significance, or better. The dependent variable is a dichotomous indicator, taking the value of one if a school is an Academy and zero otherwise, where the dummy covers all five Academy cohorts (see Table 5 and Table 8 for the number of Academy schools in each cohort). The predicted probabilities of a school becoming an Academy are 2.88% and 3.24% for logit models 1 and 2 respectively. This compares with 7.82% of schools that are Academies in the sample. Both specifications additionally include LEA dummies to control for time-invariant, LEA-specific factors that have the same impact on all schools within an LEA.

Table 8: Average Annual Key Stage 2 Total Points Scores of Year 7 Pupils by Academy/Non-Academy Schools within the CSR and by each Academy School Cohort (1997-2007)

	Number of schools	(1) 1997	(2) 1998	(3) 1999	(4) 2000	(5) 2001	(6) 2002	(7) 2003	(8) 2004	(9) 2005	(10) 2006	(11) 2007	(12) Change (1997-2007)	(13) Difference-in-Difference (1997-2007)
All Academies	33	62.40	67.80	68.17	71.94	73.76	73.58	73.65	75.42	75.88	77.18	78.35	15.95	2.38* (0.89)
Cohort 1	3	58.37	65.93	65.59	68.58	70.96	71.36	*73.29*	*74.51*	*74.63*	*75.71*	*75.00*	16.63	3.07* (1.46)
Cohort 2	6	59.59	64.24	64.80	67.76	68.90	69.54	68.00	*72.41*	*72.97*	*75.53*	*75.62*	16.03	2.47 (1.54)
Cohort 3	2	61.28	63.40	67.30	70.45	71.32	71.40	74.64	74.65	*76.89*	*77.61*	*78.80*	17.52	3.95* (0.41)
Cohort 4	10	66.25	71.64	70.75	75.93	78.41	77.42	78.04	79.19	79.96	*81.18*	*81.59*	15.34	1.78 (1.63)
Cohort 5	12	61.80	67.58	68.50	71.80	73.41	73.31	72.75	74.14	74.07	74.98	*77.77*	15.97	2.41 (1.75)
All non-academies	326	66.01	71.53	71.97	75.44	77.25	77.54	77.81	78.16	78.54	79.18	79.57	13.56	-

Notes: The Table shows the average annual Key Stage 2 total points scores of year 7 pupils in grouped Academy and non-Academy schools and by each Academy cohort over the period 1997-2007. The sample includes pupils in Academy and non-Academy schools belonging to the common support region determined by the logit regression as defined in Table 7, model 2 (see also Figure 2). Boxed italic figures indicate the policy on years for each Academy cohort. Coefficient estimates and associated robust standard errors (clustered at the school level and shown in parentheses) given in column 13 are based on a simple difference-in-differences regression equation of the outcome variable on an Academy school dummy, an Academy*policy on indicator, and year dummies, where the change in intake quality for Academy versus non-Academy schools uses the first (1997) and last (2007) years of average KS2 total points scores only. * indicates statistical significance at the 5% level, or better.

Table 9: School-Level Difference in-Differences Estimates of the Effect of Academy Status on Key Stage 2 Intake (1997-2007)

	(1)	(2)	(3)	(4)
Academy on effect (all academies)	2.460*	2.460*	2.460*	2.409*
(academy*policyon)	(0.547)	(0.549)	(0.574)	(0.575)
Cohort 1	-6.486*	-7.168*	-	-
	(0.508)	(1.766)		
Cohort 2	-7.588*	-7.863*	-	-
	(1.048)	(0.820)		
Cohort 3	-4.786*	-8.745*	-	-
	(0.988)	(1.183)		
Cohort 4	0.222	-0.141	-	-
	(2.471)	(2.301)		
Cohort 5	-4.123*	-4.650*	-	-
	(1.507)	(1.368)		
Year dummies	Yes	Yes	Yes	Yes
LEA dummies	No	Yes	No	No
School fixed effects	No	No	Yes	Yes
School-level controls for school size and pupil-teacher ratio	No	No	No	Yes

Note: The Table reports difference-in-differences regressions in which the dependent variable is the average annual KS2 total points score of year 7 pupils and explanatory variables for each specification are as listed. Robust standard errors (clustered at the school level) are shown in parentheses. All regressions use Academy and non-Academy schools belonging to the common support region determined by the logit regression as defined in Table 7, model 2 (see also Figure 2), so that regressions are based on 3,949 observations covering 359 schools, of which 33 are Academies and 326 are non-Academies (see Table 8 for the number of Academy schools in each cohort). * indicates statistical significance at the 5% level, or better. The mean of the dependent variable in the common pre-policy year across all Academy cohorts (2002) is 73.577.

Table 10: Robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Excluding former CTCs	No logit common support	Logit common support, full controls	Probit common support, selected controls	School-specific trends	Years 2002-2007	Fake policy on (years 1997-2002)
Academy on effect (all academies)	3.046*	2.547*	2.400*	2.358*	2.136*	2.388*	0.148
(academy*policyon)	(0.538)	(0.573)	(0.577)	(0.578)	(0.794)	(0.718)	(0.475)
Number of observations	*3,553*	*4,642*	*3,289*	*3,322*	*3,949*	*2,154*	*2,154*
Number of schools	*323*	*422*	*299*	*302*	*359*	*359*	*359*
Of which academy schools	*29*	*33*	*33*	*33*	*33*	*33*	*33*
Of which non-academy schools	*294*	*389*	*266*	*269*	*326*	*326*	*326*

Note: The Table shows difference-in-differences regressions in which the dependent variable is the average annual KS2 total points score of year 7 pupils. All regressions include controls as follows: year dummies, school fixed effects and school-level controls for school size and the pupil-teacher ratio. Robust standard errors (clustered at the school level) are shown in parentheses. * indicates statistical significance at the 5% level, or better. Regressions shown in columns (1), (5), (6), and (7) use Academy and non-Academy schools belonging to the common support region determined by the logit regression as defined in Table 7, model 2 (see also Figure 2). Column (1) excludes from this common support region former CTCs that became Academies and all associated non-Academy schools in their respective LEAs if a dropped CTC-turned Academy school represents the only Academy school in the LEA. The logit regression on which column (3) is based is model 1 of Table 7 (see also Figure 1). The probit regression on which column (4) is based uses the same selected controls as the logit regression shown in Table 7, model 2. The regression shown in column (5) is the same as that in Table 9, column (4) plus an additional control for school-specific trends, where the latter consists of an interaction term between each school dummy and a time counter for the year (1 to 11).

Table 11: The Structure of the Falsification Exercise as a Robustness Check (see columns 6 and 7 of Table 10)

	Policy case	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Cohort 1	**Actual**	P	P	P	P	P	P	A	A	A	A	A
	Fake	P	A	A	A	A	A					
Cohort 2	**Actual**	P	P	P	P	P	P	P	A	A	A	A
	Fake	P	P	A	A	A	A					
Cohort 3	**Actual**	P	P	P	P	P	P	P	P	A	A	A
	Fake	P	P	P	A	A	A					
Cohort 4	**Actual**	P	P	P	P	P	P	P	P	P	A	A
	Fake	P	P	P	P	A	A					
Cohort 5	**Actual**	P	P	P	P	P	P	P	P	P	P	A
	Fake	P	P	P	P	P	A					

Notes: 'P' in the Table indicates the predecessor school years (prior to the switch to Academy school status) for each cohort. 'A' indicates the initial year in which the schools in each cohort became Academies and all subsequent years of Academy school status thereafter within the sample period. The actual predecessor years and Academy years for each Academy cohort shown here are the same as those in Table 5. The fake predecessor and Academy years for the cohorts are those corresponding to the experimental scenario where the Academy years are shifted back into the pre-policy and predecessor time period (see column 7 of Table 10). Outlined sections of the actual case indicate where the actual policy set up has been made to resemble the number of years and layout of the policy design of the fake experiment (see column 6 of Table 10).

Table 12: Testing for Dynamic Effects: Key Stage 2 Intake Changes during the Policy On Period in Academy Schools

	(1) Academy* policy on; time on	(2) Academy *policy on by cohort	(3) Academy *policy on by cohort; time on	(4) Academy* policy on by cohort; time on by cohort
Academy on effect (all academies) (academy*policyon)	2.009* (0.832)	-	-	-
Time on effect (all academies) (academy*policyon*timeon)	0.208 (0.240)	-	0.194 (0.251)	-
Academy on effect, cohort 1 (cohort 1 dummy*policyon)	-	2.351* (0.582)	1.770 (1.066)	2.784 (1.571)
Academy on effect, cohort 2 (cohort 2 dummy*policyon)	-	2.777* (0.985)	2.297 (1.227)	1.356 (1.311)
Academy on effect, cohort 3 (cohort 3 dummy*policyon)	-	3.701* (1.223)	3.319* (1.349)	3.181 (1.917)
Academy on effect, cohort 4 (cohort 4 dummy*policyon)	-	1.596 (1.490)	1.313 (1.511)	1.697 (1.508)
Academy on effect, cohort 5 (cohort 5 dummy*policyon)	-	2.627* (0.852)	2.443* (0.886)	2.639* (0.853)
Time on effect, cohort 1 (cohort 1 dummy*policyon*timeon)	-	-	-	-0.145 (0.421)
Time on effect, cohort 2 (cohort 2 dummy*policyon*timeon)	-	-	-	0.570* (0.255)
Time on effect, cohort 3 (cohort 3 dummy*policyon*timeon)	-	-	-	0.264 (0.354)
Time on effect, cohort 4 (cohort 4 dummy*policy-on*time-on)	-	-	-	-0.060 (0.594)
Testing "academy on" effects by cohort jointly equal zero (p-value)	-	*0.000*	*0.022*	*0.003*
Testing "academy on" effects by cohort are jointly equal (p-value)	-	*0.824*	*0.780*	*0.883*
Testing "time on" effects by cohort jointly equal zero (p-value)	-	-	-	*0.227*
Testing "time on" effects by cohort are jointly equal (p-value)	-	-	-	*0.438*

Note: The Table shows difference-in-differences regressions in which the dependent variable is the average annual KS2 total points score of year 7 pupils and explanatory variables consider different specifications of dynamic effects as listed, for years 1997-2007. All regressions include additional controls as follows: year dummies, school fixed effects and school-level controls for school size and the pupil-teacher ratio. Robust standard errors (clustered at the school level) are shown in parentheses. All regressions use Academy and non-Academy schools belonging to the common support region determined by the logit regression as defined in Table 7, model 2 (see also Figure 2), so that regressions are based on 3,949 observations covering 359 schools, of which 33 are Academies and 326 are non-Academies (see Table 8 for the number of Academy schools in each cohort). * indicates statistical significance at the 5% level, or better.

Table 13: Describing Mechanisms Behind KS2 Intake Changes in the Policy On Years

	Dependent variable								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	KS2 intake: using all KS2 pupils and restricted sample	**KS2 intake:** using pupils with KS1 and KS2 outcomes	**KS1 levels**	**KS1-KS2 value-added**	**No. of intake Primary schools**	**Average KS2 performance of intake Primary schools**	**KS2 intake:** controlling for (5) and (6)	**KS2 intake:** controlling for (5) and (6) and Primary school-level characteristics	**Dispersion of KS2 intake**
Academy on effect (all academies)	2.339*	1.758*	1.146§	0.611	4.427*	0.865*	1.573*	1.567*	-0.514§
(academy*policyon)	(0.838)	(0.725)	(0.673)	(0.388)	(1.585)	(0.270)	(0.500)	(0.518)	(0.283)
Mean of the dependent variable for academies (2002 or 2003)	*73.69*	*75.01*	*39.14*	*35.87*	*33*	*75.62*	*73.58*	*73.58*	*16.05*

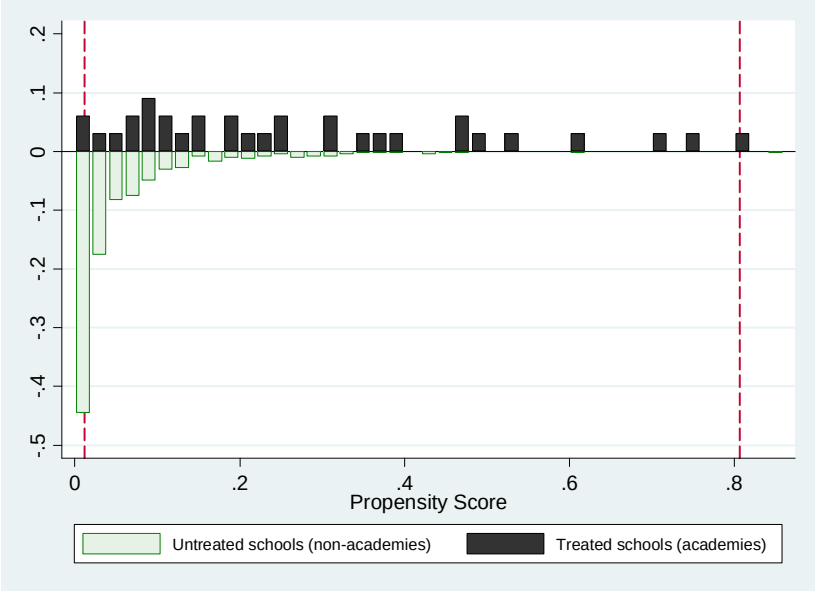
Note: School-level difference-in-differences regressions shown in columns (1) to (4) are based on a reduced sample of years and schools corresponding to pupils joining year 7 between 2003 and 2007. These use 1,700 observations on 340 schools in total, of which 30 are Academies and 310 are non-Academies. Cohort 1 of Academy schools, opening from September 2002, has been excluded from these regressions due to a lack of pre-policy information on this cohort when pupils are required to have both KS1 and KS2 outcomes. In cases where an Academy school within cohort 1 constitutes the only Academy school within the LEA, all schools in the LEA are dropped from the sample. Otherwise only the Academy school belonging to the initial cohort is dropped. Thus all schools in two LEAs and a total of three Academy schools are omitted from the sample of pupils in columns (1) to (4). Regressions shown in columns (5) to (9) are based on the years 1997-2007 and they use 3,949 observations covering 359 schools, of which 33 are Academies and 326 are non-Academies. In columns (1), (2), (7) and (8) the dependent variable is the average annual KS2 total points score of year 7 pupils; in column (3) it is the average annual KS1 total points score of year 7 pupils with KS2 outcomes; in column (4) it is the average annual KS1 to KS2 value-added of year 7 pupils; in column (5) it is the number of primary schools from which pupils in year 7 of secondary school came; in column (6) it is the average annual whole school KS2 performance of these primary schools, averaged at the secondary school level and in column (9) it is the average annual standard deviation in KS2 total points scores among year 7 pupils. For the regressions in columns (1) to (4) the mean of the dependent variable refers to 2003, otherwise it refers to 2002. All regressions include additional secondary school-level controls as follows: year dummies, school fixed effects and school-level controls for the school size and the pupil-teacher ratio. Column (8) includes additional primary school-level controls as follows: the fraction of FSM eligible pupils, the fraction of pupils with SEN with and without a statement, the fraction of pupils of white ethnic origin, school size, and the pupil teacher ratio. Robust standard errors (clustered at the school level) are shown in parentheses. All regressions use Academy and non-Academy schools belonging to the CSR determined by the logit regression as defined in Table 7, model 2 (see also Figure 2). * indicates statistical significance at the 5% level, or better. § indicates significance at the 10% level.

Table 14: Relation of Other Outcomes to Academy School Status: Pupils in Year 7 (2002-07) and All Pupils in the School (1997-07)

	(1) Eligible for Free School Meals	(2) Special Educational Needs, with statement	(3) Special Educational Needs, no statement	(4) White	(5) English as a second language	(6) Gender (male=1)	(7) FSM eligibility controlling for KS2 outcomes	(8) KS2 outcomes controlling for FSM eligibility
PANEL A: Intake Composition (pupils in year 7; 2002-2007)								
Academy on effect (all academies)	-5.563*	-0.417	0.389	0.302	0.269	0.680	-4.197*	2.049*
(academy*policyon)	(1.436)	(0.326)	(2.609)	(1.125)	(2.347)	(1.005)	(1.324)	(0.693)
Mean of the dependent variable for academies (2002)	*44.17*	*3.70*	*27.49*	*69.47*	*79.15*	*49.96*	*44.17*	*73.58*
PANEL B: Whole School Composition (all pupils in the school; 1997-2007)								
Academy on effect (all academies)	-1.697	0.283	1.090	0.171	-	-	-	-
(academy*policyon)	(1.200)	(0.396)	(1.603)	(4.718)	-	-	-	-
Mean of the dependent variable for academies (1997-2002)	*41.31*	*3.21*	*24.40*	*69.18*	-	-	-	-

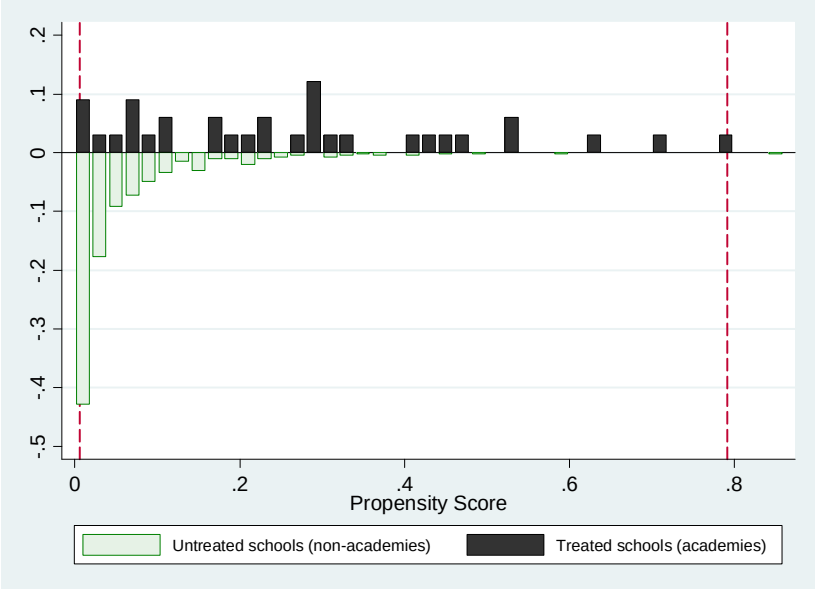
Note: *Panel A:* Difference-in-differences regressions on changes to intake composition are based on the annual year 7 pupil-level data (available from PLASC for 2002-2007). Regressions use 2,154 observations, covering 359 schools, of which 33 are academies and 326 are non-academies. *Panel B:* Whole school difference-in-differences regressions are based on the years 1997-2007. Regressions use 3,949 observations, covering 359 schools as for Panel A. All regressions include additional controls as follows: year dummies, school fixed effects and school-level controls for the school size and the pupil-teacher ratio. Robust standard errors (clustered at the school level) are shown in parentheses. All regressions use Academy and non-Academy schools belonging to the common support region determined by the logit regression as defined in Table 7, model 2 (see also Figure 2). * indicates statistical significance at the 5% level, or better.

Figure 1: Propensity Scores for Academy and Non-Academy Schools: Logit Model with Full Controls (see Table 7, Model 1)



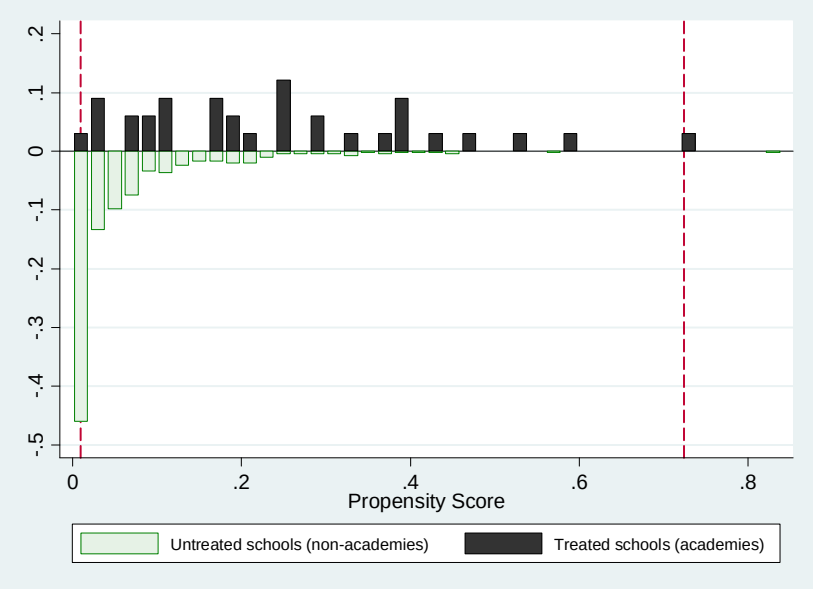
Note: Diagram plots histograms of the implied probability of treatment for Academy and non-Academy schools, where the probability estimates are predicted using the full logit specification as shown in Table 7 (model 1; see also Table 8, column 3). The common support region of (0.0115 0.8068) includes 33 Academy schools (out of 33) and 266 non-Academy schools (out of 389).

Figure 2: Propensity Scores for Academy and Non-Academy Schools: Logit Model with Selected Controls (see Table 7, Model 2)



Note: Diagram plots histograms of the implied probability of treatment for Academy and non-Academy schools, where the probability estimates are predicted using the selected logit specification as shown in Table 7 (model 2). The common support region of (0.0056 0.7919) includes 33 Academy schools (out of 33) and 326 non-Academy schools (out of 389).

Figure 3: Propensity Scores for Academy and Non-Academy Schools: Probit Model with Selected Controls (see Table 10, column 4)



Note: Diagram plots histograms of the implied probability of treatment for Academy and non-Academy schools, where the probability estimates are predicted using the selected probit specification as discussed in Table 10, column 4 (for the list of selected controls used in the probit model see Table 7, model 2). The common support region of (0.00917 0.7243) includes 33 Academy schools (out of 33) and 269 non-Academy schools (out of 389).

Appendix 1

Conditions for Free School Meal (FSM) Eligibility

"Children whose parents receive the following are entitled to free school meals:
Income Support (IS);
Income Based Jobseekers Allowance (IBJSA);
Support under part VI of the Immigration and Asylum Act 1999;
Child Tax Credit, provided they are not entitled to working Tax Credit and have an annual income, as assessed by HM Revenue and Customs, that (for 2007/2008) does not exceed £14,495; or
The guaranteed element of State Pension Credit; and
Children who receive IS or IBJSA in their own right are also entitled to free school meals" (PSA Delivery Agreements, 2008, pp. 56 (Measurement Annex)).

Drawbacks to using FSM as an Indicator of Family Poverty

As the eligibility conditions stated above suggest, FSM is a means-tested allowance, entitlement to which depends on the receipt of certain benefits by low-income households. Where family income sits just above the threshold of qualification for FSM, or where no application is made to obtain this financial support, the measure will not reflect the true extent of poverty among pupils contained within the dataset, and as such will provide an imperfect proxy indicator of difficult economic circumstances (Croft, 2003; Hobbs and Vignoles, 2007). Despite this being a crude measure, it is nonetheless a valuable and a sole source of well-collected information on the wealth of the household pertaining to each individual pupil featuring in PLASC.

Appendix 2

Schools Sample Construction

Below the procedures carried out in the process of arriving at a balanced sample of Academy and non-Academy schools are set out in detail, beginning with a Table that indicates how the sample sizes of the two school groups changed at each stage of data cleaning.

Table A1: Procedures for Creating a Balanced Panel of Academy and Non-Academy Schools

Academy schools			**Non-Academy schools**		
Procedure	**Number of schools**	**Sample loss**	**Procedure**	**Number of schools**	**Sample loss**
(1)	(2)	(3)	(4)	(5)	(6)
Step 1	46		Step 1	1,699	
Change		*-1*	*Change*		*-461*
Step 2	45		Step 2	1,238	
Change		*-5*	*Change*		*-551*
Step 3	40		Step 3	687	
Change		*-2*	*Change*		*-91*
Step 4	38		Step 4	596	
Change		*-2*	*Change*		*-80*
Step 5	36		Step 5	516	
Change		*-1*	*Change*		*-87*
Step 6	35		Step 6	429	
Change		*-2*	*Change*		*-14*
			Step 7	415	
			Change		*-26*
Total	**33**	**-13**	**Total**	**389**	**-1,310**

Changes made to the sample of Academy schools

Step 1: In all cases where two predecessor schools are replaced by one Academy school there are 2 sets of observations in the predecessor years. In the academic year 2006/07 there is a unique case of 2 Academy schools replacing a single predecessor school, resulting in two sets of observations in the Academy years. In order to ensure that the constructed balanced panel consists of 11 annual observations for each individual school, which includes predecessor schools that convert to Academies, a process of weight-averaging the observations takes place in the years where there is more than one set of annual observations. The weights that are used are the

number of pupils entering school year 7 in each year, such that in the case where one Academy school replaces two predecessor schools:-

$$WA\_I_{st} = \frac{[(I_{p_1t} * \text{Pupils entering year 7}_{p_1t}) + (I_{p_2t} * \text{Pupils entering year 7}_{p_2t})]}{(\text{Pupils entering year 7}_{p_1t} + \text{Pupils entering year 7}_{p_2t})}$$

And where one predecessor school is replaced by two Academies:-

$$WA\_I_{st} = \frac{[(I_{a_1t} * \text{Pupils entering year 7}_{a_1t}) + (I_{a_2t} * \text{Pupils entering year 7}_{a_2t})]}{(\text{Pupils entering year 7}_{a_1t} + \text{Pupils entering year 7}_{a_2t})}$$

Where *WA_I* is the weighted average of indicator *I* for school *s* at time *t* (*s* is either an Academy school formed from two predecessors or a predecessor school that is split between two Academies); p_1t refers to predecessor school *1* at time *t*; p_2t is predecessor school *2* in time *t*; and a_1t and a_2t are Academy schools *1* and *2* respectively in time *t*.

Not all indicators are weight-averaged for these schools. Those that refer to the school size, for example, are summed because pupils from 2 predecessor schools can enter one Academy school. Likewise for the unique case mentioned above, pupils from one predecessor school can enter either of the 2 different Academies that this school becomes. Weighted averaging is carried out on Academy cohort 1 (Academies opening from September 2002, where 1 Academy school replaced 2 predecessors); Academy cohort 2 (Academies opening from September 2003, where 2 Academy schools each replaced 2 predecessors); and Academy cohort 5 (Academies opening from September 2006, where 2 Academy schools each replaced 2 predecessors, and also where 1 predecessor was replaced by 2 Academy schools). Weighted averaging on Academy cohort 5 in particular reduces the initial number of Academy schools from 46 to 45, since two Academy schools are redefined into one here.

Step 2: All Academy schools that represent completely new schools are removed, since these schools have no historical information on their intake patterns prior to Academy status.

Step 3: Two Academy schools are dropped because they are each missing an annual observation of information that relates to their predecessor school.

Step 4: Two Academy schools are dropped because their predecessor versions were not open at the start of the sample period (1997) and therefore they lack enough predecessor school annual observations.

Step 5: One Academy school is dropped because its predecessor school catered for pupils aged 13 upwards and therefore there was no year 7 entry to the school.

Step 6: At this stage a balanced panel of 11 annual observations covering the years 1997 to 2007 has been created. The final step of data cleaning involves imputations. In order to minimise the amount of data that has to be imputed a 'rule' is created: imputations are made in cases where there are no more than 2 missing data points on variables of interest in any given year for a school and no more than 4 missing data points in total for that school as a whole across all 11 years of data. This rule leads to a further 2 Academies being dropped, leaving the overall number of Academy schools in the sample at 33.

Changes made to the sample of non-Academy schools

Step 1: All schools that are not directly comparable to state secondary schools (including Academies) are dropped from the sample of non-Academies. These schools are identified using variables that describe each school as provided in the LEASIS/ASC and Edubase datasets that are linked in via the school code. Specifically, the following categories of school are excluded from the sample: Independent schools, general hospitals, grammar schools, maintained and non-maintained special schools, Pupil Referral Units (PRUs), special maintained hospitals, and maintained and non-maintained special boarding schools.

Step 2: All small non-Academy schools for which there are at most 10 pupils in year 7 in the school in a given year are dropped. This represents the point at which the largest number of non-Academy schools are lost from the sample. In the process of dataset construction it was identified that the academic year 2005/2006 featured an unusually large number of schools relative to all other years (around 1,000 compared to around 600 respectively). At this point of data cleaning the sample of schools in 2006 dropped to resemble that in other years, totalling 608 schools. This suggests that the higher quantity of schools in 2006 might reflect a recording error that was corrected by the procedure of removing small schools from the sample.

Step 3: Non-Academy schools that cannot be compared to Academies because they do not have any observations in any of the years over which the sample of Academy schools opened (2002/03 to 2006/07) are dropped from the non-Academies group.

Step 4: All non-Academy schools are required to have 11 annual observations spanning 1997-2007 if their intake trends are to be compared with those of Academies and their predecessors, without missing observations affecting the findings. Therefore all non-Academy schools for which there are 10 or fewer annual observations are dropped.

Step 5: The cleaning of the Academy schools sample and the dropping of 11 Academies (as set out in steps 1-6 above and in columns 1 to 3 of Table A1) results in 7 LEAs no longer containing any Academy schools. All non-Academy schools also featuring in these LEAs then become redundant to the analysis, since their use as a comparison group is no longer valid. Dropping all schools within these 7 LEAs reduces the sample of non-Academies by 87 schools.

Step 6: A balanced panel of 11 annual observations covering the years 1997 to 2007 has been created at this point. Imputations are also carried out on the sample of non-Academy schools, using the same rule as for the Academy schools sample. This leads to 14 more non-Academy schools being dropped from the sample.

Step 7: Application of step 6 to the sample of Academy schools results in 2 Academies being cut from the sample and, as these are the only Academies in their respective LEAs, the subsequent loss of all schools within these 2 LEAs. This reduces the sample of non-Academies to the final count of 389 schools.

Appendix 3

Table A2: Correlation Coefficients on School-Level Variables, 1997-2002 Averages

Variable	(1) % eligible for Free School Meals	(2) % Special Educational Needs, with statement	(3) % Special Educational Needs, no statement	(4) % white	(5) School size	(6) Pupil-teacher ratio	(7) % 5+ GCSE, A*-C	(8) % no passes at GCSE
% eligible for Free School Meals	1.0000							
% SEN, with statement	-0.1157	1.0000						
% SEN, no statement	0.4810*	0.0679	1.0000					
% white	-0.4896*	0.1709*	-0.1505*	1.0000				
School size	-0.2579*	-0.0974	-0.3411*	0.0605	1.0000			
Pupil-teacher ratio	-0.1858*	-0.0135	-0.1192	0.3661*	0.1473*	1.0000		
% 5+ GCSE, A*-C	-0.6810*	-0.1574*	-0.5473*	0.0600	0.2735*	-0.0710	1.0000	
% no passes at GCSE	0.7149*	0.0098	0.4338*	-0.0925	-0.2190*	-0.0873	-0.8023*	1.0000

Notes: * indicates a statistically significant correlation at the 1% level of significance or better. Correlations based on 1997 to 2002 averages and covering 422 schools, of which 33 are academy schools and 389 are non-academies. SEN stands for Special Educational Needs.

Appendix 4

Testing Various Logit Model Specifications

Several logit model specifications were estimated in order to strengthen the power of observable pre-policy school-level characteristics in predicting the likelihood of school conversion to Academy status. A step-by-step process of eliminating each variable in turn from the full logit specification outlined in model 1 of Table 7 was attempted in the first instance. In almost all cases the only statistically significant variable was found to be the percentage of pupils getting no passes at the GCSE stage, as was true for model 1. Carrying out this elimination procedure on model 2 of Table 7 also resulted in the same outcome. Secondly, the Key Stage 2 total points score of year 7 pupils (averaged over 1997-2002) was included in logit models 1 and 2 each as an additional regressor, in order to allow for the predicted probability of Academy school status to depend on school-level KS2 intake quality in the pre-policy period. With a marginal effect (standard error) of 0.0022 (0.0038) in model 1 and 0.004 (0.004) in model 2, this regressor is not statistically significant. The sign of the estimated coefficient on this indicator in both models is also counterintuitive to expectations, where a priori the assumption is that as the KS2 intake quality of a school rises the probability of that school becoming an academy declines. Then the expectation is for a negative sign to appear on the coefficient rather than a positive sign as was obtained from estimation. Other specifications that were tried included (i) re-estimating both logit models 1 and 2 using the raw levels of the regressors in 2002 rather than 1997-2002 school-level averages; (ii) re-estimating logit model 2 using the raw levels of the regressors in 2002 and additionally including lags of each of these indicators; (iii) re-estimating logit model 2 with the following interaction terms added separately in each case, where all variables and interaction terms use 1997 to 2002 school-level averages: the percentage of pupils eligible for FSM interacted with the percentage of white pupils, the percentage of pupils getting no GCSE passes interacted with the percentage of white pupils, and the percentage of pupils eligible for FSM interacted with the percentage of pupils getting no GCSE passes; (iv) re-estimating logit model 2 with squared terms for the percentage of pupils eligible for FSM and the percentage of pupils getting no GCSE passes added; (v) re-estimating logit model 2 with averaged growth rates of each variable added. Across the board none of these models displayed significantly different predictive capabilities over and above the chosen specification of model 2 in Table 7.

Appendix 5

Table A3: Number of Pupils Entering Year 7 of the Secondary Schools Sample and Their Match to Key Stage 1 and Key Stage 2 Prior Attainment

Data source and academic year	Key Stage 3					PLASC					
	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Year of entry into secondary school (year 7)	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
No. of pupils in year 7	121,829	123,397	125,962	129,134	127,862	128,316	128,453	128,057	124,012	121,867	120,486
No. of pupils in year 7 with linked KS2 attainment	109,124	114,220	118,679	121,511	121,448	124,829	125,393	125,004	120,469	118,593	117,160
Percentage of year 7 cohort linked	89.57%	92.56%	94.22%	94.10%	94.98%	97.28%	97.62%	97.62%	97.14%	97.31%	97.24%
No. of pupils in year 7 with linked KS1 and KS2 attainment	-	-	-	-	-	-	115,742	118,046	114,363	112,248	110,472
Percentage of year 7 cohort linked							90.10%	92.18%	92.22%	92.11%	91.69%

Notes: This Table appears as Table 4, but the number and percentage of year 7 pupils with matched KS1 data is also added in here. KS3 exams are taken when pupils are aged 13/14, in year 9 of secondary school. Assuming no school mobility over the period, pupils who took their KS3 exams in a particular secondary school should have entered the same secondary school 2 academic years earlier, aged 11/12 (year 7). KS2 tests are taken one school year prior to year 7 entry into secondary school, when pupils are in the last year of Primary school and are aged 10/11. KS1 tests are taken earlier on in Primary school at the age of 6/7.

Appendix 6

Restricting the Sample of Schools to the Common Support Regions – Impact on the T-statistics of Table 6

Tables A4 and A5 presented below show that restricting the sample of schools to those within the common support region reduces the t-statistic of the difference in observable characteristics between Academy predecessor and non-Academy schools when logit regression follows both the full and selected controls specifications. Therefore non-Academy schools that differ greatly in terms of their pre-policy observable characteristics from Academy predecessors are excluded from the estimation procedure when the CSR is in place. The process of defining a CSR results in less heterogeneity in the pre-treatment attributes of treated and control schools. Logit model 2 (with selected controls) represents the preferred specification for the reasons stated in the text surrounding Table 7 in Section 3, 'Empirical Methodology'.

Table A4: Descriptive Statistics of School-Level Characteristics for Schools Belonging to the CSR Determined by the Logit Regression with Full Controls (see Table 7, Model 1 and Figure 1)

School-level characteristics of predecessor and non-Academy secondary schools, 1997-2002 averages				
Variable	(1) Predecessor schools	(2) Non-Academy schools	(3) Difference (1)-(2)	(4) T-statistic of difference
% eligible for Free School Meals	41.31	29.70	11.61	4.09*
	(15.81)	(15.31)		
% Special Educational Needs, with statement	3.21	3.09	0.12	0.22
	(1.78)	(2.95)		
% Special Educational Needs, no statement	24.40	20.69	3.71	2.36*
	(9.00)	(8.44)		
% white	69.18	72.38	-3.20	-0.63
	(27.19)	(27.45)		
School size (number of pupils)	910	996	-86	-1.48
	(345)	(312)		
Pupil-teacher ratio	15.13	15.37	-0.24	-0.94
	(1.59)	(1.32)		
% 5+ GCSEs, A*-C	25.45	36.05	-10.60	-3.36*
	(19.61)	(16.77)		
% no passes at GCSE	22.25	14.47	7.78	4.84*
	(11.98)	(8.24)		
Number of secondary schools	*33*	*266*	-	-

Note: The standard deviation of each variable is shown in parentheses. * indicates statistical significance at the 5% level, or better.

Table A5: Descriptive Statistics of School-Level Characteristics for Schools Belonging to the CSR Determined by the Logit Regression with Selected Controls (see Table 7, Model 2 and Figure 2)

School-level characteristics of predecessor and non-Academy secondary schools, 1997-2002 averages				
Variable	(1) Predecessor schools	(2) Non-Academy schools	(3) Difference (1)-(2)	(4) T-statistic of difference
% eligible for Free School Meals	41.31	27.90	13.41	4.92*
	(15.81)	(14.84)		
% Special Educational Needs, with statement	3.21	3.48	-0.27	-0.40
	(1.78)	(3.86)		
% Special Educational Needs, no statement	24.40	20.04	4.36	2.82*
	(9.00)	(8.41)		
% white	69.18	74.32	-5.14	-1.02
	(27.19)	(27.61)		
School size (number of pupils)	910	1007	-97	-1.68
	(345)	(315)		
Pupil-teacher ratio	15.13	15.54	-0.41	-1.59
	(1.59)	(1.37)		
% 5+ GCSEs, A*-C	25.45	36.27	-10.82	-3.66*
	(19.61)	(15.82)		
% no passes at GCSE	22.25	13.68	8.57	5.69*
	(11.98)	(7.78)		
Number of secondary schools	*33*	*326*	-	-

Note: The standard deviation of each variable is shown in parentheses. * indicates statistical significance at the 5% level, or better.

Appendix 7

Discussion of School Type Changes among Non-Academy Schools and the Types of Schools That Became Academies

It could be that non-Academy secondary schools also changed their type over the period, such as converting from a Community to a Voluntary-aided school, or from a Community to a Foundation school. If the incidence of status change in this group is high, this raises the issue of the reliability of comparing intake patterns of some schools within this group to those of Academies. The extent to which this is a cause for concern is investigated here:-

- Within the full sample of 389 non-Academy schools, 11 schools changed their type from a Community to a Foundation school. This is equivalent to 2.828 per cent of the full sample. This is the only recorded type of school change among all non-Academy schools.
- Within the sample of 266 non-Academy schools contained within the CSR determined under logit model 1 (with full controls), 10 schools changed their type from a Community to a Foundation school. This is equivalent to 3.759 per cent of this restricted sample.
- Within the sample of 326 non-Academy schools contained within the CSR determined under logit model 2 (with selected controls), 10 schools changed their type from a Community to a Foundation school. This is equivalent to 2.571 per cent of this restricted sample.

Therefore it appears that non-Academy schools did not change their type to such an extent that the reliability of using these schools as a comparison group could be called into question.

In terms of Academy schools, the following indicates the numbers and percentages of school types that changed into an Academy between 2003 and 2007:-

- 24 Academies were formerly Community schools (72.73 per cent of the sample of 33 Academies);
- 4 Academies were formerly Voluntary-aided schools (12.12 per cent);
- 1 Academy was formerly a Voluntary-controlled school (3.03 per cent);
- 4 Academies were formerly CTCs (12.12 per cent);
- No Academies were formerly Foundation schools.