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Mobility and School Choice in England

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Abstract

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 from any background. Two initiatives of 'school choice' and 'school improvement' have been specifically introduced for this purpose.

Choice policies came about in the late 1980s. They propose to provide equal access through breaking the historical geographical link between the home and the school attended. Pupils can apply for admission to any preferred school from their current home location. An equal distribution of better standards in education is thought to be achieved through the scheme's creation of school competition for pupils.

Improvement strategies took off in the early 2000s under the Academies Programme. The initiative targets the re-emergence of low-performing schools as viable competitors for pupils through a process of institutional reform. It aspires to raise standards and equality by providing more opportunities for all pupils to have access to better-quality schools.

The National Pupil Database is an administrative annual census of state school pupils that allows enrolment-related activity in schools to be tracked. It is used here to address whether fairness is an outcome of the two education policies. Evaluation considers (i) if pupils of differing backgrounds gain access to popular primary schools without moving home under the choice system and; (ii) if failing secondary schools that convert into Academies remain accessible to all pupils.

Evidence indicates that the connection between the school attended and home location persists partly because entry rules by popular schools reinstate school-home proximity as an admissions criteria. Meanwhile, there is exclusivity in entry to Academies, with proportionally fewer underprivileged, low-ability pupils featuring in the renewed schools. These outcomes suggest that education policy has a long way to go if fair access to schools is to be achieved.

(300 words)

Declaration:

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

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Introduction

According to Human Capital Theory individuals invest in education in order to maximise the anticipated labour market returns accruing to the productivity enhancing labour inputs individuals acquire through education[1]. Estimates suggest that the gross private rate of return to an additional year of schooling is in the range of 5 to 10 per cent for most Western economies and in the case of the UK lies between 5 to 7 per cent (8 to 10 per cent) for men (women) (Adnett and Davies, 2002). Such increases in productivity attributable to individual educational initiatives transfer positive externalities to the wider society by both pecuniary and non-pecuniary means.

Pecuniary externalities arise from greater human capital inciting firms to invest more in physical capital (machinery, buildings or equipment)[2] so that the wages of all workers are raised by this channel and not just those of the initial education investors, increasing societal income. In a progressive taxation system, higher earnings in turn allow for an equality enhancing redistribution of income by means of benefit transfers to low-income households, presenting a further channel of operation for pecuniary spillovers to society.

Non-pecuniary externalities are generated from the exchange of ideas amongst workers that raise productivity, such that societal benefits to education derive from human interactions (Acemoglu and Angrist, 2000). Evidence points to social rates of return to an extra year of schooling in the UK that are of relatively similar magnitude to those in other OECD countries, with mean rates of return of 8.6 per cent (8.5 per cent) to primary education, 7.5 per cent (9.4 per cent) to secondary education and 6.5

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[1] Human capital is commonly proxied by years of schooling. The original concept was alluded to by the classical economist Adam Smith in *The Wealth of Nations* (1776), in which he considered man's human capital investments in education and the physical capital investments undertaken by firms as both contributing to the productive capacity of society (Psacharopoulos, 1987; Machin and Vignoles, 2005).

[2] Specifically, firms will invest in new technologies only where it is profitable to do so and this will in turn depend on there being an adequate supply of trained workers to replace those exiting the firm (Acemoglu and Angrist, 2000). Therefore physical capital investments are induced by higher human capital in the firm.

per cent (8.5 per cent) to higher education in the UK (OECD) (Machin and Vignoles, 2005)[3].

The individual and society-wide gains that human capital produces have led many governments to adopt policies aimed at not only tapping into education accumulation, but also encouraging its more equal dispersion. In England two education policy initiatives have specifically been introduced that seek to raise *access* to publicly-provided schooling provisions. The expectation is that better access will generate a more even distribution of educational opportunity coupled with higher returns to learning by increasing the supply of good quality schools available to all pupils from their current home location.

The first initiative of *school choice* was launched onto the English state schools arena in the late 1980s. This policy aims to establish a market-place for schooling by replacing a traditional admissions system in which each pupil simply attends their nearest local school with a practice of open enrolment, where pupils can apply to attend a school of their preference from their current home location. The scheme offers parents (and pupils) accountability information on the academic performance of schools relative to nationally-defined education targets in order to guide their choices. School funding is attached to the social background and the number of pupils a school attracts. Under market conditions, higher standards of attainment and equal learning opportunity among all pupils stem from the competition between schools for students that the scheme is designed to create.

The second policy of *school improvement* has its largest outlay in the Academies Programme, which came about in the early 2000s. This scheme acknowledges the uneven foundations of school performance from which the schooling market-place attempts to operate. Historical variations in attainment standards across schools reflect a conventional process of location-related admissions, which cause the performance of schools to relate to the academic ability and socio-economic status of pupils in the neighbourhood. As a consequence of a reputation of poor historical performance – in turn brought on by relatively stable local demographics of low academic ability students – some schools appear undesirable to pupils in a choice

[3] The OECD figures given here are derived from several studies that use data spanning the early 1970s to the late 1990s. Data for the UK are from 1986.

system. The initiative targets re-emergence of low-attaining schools as viable competitors for pupils through a process of institutional reform, in which private agents can be in charge of running state-owned schools. School renewal aims to deliver better standards and a fairer system by providing more opportunities for all pupils to have access to schools potentially improving in their quality.

In order to achieve an equal distribution of higher standards in education, the two policy initiatives of school choice and institutional reform should ensure *fair right of entry* to a school *for all pupils from any background*. The choice process should allow pupils to access their preferred school by transferring between schools without moving home, given that the policy seeks to untie the dependence between the school attended and where a pupil lives. Under this scenario school choice should encourage mobility between schools if the quality of the current school attended is not preferred. A scheme of school reform and renewal should similarly allow all pupils equal access to the potentially improving school, including those who seek entry to the school under the choice system and those who would have traditionally attended the school under a proximity-based system of place allocation. In this case improving the quality of local schools in the choice system should encourage and allow attendance at the nearest school, if that school is subsequently preferred to alternatives.

Empirical evaluation of the effectiveness of these recent education initiatives in providing equality of educational opportunity is thin on the ground, despite their growing significance as policy tools. This is a consequence of a lack of suitable data sources that allow for the assessment of issues surrounding the concept of fairness as applied to education policy. The onset of the National Pupil Database (NPD) since January 2002 has established a valuable source of information that makes this kind of analysis possible. The NPD is an administrative annual census that provides details on the academic performance and social background of all pupils in every state school across England and is the first dataset of its kind to offer researchers the potential to track pupil enrolment-related activity in schools. In this research the NPD will be used to address the issue of fairness by considering (i) whether pupils differing in their background gain access to popular primary schools without moving home and; (ii) the extent to which secondary schools that undergo a strategy of improvement, in the form of conversion into an Academy, remain accessible to all pupils. As the main goals of these policies are to enhance the equal distribution and accumulation of human capital through ensuring fair access to schools for all pupils, so the central aim of this study is to establish if fair access is their outcome.

The structure of this thesis is as follows. **Key Concepts** outlines the historical formation of choice policies and describes the steady growth of school improvement strategies, of which the Academies Programme is the most prominent. Thus this Section puts into context the significance of these education policy initiatives.

In **Part I**, **Chapter One** presents descriptive analysis of the amount of pupil movement between schools that does and does not involve a move of home for one cohort of pupils attending England's state primary schools. This evidence fills an important gap in knowledge on the extent of school change of the two differing types. This Chapter also considers whether participation in these moves varies by pupil characteristics and therefore if there are differences in the use of choice by social background. One barrier to choice operation that has the potential to impact on fair access is the existence of constraints in the supply of school places. These necessitate rules of entry when popular schools are above-capacity, and a criterion that is commonly applied is that of proximity of the home to the school. To assess the implications of this barrier for equality of educational opportunity, evaluation looks at the capability of pupils differing in their background to enter popular schools by engaging in school only transfers instead of relocating home in order to satisfy oversubscription admissions rules. In **Chapter Two** of **Part I**, the descriptive content of the initial Chapter is set in a regression framework. This allows for formal testing of the link between school change and pupil characteristics, as well as of the relationship between school change and entry into oversubscribed schools by pupils differing in their characteristics. Statistical associations consider the likelihood that a pupil makes either of the two move forms of pure school change or combined school and home moves.

Part II consists of **Chapters Three to Five**, across all of which an extensive evaluation is carried out into the issue of fairness in access to state secondary schools that undergo reform as part of the Academies Programme. **Chapter Three** contains details on the features of Academy schools and the ways in which, as a consequence of their independence from local authority control, they differ from other schools in the state system. Here the main objectives of the scheme are also laid out, with the key aim that matters for equality and fair access being one which requires Academies to be inclusive schools featuring pupils of mixed ability ranges. In **Chapter Four** the methodology behind the construction of the dataset to be used in empirical analysis of equal access in Academies is described in detail. This process includes defining a control set of non-Academies against whom the enrolment activities of Academy schools can be compared, where this control group consists of other schools located in the same area as, and with similar characteristics to, Academies that did not themselves undergo any process of school reform. **Chapter Five** considers whether institutional change results in access to improving schools for all pupils at the expense of none or whether the Academies Programme is associated with proportionally more 'exclusive' entry to the school by a higher quality pupil type. Statistical difference-in-differences estimation is used to evaluate changes in the pupil intake profile of Academy schools. The composition and prior academic ability of pupils being admitted into year 7 of the Academies sample are compared to those in both the predecessor schools that they replaced and other non-Academy schools located within the same region. To give a broader picture to the study of fair access in Academy schools, analysis also looks at whether there are changes in the whole school-level aspects of composition in Academies relative to in predecessor and control schools.

Following on from this is the overall **Conclusion** to the thesis, in which empirical findings across all Chapters are summarised, recent policy developments and their implications are discussed, and potential areas for future research are highlighted.

Key Concepts: School Choice and School Improvement

Two significant policy initiatives applied to the English state schools education sector in recent decades are those of school choice and institutional change. The aim of this Section is to provide some background information on these Key Concepts. School choice policies are a dominant theme throughout this research, with Part I aiming to understand if choice-type school change occurs for all pupils and Part II considering equality of access to reforming schools that, through this process, are attempting to return to the school choice market-place. The policy of school improvement is central to the evaluation undertaken in Part II of this thesis, which focuses on the Academies Programme as the largest version of this initiative in particular.

i. The Development and Functioning of School Choice in Education

Before the 1960s and 1970s the structure of state secondary school education in England centred around a stratified system of selection by ability, with academically orientated students who were successful in passing their "11 plus" entry exam transferring onto state-sponsored "grammar" schools for their secondary education. All other students attended "secondary modern schools" with a vocational bent and these pupils tended to leave formal education by the compulsory school leaving age of 15 (16 after 1973). In the 1970s, however, there was an undercurrent of immense change to the operation of secondary schools, with a movement towards a mixed ability, "comprehensive" style of schooling. While mixed ability schools are non-selective at the entry level, streaming at the class level by ability occurs for core subjects such as English, mathematics and the sciences[4].

[4] The 1976 Education Act required Local Education Authorities (LEAs) to replace schools previously split by the 11 plus examination with comprehensive schools, but this act was repealed in 1979. As a result around 85% of secondary schools within the state sector are of mixed ability, but there are some 33 (out of 150) authorities in England which still allow selective state grammar schools to co-exist alongside comprehensives (Machin and Vignoles, 2005).

Since the 1988 Education Reform Act various market-oriented strategies have been applied to England's maintained schools, at both the primary and secondary phases, in an attempt to generate competitive behaviour among education providers. This competition is assumed to be delivered through a process of allowing pupils access to a wide choice of schools from their current home location, rather than restricting admission to traditional place allocation in the school nearest their home. The creation of a schooling 'market-place' aims to counteract both the perceived drop in educational standards of attainment and the inequality of their distribution[5].

For **schools** themselves, choice strategies have largely introduced greater transparency surrounding their operation, performance and accountability as means for raising their productivity, efficiency, and overall competitive strength. In terms of their *operation*, schools are able to opt out of local government financial control and obtain their finances direct from central government, with internal (board of governor) rather than local authority level management of income. Whilst this has allowed schools more control over their budget, funding has been increasingly attached to student enrolment numbers, leading to a pressure to attract students in an attempt to operate to full potential, thereby maximising revenue. Where schools are able to attain their capacity-limit of student numbers and face further demand for places, those Local Education Authorities (LEAs) that control admissions into the school are required to make publicly available their oversubscription entry criteria, which serves to open up the school and LEA intake procedures. At the same time, the requirement to have more parental representation on the board of school governors, in conjunction with the delegation of financial management and appointment of staff to the board, has also increased visibility of internal school processes.

The formation, setting of key targets and publication of school results in National Curriculum examinations have been the main objectives by which school *performance* has been made more transparent. The National Curriculum was established through the 1988 Act and was in place in all primary and secondary schools between the academic years of 1989/90 and 1996/97. It produced a much

[5] State *primary* schools in England have traditionally been non-selective, of mixed gender and non-specialist in subjects. The introduction of market forces served to base their funding on pupil numbers and allow control and governance autonomy (if a primary school opted out of LEA control), thus providing mechanisms to attract students in the same way as for secondary schools.

scripted form and content of subjects to be taught in state schools for all pupils aged 5-16. Curriculum comprehension is now tested through national attainment exams at the ages of 6/7 (Key Stage 1), 10/11 (KS 2), and 15/16 (KS 4) and the government has set national targets of achievement at each stage.

Publication of school average test scores in the Key Stages (in the form of "league tables" appearing in local newspapers and on the internet) seeks to generate school *accountability* through performance transparency. This information enables the public to compare the performance of individual schools relative to both other schools within the local area and to nationally set targets. The Office for Standards in Education (Ofsted) was set up under the Education (Schools) Act of 1992 to inspect all state-funded schools at least every one in four years and to produce a publishable detailed report on the internal management, functioning and quality of schools, as a more direct method of accountability (Machin and Vignoles, 2005).

For **parents**, the transparency of the system is designed to present them with more options in the educational exposure of their child(ren), beyond home location-related provisions, thereby laying the demand-side foundations of a schooling market-place. Information on school effectiveness, offered through performance tables and Ofsted reports, forms the tool to be used by parents to help them choose schools most satisfying the preferences and pedagogic needs of their offspring. The higher competition between schools for pupils that more parental choice aims to create is intended to produce a system of effective schools that are able to expand to full capacity, since, at least theoretically, schools should face no constraints in their supply of places. In this system weaker schools are charged with either improving their performance, through schemes such as conversion into an Academy school, or otherwise facing the prospect of permanent closure.

ii. Institutional Change as a Feature of Education Policy Initiatives: the Academies Programme

Academy schools have featured in the English state secondary education sector since 2002. As an education policy initiative the Academies programme forms part of the government's commitment to tackle the legacy of the inequality of opportunity that exists together with a long tail of poorly performing schools. The driving force behind the Academies programme is school improvement delivered through a unique and complete form of institutional change, in which an underperforming school is restarted from the ground upwards. A new school building, management structure and autonomy of functioning are packaged together to give Academy schools "the potential to make a major contribution to improving opportunities for all our children" (Rogers and Migniuolo, 2007, pp. 8, quoting the then Education Secretary David Blunkett).

Despite the government's coming-to-power rhetoric that "[s]tandards, more than structures, are the key to success" (Labour Party, 1997) and would therefore form the basis of education policy developments, there has nevertheless been a steady stream of initiatives designed to tackle education underachievement which, like the Academy schools model, have institutional change at their heart. As a general reference for Part II of this study, this Section charts the rise of school reform policies of different types and sets the significance of each against that of the Academies initiative.

a. Fresh Start Schools

The Fresh Start initiative was first introduced by the New Labour government in 1997 in the White Paper *Excellence in Schools* as part of the school improvement policy agenda, and was applied to underperforming schools from 1998 onwards[6]. It was presented as an option for schools in Special Measures, or, more specifically, "where schools over three consecutive years failed to get 5 good GCSE passes for at least 15 per cent of their pupils, they would be considered for a Fresh Start" (DfES,

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[6] The Fresh Start Schools initiative was partially modelled on the American schools model of 'Reconstitution', under which failing schools start from afresh with new staff, new leadership and a new curriculum (Matthews and Kinchington, 2006).

2000). Very often it acts as a last resort for failing schools frequently characterised by a high fraction of pupils from low socio-economic backgrounds with lower-than-average academic outcomes. The policy involves 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. As noted in Matthews and Kinchington (2006, pp. 107), "[a] school may be closed on one day and opened as a new school on the following day on the same site, but with a new identity and frequently with a new staff, governors, vision, environment, initiatives and extra funding." Additional capital and revenue funding from government covers the initial three years of the scheme and is combined with Ofsted school inspection within one to two years of the formation of the new school. To date 37 Fresh Start schools are known to have been set up in England (Hansard, 2008d).

b. Building Schools for the Future (BSF)

First launched in 2004, the BSF is a Private Finance Initiative (PFI) programme[7] that represents a major source of capital funding for public secondary schools and aims to rebuild or renovate the entire state secondary school estate (around 3,300 schools in 2007[8]) by 2020 (Curtis *et al.*, 2008; Rogers and Migniuolo, 2007; Gadkowski, 2007). The scheme enables all LEAs to rebuild up to 50 per cent of their estate and to undertake major and minor refurbishments to 35 per cent and 15 per cent respectively of the remaining builds. Beginning in 2005/06, there are a total of 15 planned waves of investment, with the order in which LEAs are entering into the programme reflecting their relative levels of social and educational need (PSA Delivery Agreements, 2008; Sibieta *et al.*, 2008). The initial receipt of BSF funds requires LEA submission of a 'Strategy for Change' document which sets out the educational aspirations, secondary school estate plans, and pupil placement forecasts of the area for the next ten years. Additionally the LEA is required to agree on

[7] "The PFI began in 1992, and engages a private consortium, the PFI provider, to invest in new or refurbished buildings such as schools, once there is a public invitation to tender. Under the PFI, a contractor is responsible for construction or refurbishment of the school, and then can additionally provide a range of services such as school meals, and utilities on behalf of the local authority under a long-term contract. The Local Authority pays a monthly charge to use the PFI's infrastructure and, at the end of the contract the Local Authority adopts responsibility for the infrastructure" (Gadkowski, 2007, pp. 12).

[8] Figure obtained from DCSF (2007), Table 1: All Schools: Number of Schools and Pupils by Type of School, January 1998 to 2007.

projects with governmental bodies, such as Partnerships for Schools, the body in charge of the delivery of BSF, prior to funds allocation. The government plans to spend a total of £9.33 billion on BSF over the next three financial years (2008/09 to 2010/11) (Sibieta *et al.*, 2008; Astle and Ryan, 2008). To date 26 BSF projects have been agreed (PwC, 2008).

c. The National Challenge (NC)

The National Challenge was announced by the current Secretary of State for Education, Ed Balls, in June 2008. The policy aims to raise standards in schools with the lowest GCSE results and sets a target rate of achievement across the entire state secondary school network in England. By 2011 it is expected that "in every secondary school at least 30% of students will achieve at least five GCSEs at A*-C including English and mathematics" (DCSF, 2008, pp. 1, quoting Ed Balls)[9]. The majority of secondary schools falling below this benchmark are those where greater than fifty per cent of pupils are eligible for free school meals, a proxy measure of disadvantage[10]. As such the Challenge is in line with two major aims of the government of (i) improving the life chances of children from deprived social backgrounds by lifting the schools they attend out of failure; and (ii) narrowing the gap in educational achievement between children from disadvantaged and low-income backgrounds and their peers (DCSF, 2008; PSA Delivery Agreements, 2008).

Standards are to be raised through the introduction of a package of financial and functional strategies of support in underperforming secondary schools. To date a budget of £400 million has been set aside by the government for the programme. Of this, £20 million is to be spent on bringing in a National Challenge Adviser (NCA) to each NC school, whose task it is to work with the school to identify their problem areas. A further £20 million provides for leadership guidance and support, and £100

[9] This performance target for schools was originally referred to in the April 2008 Public Service Agreements (PSAs) for the 2008-2011 spending period of the Government. PSAs were first introduced through the 1998 Comprehensive Spending Review (CSR) as a performance management framework for Government, setting out their key priority outcomes (in the form of "Delivery Agreements") for each wave of spending (see http://www.cabinetoffice.gov.uk/about_the_cabinet_office/publicserviceagreements.aspx). The National Challenge is contained within the "Fairness and opportunity for all" category of PSA Delivery Agreements, as PSA number 10 (see PSA Delivery Agreements, 2008).

[10] See Appendix 1A, Section 1A.G for an explanation of the parental financial or other conditions under which their children are entitled to free school meals.

million for teaching, learning and study support. Thus the scheme offers "structural solutions" to poor school performance (DCSF, 2008, pp. 13). Funds are distributed to NC schools according to their need and can result in an individual school being awarded anywhere up to one million pounds to help reach the achievement target (DCSF, 2008; Curtis *et al.,* 2008). In 1997 there were 1,610 secondary schools below the National Challenge threshold, representing around 46 per cent of all secondary schools. By 2007 this fell to 638 schools (close to 20 per cent of the total) and at the latest measure in 2008 it stood at 440 schools, or 13 per cent of the total (DCSF, 2008)[11].

d. The Significance of Academies as an Institutional Change Initiative

Aspects of the Academies programme can be seen in each of the education policies described above. Academy schools, like Fresh Start schools, offer a catalytic system of whole school renewal in order to bring about school improvement, involving fundamental changes to school operations and the development of a new school philosophy from within the same environment (Matthews and Kinchington, 2006). In fact, 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) and forming an integral part of New Labour's "zero tolerance of underperformance" within state secondary schools (Labour Party, 1997).

Like the BSF scheme, Academies involve expenditure on the physical stock of schools, either in the form of the development of a new school building, or through the remodelling of a pre-existing school that is being replaced by an Academy. Both initiatives are presumed to provide a clear signal of local community investment and regeneration, and to have a direct impact on pupil motivation and engagement. In their first annual report on the BSF programme on behalf of the Department for

[11] The figure for 2008, of 440 schools, relates to a press briefing on the progress of National Challenge schools given by the Secretary of State according to information available as at 15 January 2009 (see http://www.dcsf.gov.uk/nationalchallenge). In 1997 there were around 3,500 maintained secondary schools in total in England (DCSF (2006a), Table 1: All Schools: Number of Schools and Pupils by Type of School, Position in January each year: 1997 to 2006) and by 2007 this was down to around 3,300 schools (DCSF (2007), Table 1: All Schools: Number of Schools and Pupils by Type of School, Position in January each year: 1998 to 2007). The percentage calculation for 2008 (of 13%) uses the 2007 total of 3,300 schools as the total for 2008 is not yet available.

Children, Schools and Families (DCSF), PricewaterhouseCoopers (PwC) noted that the overall purpose of the initiative is to contribute to the transformation of education through school reconstitution that has a maximum possible effect on pupil performance. Specifically, "it is hoped that it [BSF] will engage and inspire teachers, young people and their local communities" (PwC, 2007, pp. ii). Likewise, the House of Commons (HC) report on the matter identifies an underlying conjecture that, as a policy measure, capital investment can be used "to deliver much higher standards of education and to transform learning and working environments in schools" (HC, 2007, pp. 12).

In terms of the National Challenge, the focus that this places on poor-performing schools characterised by pupils from disadvantaged social backgrounds has its parallels in the Academies scheme. The Academies model originally targeted failing schools classified as being in Special Measures or more generally showing signs of underachievement, and therefore likely featuring a higher proportion of pupils eligible for free school meals, as is the case for NC schools. The Academies programme also endeavours to bring about a new positive direction for weak schools through significant structural changes to school functioning, in line with the main means by which the NC aims to deliver school improvement.

The fact that there are many common threads running through several government education policy measures and the Academies programme highlights both the importance of institutional change as an education initiative overall and the relative prominence of the Academies model as one such type of this initiative. The Academies programme has reached new heights of significance more recently, following its specific incorporation into some of the above proposals[12], which has allowed for a more widespread expansion of the scheme. In March 2006 it was announced that all future Academy school buildings would qualify for capital funds under the BSF project, meaning that Academy school formation now explicitly contributes to the redevelopment of the school estate within a locality and can be used to satisfy BSF requirements (Rogers and Migniuolo, 2007; Curtis *et al.*,

[12] As was mentioned, the Academies programme was launched as a new aspect of the Fresh Start initiative. Given that recent records show there to be only 37 Fresh start schools (and it is unclear how many of these relate to the secondary education phase), Academies have contributed and continue to contribute much more to driving this scheme forward.

2008)[13]. As stated above, the National Challenge applies to underachieving schools defined by 30 per cent of pupils or more not attaining five good GCSEs in the A*-C range, including in English and maths. Since 2008 this definition has been used in the Academies programme to offer a more precise indication of what constitutes an underachieving school that consequently qualifies for replacement by an Academy (Curtis *et al.*, 2008). The implication is that one option for National Challenge schools is to convert to Academy school status. Crucially, of the £400 million that has been budgeted by the government for the National Challenge, £195 million has been earmarked for the transformation of NC schools into Academies, representing near half of the budget slice and creating a strong impetus for NC schools to make this switch. In total, it is expected that a further 70 Academy schools will result from the National Challenge (DCSF, 2008)[14].

Putting the above points into context, 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)[15]. In November 2006 this target was doubled to 400 Academies, recently predicted as being established by 2015 (Rogers and Migniuolo, 2007; HC, 2008). At the time of writing (June 2009) there are 133 Academy schools open in 65 (out of 150) LEAs[16]. Prior to the announcement of additional funds being made available for Academy school set-up as an option for National Challenge schools, it was expected that a further 55 Academies would open in each of September 2009 and 2010, bringing the actual total by 2010 to 243 Academies, 43 schools in excess of the original target. Following the budget support offered through the National Challenge however, the government anticipates the expansion of the Academies programme to lead to 80 and 100 Academy schools opening in 2009 and 2010, representing 25 and 45 more schools respectively than was expected (70 more in total, as was mentioned, see DCSF (2008)). On these bases, there should be 313 Academies open in September

[13] Academy schools financed under the BSF scheme usually involve redevelopment of an existing (predecessor) school building. Consequently their turnaround time is shorter than for Academies that require completely new builds, taking only around two years (Rogers and Migniuolo, 2007).
[14] To clarify, the £400 million budget for the National Challenge is expected to be allocated amongst national challenge advisers (£20mn), national education leaders and other leadership support (£20mn), teaching, learning and study support (£100mn), Academy schools (£195mn) and the establishment of Trusts (£65mn). Thus the largest allocation goes to Academies (DCSF, 2008).
[15] This is in line with the original concept of "City Academy" schools. These were to be established in such conurbations so as to provide a means for urban education reform in particular.
[16] The current number of open Academies was obtained from the following website (accessed 27 January 2009): http://www.standards.dfes.gov.uk/academies/projects/?version=1

2010, around one-and-a-half times more than was initially planned, and, according to the DCSF (2008), the Academies programme should be responsible for the replacement of more than 200 National Challenge schools overall (using the definition of a NC school applied to schools that had already been replaced by Academies prior to NC introduction as well as following implementation of the NC). This would suggest that the target of 400 Academies forecasted as being open by 2015 is feasible, requiring only a further 87 such schools to be set up between 2010 and 2015. In this case, based on current government projections of the number of state secondary schools in the system being 2,659 by 2015, Academies will account for about a 15 per cent share at this time, up from a near 7 per cent share had the original target of 200 Academies being established by 2010 remained[17]. This is a sizeable fraction that has the potential for yet further expansion and is indicative of the weighty presence of Academies on the schooling and education policy landscape for the foreseeable future.

[17] The projected number of secondary schools figure for 2015 is obtained from HC (2008) and refers to the academic years 2014-2015. For 2009-2010 it has been forecasted that there will be 2,966 secondary schools in the system (*ibid*).

Part I

Chapter One: Exploring Dimensions of School Change during Primary Education in England

1.1 Introduction

Family background constitutes the most important determinant of child cognitive development. Cognitive ability concerns the knowledge procurement process and involves the capacity to engage in thought and reason, as well as to exercise perception, judgement and awareness. Observable measures of schooling outcomes such as standardised tests capture both innate and acquired cognitive ability (Postlewaite and Silverman, 2006). Estimates suggest that the proportion of variation in pupil achievement that can be attributed to household characteristics is as much as 75 per cent (West and Pennell, 2003)[18]. The influence of the family on child cognitive outcomes works through aspects such as parental interest in schooling and aspirations for their child's success, both of which are related to the education and income of parents (Adnett and Davies, 2002).

The role of schools within cognitive skills formation is to close the gap in learning ability associated with differences in the family background of children. Research has indicated a small but nonetheless significant position played by schools in this respect, with estimates suggesting a 'school effect' on variations in pupil outcomes of between 5 and 18 per cent (Machin and Vignoles, 2005)[19]. That part of child cognitive development linked to education depends on the types of schools available in the locality and the accessibility of these schools by different households. School accessibility in an area varies according to whether institutions are centrally funded by the government (state schools) or require the payment of fees (independent or private schools). For the vast majority of families state schools represent the principal accessible supplier of education given that they provide free compulsory education for all, so that they form the focus of schooling considerations. At the

[18] This refers to the original work of Thomas, S. and Mortimore, P. (1996). Comparison of Value-Added Models for Secondary School Effectiveness. *Research Papers in Education*, 11(1): 5-33.
[19] This refers to the original work of Sammons, P. (1999). School Effectiveness: Coming of Age in the Twenty-First Century. Lisse, the Netherlands: Royal Swets and Zeitlinger.

household level, travel costs and school quality issues, amongst other factors, result in preferences for entry into some local state schools above others[20]. Minimisation of travel costs implies attendance at those maintained schools that are geographically close to the home, or that can fit into the travel-to-work patterns of employed household members. For pupils within households the quality of the state school attended shapes cognitive learning and affects the life course, since education outcomes are carried through to the labour market (Adnett and Davies, 2002).

Non-cognitive, or life-skills – such as self-assurance, motivation, interpersonal attributes and general emotional intellect (Carneiro *et al.*, 2006; Heckman and Rubinstein, 2001) – are mainly a function of family background, though their development in children is also affected by schooling and the external neighbourhood surroundings to which a child is exposed. At home, parent-child interactions instil the family norms, values, attitudes and behavioural responses that impact on child non-cognitive development. Within the school these skills relate to the nature of friendships and peer group communications that the child engages in – both inside the classroom and when interacting with other year groups – in addition to the overall ethos of the school. Outside of the school, residential location affects notions of opportunities that exist beyond educational years through the amount of social capital and adult role model influences that are present in the home surroundings, impacting on child academic aspirations and persistence (Glaeser, 2001). Research has revealed that life skills acquired by individuals are advantageous not only to the individuals themselves but also to society as a whole, since they encourage the formation of socialisation attributes and can reduce deviant behaviour, like involvement in crime, or minimise individual exposure to risks factors, such as unemployment or teenage motherhood (Carneiro *et al.*, 2006).

In general the intertwined cognitive and non-cognitive facets of child progress react to and depend upon the local provisions of public services that relate to schooling, housing and other community inputs. Changes to these spatial dimensions can produce differences in the life chances of children by affecting their exposure to effective schools and therefore both their cognitive and non-cognitive development.

[20] School quality is used here to refer to the performance of the school in National Key Stage tests. In general, it can also indicate aspects of schools such as the quality of teaching provision, the compositional mix of fellow pupils and their academic ability, and the current governance and management conditions of the school.

In terms of schooling, spatial change may involve attendance at a different school whilst remaining in the current residential location, or may relate to a change of school occurring together with a move of home.

To date there has been limited research examining the varied aspects of moves between schools. These seem necessary to understand if consideration is made for the contribution attendance at an 'effective' school can make to child development. Recent changes in public sector education policy in England have acted to affect the form of moves made and therefore the influence of schooling on child progress, strengthening the need to evaluate dimensions of school change. In particular, government initiatives in the state school system have increasingly involved an attempt to widen the scope of education institutions that pupils can access from the current home location, an admissions method that compares with traditional place allocation in a state school nearest to the pupil's home. At the same time, performance indicators on the academic standards of England's maintained schools have been made publicly available, promoting the notion of parents 'choosing' a school for their child to attend. Combined, these factors have potentially promoted the likelihood of movements between state schools driven by the pursuit of raised education standards, with this mobility prospectively able to occur independently of a move of home. However, one major caveat to the effective operation of choice has been the fixed capacity constraints faced by state schools that have necessitated the imposition of 'oversubscription' entry criteria when applications for places exceed the number available. The most significant of these involves the proximity of a pupil's residence to the school, a condition that serves to reinstate the school-home link which choice polices have attempted to forge apart.

In this Chapter features of school moves excluding and involving home moves will be described and assessed for one cohort of pupils as they progress through the primary years of *state schooling* that encompass Key Stage 1 (aged 6/7) to Key Stage 2 (aged 10/11) National Curriculum examinations. The empirical source of reference for this analysis is the National Pupil Database (NPD), which comprises of an annual collection of administrative records on all state school pupils in all phases of education throughout England since the academic year 2001/2002. The aims of this research are: (i) to define and measure both 'pure' pupil mobility, in which pupils change schools without moving home, and combined school-home moves; (ii) to describe the key pre-move attributes of the different mover types, as well as their pre-move academic attainment; so as to establish the association between pupil characteristics and the form of move made, and (iii) to establish some understanding of the effectiveness of school choice policies by considering evidence on the extent and nature of pure school change that involves entry into an oversubscribed school.

Section 1.2 introduces evidence on the common way of classifying and measuring pupil mobility identified in the literature and on the amount of school moves witnessed according to this method. Much of the literature uses a composite approach in which no distinction is made between school change that does and does not involve a move of home. In Section 1.3 recent government initiatives in the state education sector discussed above are described in more detail and are pinpointed as a reason for the need to separate out differing forms of school change. Section 1.4 explains the primary school set-up in England as a precursor to the empirical focus. Here it is suggested that the importance of parental access to a wide network of good quality schools for their children from an early age must be set against the desire for the school attended to be close to the home, conflicting concerns that give rise to an interest in assessing mobility patterns and the operation of school choice during the primary education stage in particular.

In Section 1.5 details on both the structure of the NPD and on the Key Stage 1 to 2 cohort of primary school pupils attending state schools in England, who make up the empirical source of reference for this Chapter, are given. Section 1.6 describes the means for measuring dimensions of school mobility in this data sample and establishes the sample size under analysis. In Section 1.7 estimates of school and home moves are presented according to both the composite measure defined by the literature, and to measures that divide school change only from combined school-home moves. This empirical Section highlights the loss of valuable detail on mobility patterns that is brought about when only a composite indicator of school moves is estimated. As a natural extension to the re-evaluation of mobility, Section 1.8 looks at the characteristics of the differing mover types, including their prior attainment, and highlights the tendency for pupils from a more advantaged background to make pure school changes over and above school-home moves.

The effectiveness of school choice policies forms the cornerstone of assessment undertaken in Section 1.9. Here estimation looks at entry into popular schools by pupils making one move of school, or school-home, as a means for establishing whether school choice is counteracted by oversubscription rules applied in England's filled-to-capacity state schools. The findings from this angle of enquiry and those on the attributes of pupils are then brought together in a brief discussion that considers issues of equality in the utilisation of school choice. Finally, Section 1.10 summarises the main results of this work and its contributions to education research.

1.2 Literature on Mobility

The movement of pupils between schools has been discussed in literature concerned with the sociology of education and the management of schools as early as the 1960s (see for example, Plowden, 1967, and Douglas, 1964). In England, the first large-scale study of the nature and causes of school change was undertaken by Dobson and Henthorne (1999). Their project involved the collation of general LEA statistics on pupil mobility in schools, for which they attained details from 130 out of 150 of the surveyed authorities (an 87 per cent response rate). The authors established a common formula that LEAs employ in order to measure pupil mobility in their regions, which is named the Joiners Plus Leavers (JPL) method and refers to those pupils entering the school at times other than the normal starting period of the beginning of the academic year. This formula is given by[21]:-

$$\frac{\text{Pupils joining school+Pupils leaving school}}{\text{Total school roll}} * 100$$

In terms of the nature of school moves, the authors note a perception of 'high' mobility at the primary school stage of education where it is at or above an annual rate of 20 per cent in LEA primary schools. Contributors to high mobility include travellers and members of armed force families, those experiencing changes to the household dynamics through parental break-up or separation, those accommodated in particular types of housing (such as rented or temporary) and households engaging in seasonal employment. Areas characterised by high mobility include major cities, particularly London, coastal resorts and regions featuring armed forces bases.

The causes of school change are divided into four main categories: international migration, internal migration, individual movement and institutional movement. Both international and internal migration are mainly driven by household employment factors, and in the former case can result in permanent settlement in the UK or elsewhere, while in the latter case the overall quantity of moves are mostly determined by stages in the life cycle. Individual movement relates to changes in family circumstances which necessitate children moving between households. Of

[21] See Dobson and Henthorne (1999, pp. 12).

direct relevance to the focus of this Chapter is institutional movement, which involves children changing schools by choice, or transferring between differing school types, such as special and mainstream schools.

Though their analysis addresses mobility at the LEA-level, Dobson and Henthorne (1999) also provide a general definition of mobility at the level of the individual pupil. This is stated as "a child joining or leaving a school at a point other than the normal age at which children start or finish their education at that school – *whether or not this involves a move of home*" (pp. 5, original emphasis). Thus, pupils who switch schools at times other than when transferring from primary to secondary school, for example, are included in the measure. This definition of school movers is applied in many studies that assess mobility, especially those concerned with the impact of school change on own-pupil educational attainment (see for example Blane, 1985, Strand, 2002, and Burgess *et al.*, 2006b). If one considers the potential for this relationship to differ according to the form of mobility involved then the use of such a general definition could be problematic. In this respect isolated school changes or combined school-home moves may exert varying effects on attainment, rather than having an overall clear-cut consequence. Categorisation of mover types along these dimensions matters not only in the evaluation of aspects such as the mobility–own-pupil performance relationship, but also in the development of a group of immobile pupils against whom educational outcomes of school movers are compared. If a 'stable' set of pupils only alludes to those pupils not changing schools over the study period under consideration then it could be that this group are not *residentially immobile*. Then if school stayers (or likewise school changers) who do and do not move home differ along a range of significant dimensions, clustering them into one group according to their schooling behaviour alone could result in an incorrectly defined comparison group and incorrect analysis of the result of moving schools. The implication of this is that there is a need to redefine mobility in a way that allows for consideration of the importance of the type of move made.

To date there has been little research undertaken that distinguishes between differing kinds of pupil moves between schools, predominantly due to a lack of available data that provides detailed coverage of moves and information on their nature. Previously co-authored work (Machin *et al.*, 2006) has utilised the National Pupil Database (NPD) – a state-school-level Census of pupils on roll in January of each academic year – to address mobility patterns, where an allowance is made for differing mover types. Composite school moves across two waves of the Pupil-Level Annual School Census (PLASC) component dataset to the NPD are studied, as is residential mobility behaviour associated with in-school children, from the stance of whether there are changes of home residence occurring together with pupil mobility. Table 1.1 details school moves that involve a change of residence for pupils moving schools between 2001/2002 (the first wave, or year, of PLASC) and 2002/2003. Moves of school attended are identified by changes to the code of the school recorded in the PLASC data between the two years, and refer only to those non-compulsory school changes rather than expected school shifts, as per Dobson and Henthorne (1999). Residential moves reflect home postcode changes over the same period.

Table 1.1: Proportion of School Movers Moving Home by Year Group and Key Stage (KS)

Year group	Composite mobility: Total school movers (1)	Residential movers (2)	Proportion residential (3)
1-2	40,897	27,387	0.670
2-3	30,681	20,527	0.669
KS 1 average			*0.669*
3-4	39,606	25,188	0.636
4-5	37,007	22,948	0.620
5-6	32,577	20,984	0.644
6-7	8,808	2,365	0.269
KS 2 average			*0.606*
7-8	20,894	11,706	0.560
8-9	20,555	10,688	0.520
9-10	17,225	9,042	0.525
KS 3 average			*0.536*
10-11	8,815	4,274	0.485

Source: Adapted from Machin *et al.* (2006, pp. 264, Table 4).
Notes: School movers are pupils moving school other than at compulsory times. The remaining non-compulsory movers between years 6 - 7 (when the move to secondary school occurs) reflect pupils attending middle school who leave later than year 6. Column (1) shows total year group numbers of movers when both the REE school code and the home postcode contained in PLASC are available for both academic years for the pupil.

In the analysis of mobility patterns across all stages of education, the national dataset used in this research revealed that just over 900,000 school children switched schools across the two PLASC years, equal to roughly 16 per cent of the total of almost 5.9

million pupils sampled. Of these, just over a quarter of a million, or 4.4 per cent of school changes were made at non-standard time stages of transition between the academic years. It was found that non-compulsory school changes occur most often in the transition from school Year 1 (aged 5/6 in 2001/02) to school Year 2 (aged 6/7 in 2002/03) at a rate of 7.3 per cent, and that, overall, mobility was considered to be more prevalent in the primary school stage of education. Table 1.1 shows that more than half of those pupils switching schools also changed residence in almost all year group transitions (except for between years 6 and 7 and years 10 and 11). Residential transfers were higher in the primary school years, particularly in the years leading up to and including the Key Stage 1 examinations (taken at the end of year 3, when pupils are aged 6/7), at an average of 70 per cent for the two year groups involved (column 3)[22].

This evidence emphasises the complexity of the school changing process and additionally indicates that the analysis of mobility patterns needs to go beyond the informative content deriving from the general definition of pupil mobility between schools that Dobson and Henthorne (1999) provide. In the Section that follows the importance of differentiating between school changers of different forms is further highlighted in reference to recent developments in government education policy, which have served to impact on the nature of school moves made.

[22] Section 1A.A of Appendix 1A also provides some statistics on child migration from the 1991 and 2001 Population Censuses. These data indicate that home moves are particularly prevalent in the pre-compulsory schooling years when children are aged 1-4. They additionally signal a higher amount of home mobility at the primary schooling ages, as found by Machin *et al.* (2006), though it is not possible to identify from the Censuses how much residential change also involved a school transfer.

1.3 Mobility and Government Education Policy

State school admissions systems can be broadly categorised into two main models of schooling provision, namely community-school models and parental-choice models. In a community-based model schools serve only local community pupils and admission is determined purely by residential location, typically within the limits of a defined geographical 'catchment' area that comprises of pupils inhabiting homes of close proximity to the school concerned. In the choice-based model admissions are weighted towards parental preferences, so that parents are given more freedom and input over the education exposure of their children. This model of education provision incorporates a wider local area and is not restricted to place allocation in schools nearby the home (Gibbons *et al.*, 2006).

In recent decades, the UK government has enacted reforms pushing the organisation of the procedure of admissions into public-sector education towards the choice mode, as opposed to the more traditionally featuring community system, resulting in the current existence of a hybrid education service. A 'quasi-market' for the provision of education based on school choice was first introduced through the 1988 Education Reform Act. Justifications for this policy shift lie in the perceived merits of incentive mechanisms existing in a competitive market-place for schools characterised by parental choice, and the ability of these devices to drive up standards in education[23]. In the UK this is exemplified in the performance of independent schools, which tend to operate under the choice-based mode, and which have consistently produced academic records above those of state schools – 60 per cent of privately educated pupils attained post-secondary degrees in the 1980s and 1990s compared with only 16 per cent of state educated pupils (Machin and Vignoles, 2005)[24]. State schools, on the other hand, having been historically characterised by the neighbourhood-based approach to schooling allocation, are faced with education standards that are partly dependent on the learning capacity and socio-economic status of local community pupils. It is argued that this allows for poor standards of academic achievement to prevail by preventing those living in poorer communities in particular from attaining

[23] For background information on the school choice policy, see the Section entitled 'Key Concepts'.

[24] Literature on the effects of school choice and competition attributes the superior performance of independent schools relative to state schools to the competition induced by parental choice which improves the technological efficiency of private schools (see, for example, Gibbons *et al.*, 2006).

education services that may accurately match their wants and capabilities (Gibbons *et al.*, 2006).

The application of parental choice and school competition to the state school system has featured the formation of market-based incentive mechanisms in school enrolment and school performance. In terms of enrolment, school funding is linked to the number of pupils on roll at the school and their characteristics. At the institution-level, league tables of performance have been supplied to the public since 1996 (1994) for primary (secondary) schools, providing accountability information on the academic achievement of schools in standardised tests relative to both nationally defined education targets and to other schools in the local area. Taken together, these two changes mean that parents are enticed into 'shopping around' for a local education supplier that best matches the preferences and learning needs of their children and schools, in order to maximise their revenue funding, are encouraged to actively engage in market-like competition for pupils as a result of the policy reforms (Tiebout, 1956).

Theoretically one would expect that more transparency in the relative academic performance of local schools and a greater parental freedom to choose amongst a wider range of differing education providers within the same local area would affect spatial mobility that relates to schooling, as parents attempt to take advantage of opportunities for improving the learning circumstances of their children. Under effective policy, localised changes in the school attended should be feasible without such moves necessitating changes of home. More specifically, the emphasis on parental choice in education provision put forward by recent government policy represents an attempt to sever the link between where a child lives and the range of schools that s/he is eligible to attend, a situation imposed by the historical prevalence of education provision under the community-school model. Instead school choice aims to forge a link between the demand for and the supply of local education services, by offering more school alternatives *conditional* on pre-existing family residential location (Gibbons and Silva, 2006a). Then it is conceivable to suggest that such initiatives may have introduced or strengthened an element of spatial activity in which pupils change schools whilst remaining in the same place of residence, a situation that can be termed 'pure' pupil mobility.

Empirical evidence on 'pure' school moves is limited, given that the common way of assessing pupil mobility in the literature has thus far failed to distinguish between school moves *only* and those that involve changes of home. Statistical facts about the distinct amount of moves of each type appear important, in light of the disconnection of the home-school link that government policy has targeted. Hence the empirical Section that follows will incorporate the redefinition and re-measurement of school shifts, dividing them up between 'pure' pupil mobility and 'school-home moves.' One cohort of pupils aged between 5/6 and 10/11 and attending state Primary schools in England throughout the Key Stage 1 to Key Stage 2 learning phase will be extracted from the NPD for this purpose. Prior to the presentation of empirical findings, the following Section provides a brief description of the structure of state Primary schooling, and then goes on to address why this education stage is of particularly high relevance to the mobility discussion.

1.4 Primary Schools in England and Admissions Policies

Primary schools in the state or 'maintained' schools sector in England are organised into one of four categories – Community, Foundation, Voluntary-aided (VA), and Voluntary-controlled (VC) – where variation reflects structural differences in governance, ownership, and pupil admissions policies, as summarised in Table 1.2. The Table shows that Community schools represent the predominant form of state-provided primary schooling in England, catering for close to 62 per cent of all primary-age pupils. VA and VC schools supply education services to near 22 per cent and almost 14 per cent of primary-age pupils respectively, with Foundation schools accounting for the remainder (just above 2 per cent).

Table 1.2: Characteristics of State Primary Schools in England

Type (1)	No. of schools, 2005/06 (% of total) (2)	Faith (3)	Governors (approximately) (4)	Assets owned by (5)	Admissions authority and employer (6)
Community	9,579 (61.42%)	Secular	Parents >30%, Staff <30%, LEA 20%, Community 20%.	LEA	LEA
Foundation	325 (2.08%)	Mostly Secular, some C. of E.	Parents >30%, Staff <30%, Foundation/Partnership <25%, LEA <20%, Community 10%.	Foundation or Governors	Governors
Voluntary-aided	3,467 (22.23%)	Mostly C. of E. or Catholic, some other faith, some secular	Foundation >50%, Parents >30%, LEA <10%, Staff <30%.	Foundation	Governors
Voluntary-controlled	2,226 (14.27%)	Mostly C. of E., some other faith, some secular	Parents >30%, Staff <30%, Foundation <25%, LEA <20%, Community 10%.	LEA	LEA
Total	**15,597**				

Source: Adapted from Gibbons and Silva (2006b, pp. 36, Table 1).
Notes: The number of schools (and percentage of total) is based on the Key Stage 1 and 2 cohort data used in the empirical Section and includes only those pupils with a full set of mobility indicators and pupil characteristics (see Table 1.6). LEA stands for Local Education Authority. On average Community schools are the dominant institution type in England, accounting for about 65 per cent of all Primary schools.

In terms of *governance*, the governing body (or board of school governors) of a primary school is responsible for the overall management of the school – that is it "sets the strategic direction of the school, draws up school policies, sets targets and monitors performance" (Gibbons and Silva, 2006b, pp. 8) – while responsibility for daily school management falls on the leadership group. Community schools feature the highest representation of the LEA on their governing body relative to other school types, with the LEA accounting for a 20 per cent share. VA and VC schools are commonly attached to a 'Foundation', comprising of a charitable (including faith) or a business organisation. Foundation schools themselves, on the other hand, tend to operate with local organisations on a partnership basis. The board of school governors (including the 'Foundation') linked to VA schools contributes financial resources to the building and maintenance expenses of the school, which is in line with their greater presence on the governing body, where they account for a share of in excess of 50 per cent (see column 4 of Table 1.2). Overall *ownership* of school assets (the land and buildings) can belong to the LEA or to the school governors and the principal employer of staff to the school also varies along these dimensions (column 5).

Where *pupil admissions* are concerned, across all primary school types the initial coordination of the admissions process is in the domain of the LEA, but they are only responsible for allocating places in the schools for which they are the admissions authority, that is, in Community and VC schools. LEAs are required to allocate pupils to these schools on the basis of stated parental preference in the first instance, as appearing in the admissions application form. So-called 'oversubscription criteria' are laid out by the LEA for use when there are more applications to the Community or VC school than places available. In Foundation and VA schools there is greater flexibility over pupil entrance decisions, since the governing body is the admissions authority and therefore has more freedom to set the admissions and oversubscription rules and allocate places with adherence to these rules[25]. However, the majority representation of the 'Foundation', as opposed to the LEA, on the board of school governors in VA schools implies that only in these schools can admissions practices

[25] In turn, the admissions rules must comply with the law and any mandatory requirements of the relevant Code on admissions, as discussed in Section 1.4.1 below (West *et al.*, 2009).

truly deviate from those applied in LEA-run institutions (Gibbons and Silva, 2006b; Tough and Brooks, 2007)[26].

1.4.1 Primary school mobility and admissions 'oversubscription'

The main reasons for addressing school and home moves undertaken by pupils attending state-sector Primary schools in particular relate to both the education sector changes introduced by the 1988 Education Reform Act and to the admissions criteria adopted in the event of place oversubscription, both of which, it will be argued here, are likely to have impacted more on mobility during the primary education phase.

As discussed in Section 1.3, since 1988 government policy has favoured a quasi-market method of education provision, in which parents are encouraged to be actively involved in the schooling choices for their children. Theoretically, the radius of parental choice of schools is meant to encompass a wider field than that which the traditional allocation of pupils to localised schools would allow, and this field should be attainable from the current residential setting. At the same time schools are encouraged to attract a high number of pupils, since pupil quantity determines school sustainability by being directly related to total school funding.

The process of admission into England's state schools has only received a legal setting in the last decade, under the School Standards and Framework Act 1998. This established a School Admissions Code, the first of which was the 1999 Code, that was applied to the admissions round beginning in September 2000. There have since been three updated versions of the Code (2003, 2007 and 2009), each coming into effect in the September of their year of publication, which differ in their statutory strength. In particular, the 1999 and 2003 Codes contain 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)[27]. Under the Education and Inspections Act of 2006 the admissions framework was tightened,

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[26] All admissions authorities, whether the LEA or the school's governing body, are required to publish their admissions arrangements, including those applying in the event of oversubscription (see DfES, 2003, paragraphs 4.15 and 4.17).

[27] West *et al.* (2009, pp. 7) note that this enabled admissions authorities to "set admissions criteria that did not comply with the Code as long as they had good reasons for their actions."

and the 2007 Code was introduced, which obliged admissions authorities to "act in accordance with its mandatory provisions" (DfES, 2007b, pp. 7), a legal status that has been upheld in the 2009 Code (Tough and Brooks, 2007; West *et al.*, 2009). These "mandatory provisions" have been enforced mainly on the normal admissions process, while non-statutory guidelines have applied throughout in the case where a school is oversubscribed, although, since the 2007 Code, some practices have been explicitly ruled out[28]. The 2003 Code states that "[a]dmission authorities have discretion, which they must exercise reasonably, to determine their own oversubscription criteria provided these criteria are objective, clear, fair, compatible with admissions and equal opportunities legislation...." (DfES, 2003, pp. 10, paragraph 3.4). Hence there is room for variation in the entry rules of oversubscribed schools, though there are certain "acceptable" criteria that are "[c]ommonly used" (*ibid*, pp. 10, paragraph 3.5). For majority-LEA-governed Community and VC schools, specifications usually involve a higher chance of school entry for cases where (i) the child is 'looked after';[29] (ii) the child is of Special Educational Needs; (iii) the child has siblings attending the same school; or (iv) the household to which the child belongs resides in the school 'catchment area', an area within a close geographical range of the school (Gibbons *et al.*, 2006). VA schools are not controlled by the LEA and in these schools more weight is given to religious affiliation or an expression of faith by the pupil when there is surplus entry demand, rather than to the satisfaction of criteria such as residential proximity to the school. This is in keeping with the faith-based ethos of VA schools. Indeed it has been found that travelling distances to VA schools generally exhibit longer area ranges than for other school types (Gibbons *et al.*, 2006), suggesting a more tenuous link of the school-home distance. As Table 1.2 highlights, the vast majority of Primary school pupils attending state schools in England are educated in Community schools, for whom the LEA is the admissions authority. This means that for most pupils the oversubscription rules (i) to (iv) stated above are of greater relevance.

[28] These include criteria that consider a parent's occupation, their marital status or their financial position, among other factors (DfES, 2007b).

[29] The 2003 Code defines a 'looked after child' as one "who is in the care of a local authority or provided with accommodation by that authority" (DfES, 2003, pp. 36, paragraph 7.22). In terms of the ranking of looked after children, the 2003 Code states that "[i]t is recommended that all admission authorities give these children top priority in their oversubscription criteria" (*ibid*). The 2007 Code makes the prioritisation that should be given to this group of children statutory and states that "[a]ll admission authorities **must** give highest priority in their oversubscription criteria to these children" (DfES, 2007b, pp. 45, paragraph 2.7, original emphasis).

Taken together, the concepts of school choice and admissions oversubscription criteria applied to majority-LEA-governed schools invoke a situation characterised by two main features. Firstly, all schools that are perceived as being of good quality on the basis of their attainment performance are likely to appear desirable to parents. If this holds, then this will result in an excess demand for places in such schools and the application of the oversubscription criteria. The latter will apply in the short-run, since schools face physical infrastructure limitations, a supply-side rigidity that restricts their pupil admissions quantity to the maximum capacity threshold. Capacity constraints may also have a long-run effect, if additional buildings are not made available or building expansion does not take place.

Secondly, all admissions authorities are required to make public their admissions rules, and the publication of oversubscription criteria gives parents a chance to influence place allocation for their child in the oversubscribed school, if they are able to satisfy one or more of these conditions of entry. The most significant condition for the concept of 'pure' pupil mobility set in the context of school choice is that of catchment area occupancy. In respect of the geographical coverage of catchment areas, the 2003 School Admissions Code states that "it is good practice for admission authorities to provide a map of the areas, and to indicate how far parents within those areas have succeeded in getting places in the past, and whether that is a good guide for the future" (DfES, 2003, pp. 22, paragraph 4.17)[30]. Thus parents are sufficiently informed of the catchment area space of a school and whether living within this space helps in ensuring place allocation to an oversubscribed school. If pupils inhabit homes that exceed these catchment boundary limits, some households may be prepared (and more financially able) to engage in residential mobility to within the boundary walls in order to ensure compliance with this clause. This is likely to be a more important aspect of spatial activity at the primary school stage in particular because parents will wish to maximise the quality of the school attended so as to secure optimal future returns to schooling and at the same time they will want to minimise travel-to-school distances for their children in order to allay safety fears. Thus they will have a stronger interest in relocating if this enhances the potential for place allocation of their children in good schools nearby to the home. If strategic

[30] This is the same under the 1999 Code. It should be noted that, in terms of the cohort of pupils to be evaluated in this study, the 1999 Code and the 2003 Code are the most applicable, since they cover school entry during the periods September 2000 to August 2003 and September 2003 to August 2007 respectively.

moves of this kind are made, this suggests that the attempt by the parental-choice model of schooling provision to undo the link between residential setting and the school attended is counteracted by the oversubscription criteria of LEA-controlled schools at the primary school stage, in turn induced by supply-side inflexibilities in the physical capacity of schools. Hence while 'pure' pupil mobility may be enhanced by parental choice provisions, oversubscription rules imply a significant 'school-home moves' connection. In respect of establishing some knowledge on the success or otherwise of the quasi-market in education, it is therefore valuable to accurately define and measure mobility patterns that relate to school moves exclusive of home moves and combined school-home changes with particular reference to the primary school years.

As preliminary evidence, Table 1.1 showed the relatively greater extent of composite pupil mobility and conjunctional schooling and residential mobility at the primary school stage over a two-year period. Extended data availability now permits the longitudinal tracking of pupils over a longer time frame during this education phase. Such information can be used to analyse multiple moves of different types made by the same pupil, as well as to look for evidence of an effectively operating quasi-market for schools. In Section 1.5 the empirical source to be employed for this purpose is described and the structure of the sample is set out.

1.5 Mobility in the National Pupil Database

Definition and measurement of isolated school change or combined school and residential mobility will utilise a cohort of pupils attending state-maintained primary schools throughout Key Stage 1 to Key Stage 2, details on whom are contained in the National Pupil Database (NPD). This is made up of two data sources: (i) the Pupil-Level Annual School Census (PLASC) and (ii) National Curriculum Key Stage test scores of attainment. In this Section the origins and content of the NPD are explained, as well as the exact structure of the cohort to be assessed.

1.5.1 Describing the PLASC dataset component of the NPD

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. Data collection encompasses all pupils across the education spectrum of the maintained schools sector in England only, a situation that is enforced by the legally binding status of the Census, in which schools are statutorily required to provide Census information under Section 537A of the Education Act 1996 (Harland and Stillwell, 2007). Records are supplied electronically by the school and transferred to central government (the DCSF) via each LEA. Legal enforcement of the administrative records provision and their centralised collection reflects the use of the collated statistics on pupil numbers and pupil characteristics to determine the amount of funding to be allocated to each school (Gibbons and Telhaj, 2007). PLASC collection first began in January 2002 to include pupils on roll for the academic year 2001/2002. 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). At the time of writing (April 2008) there are 5 waves (academic years) of PLASC data available for the annual January school roll only, yielding some 8 million pupil observations per wave, the latest being that for the school year 2005/2006 (based on data collected in January 2006). These waves can be linked together by means of a unique, anonymous, pupil identifier, to give a five-year longitudinal source of PLASC information in which pupils can be tracked as they transfer from one year group to another within the state school education system.

PLASC contains data on individual pupil characteristics and the social background of each pupil. Important to the measurement and analysis of mobility, each wave of PLASC includes information on the date at which the pupil entered the school, an identifier for the school attended by the pupil, and a record of the home postcode of the pupil, all on an anonymous basis.

1.5.2 Describing the Key Stage dataset component of the NPD

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 Key Stage. Formal introduction to the Key Stages 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[31]. At the age of 15/16 the end-of-compulsory-schooling General Certificate of Secondary Education (GCSE) exams are taken (KS4). The publication of school average test scores in some of the Key Stages (usually KS2 and KS4 results are published in the form of 'league tables' appearing in local newspapers and on the internet) enables the public and, in particular parents, to compare the relative performance of individual local schools to other schools within the local area and to nationally set government targets of achievement at each Key Stage. Thus school

[31] 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 are to be replaced by classroom assessment and randomised testing. See http://www.telegraph.co.uk/education/primaryeducation/3199156/Sats-for-14-year-olds-abolished-Teachers-and-parents-praise-decision.html (accessed 15 October 2008).

attainment details provide a means for parents to make informed choices in the process of applying for a school place.

Information on test score outcomes for each pupil at the end of each KS is available in the NPD since the academic year 1997/98 for KS1 and KS3, 1995/96 for KS2, and 2001/2002 for KS4. As a unique anonymous pupil identifier is included in both PLASC and in each of the Key Stage records of the NPD this allows for one-to-one matching of the files, such that background variables can be aligned with attainment scores. For the analytical details presented in this Chapter, the test score information of pupils is used to determine the exact cohort members in the sample of interest. It is also used to assess educational attainment before any measured move activity takes place, given by the averaged KS1 exam outcomes of each pupil in the specific cohort sample.

1.5.3 Key Stage 1 to Key Stage 2 cohort coverage

In this Chapter, one cohort of pupils contained within the NPD are studied as they move between National KS1 and KS2 exams during state primary education in England, where the exact form of this longitudinal sample is shown in Table 1.3.

Table 1.3: The Structure of the KS1 to KS2 Cohort

School year group	2	3	4	5	6
Age	6/7	7/8	8/9	9/10	10/11
Key Stage	End of KS1	←	KS2		→
Key Stage exam year	2002				2006
PLASC academic year	2001/02	2002/03	2003/04	2004/05	2005/06

This cohort started their KS1 phase of education in the academic year 2000/2001 at the age of 5/6 (school year group one) and subsequently sat for their KS1 exams in English Reading, English Writing and Mathematics at the end of year group two, in the summer of 2002. Their KS2 learning phase began in the school year 2002/2003 and covered 4 academic years of instruction, leading to KS2 examinations in

English, Mathematics and Science being taken in the summer of 2006. Table 1.4 details the number of pupil-level observations for this particular cohort[32].

[32] Note that the figures in Table 1.4 are based on pupils with a valid KS1 and KS2 entry in the NPD, and they are exclusive of pupils attending independent schools. Row (3) additionally restricts the sample to include pupils with no completely missing mobility indicators across all PLASC waves. For further details see Appendix 1A, Section 1A.D.

Table 1.4: Number of Pupil-Level Observations in the KS1 to KS2 Cohort

Status	**Number of pupils**
In KS1, *not* KS2 or PLASC (1)	23,599
In KS2, *not* KS1 or PLASC (2)	23,908
In KS1 through KS2 (3)	552,892
Total (4)	**600,399**

A total of 552,892 pupils can be traced across all years of the KS1 to KS2 phases of education. PLASC records existing from the academic year 2001/2002 to 2005/2006 inclusive are matched to this sample of pupils, henceforth known as the 'KS1-2' cohort, using the anonymous pupil identifier available in all KS and PLASC files. Every PLASC wave contains variables that can be used to assess individual mobility patterns between the two Key Stages. For those cohort members appearing in the sample in only a single KS, their mobility patterns cannot be observed throughout the entire KS1-2 window. Observations on this group of pupils are dropped from the sample of interest (a loss of 47,507 pupils in total - rows (1) and (2) of Table 1.4 - or 7.91 per cent of the KS1 to KS2 cohort of 600,399 pupils).

1.6 Measuring Mobility in the KS1-2 Cohort

Three indicators are available to use in PLASC that allow for the measurement of pupil and residential mobility among the KS1-2 cohort. Two of these indicators can be applied in order to quantify school switches for individual pupils, these being the date at which the pupil entered the school and the unique school code. The third indicator, the home postcode of the pupil, enables evaluation of residential moves. The exact measurement approach taken in each case is dealt with here. Beginning with school moves, the methods are referred to as follows:-

a. 'Date of school entry approach' – this takes academic year-on-year changes to the recorded date of entry into the school provided in the administrative data as indicative of a school change by the pupil, so that pupil mobility = 1 if *date of school entry in year t+1 for pupil i ≠ date of school entry in year t for pupil i*

b. 'School code change approach' – this takes changes in the recorded identifier for the school, the school code, from one academic year to the next as indicative of a pupil move, so that pupil mobility = 1 if *school code in year t+1 for pupil i ≠ school code in year t for pupil i*

Three key issues must be raised in respect of school mobility measured by both of these approaches. Firstly, only those school moves taking place at *non-standard* points during the Key Stage 1 to 2 phases are counted here. For this cohort, this means that the following moves are *not* counted under pupil mobility:

- transfers from Infant School (covering the age ranges 5-7 or 5-8) to Junior School (age ranges 7-11 or 8-11);
- transfers from First School (age ranges 5-7 or 5-8) to Junior School (age ranges 7-11 or 8-11);
- transfers from First school (age ranges 5-8, 5-9, or 5-10) to Middle School (age ranges 8-11, 9-12, 10-13, or 10-14).

Secondly, an intention of the analysis is to isolate 'pure' school moves, in which the only dimension of the environment that is changing for the pupil is the school. In this respect the term 'pure pupil mobility' is used to refer to *a non-standard change of school that does not involve any move of home* in this analysis. Thirdly, in addition to pure school shifts, pupils can also make school changes that do involve moves of home. The unique advantage of the PLASC data source is that it allows for estimation of the extent of combined school and home moves. In the text the term 'school-home moves' will be used to address those *non-standard changes of school that occur together with a change of home.*

Turning now to the actual estimation of home moves, a count of home changes between the Key Stages can be made by comparison of PLASC records on pupil home postcode from one academic year to the next, so that:

c. Home mobility =1 if *home postcode of the pupil in year t+1 for pupil i* $\neq$ *home postcode of the pupil in year t for pupil i*

Though this forms the only method for measuring home mobility using PLASC, it does present an accurate method when consideration is made for the geographical proximity of postcodes: a postcode ordinarily covers at most 10 adjacent housing units, allowing for precision in determining residential location and changes to it (Gibbons and Telhaj, 2007).

1.6.1 Counting mobility in the KS1-2 cohort

Utilising the information contained in PLASC and the Key Stage data, the following Table details the cumulative number of school moves and home moves that can be observed and the order in which these moves appear in the data:-

Table 1.5: Cumulative Number of School and Home Moves in the KS1-2 Cohort

Data file	Data collection time	Cumulative school moves: school code	Cumulative school/home moves: date of school entry and home postcode
PLASC 2001/2002	January 2002		
Key Stage 1	Summer 2002		
PLASC 2002/2003	January 2003		
PLASC 2003/2004	January 2004		
PLASC 2004/2005	January 2005		
PLASC 2005/2006	January 2006		
Key Stage 2	Summer 2006		

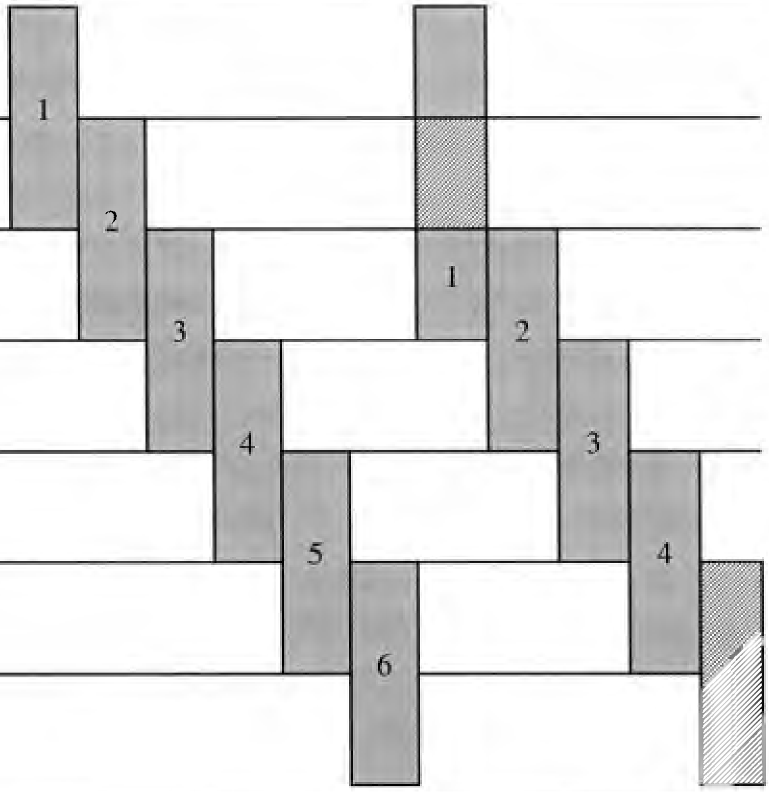

Table 1.5 reveals that there are a total of seven observations on the school code, as compared with five observations on both the date of school entry and the home postcode. This is a consequence of the KS data collection phase occurring at a different time point in the academic year relative to PLASC data collection and the exclusion of any administrative information on the pupil from the KS files, other than the code of the school attended by the pupil when taking their KS tests. Thus pupil mobility measured according to the school code approach can be counted for a maximum of six times across the sample period. This compares with a maximum count of four pupil moves using the date of school entry approach and likewise when measuring residential mobility.

In order to establish comparable measures of school moves based on the school code method and the date of school entry method, all seven observations on the school code cannot be fully exploited here. In fact, comparability requires that the two school mobility estimates and home mobility be based on the five PLASC waves only, given the lack of details in the KS datasets with which to derive all move measures. Therefore no more than four school moves and residential changes by the individual pupil can be observed. The under-use of the school code data may change in the future when the provision of tri-annual PLASC data (and in particular that collection taking place in May) presents the opportunity for the closer alignment of PLASC and KS data collection points.

Accuracy of the mobility estimates requires that all pupils have an observation on the school code, the date of school entry, and the home postcode in every PLASC wave. That is, the amount of mobility to be derived here is to be based on a sample of pupils with a full set of mobility variables. Without this restriction on the sample, mobility that cannot be accounted for may occur amongst pupils with missing observations on some mobility indicators, to the extent that these details are missing precisely because the pupil moved. Then their inclusion in the sample would result in an underestimation of measured mobility, which would have a biasing impact on all subsequent analysis. Additionally, the sample is restricted such that information on the characteristics and social background of pupils are present in each year of PLASC,[33] plus each pupil is required to have a valid outcome in each of the three KS1 tested subjects[34]. These details can be used to assess how movers of differing types vary by their attributes and the association between pre-move academic

[33] PLASC background variables on each pupil that are used to examine the link between mobility and individual characteristics are gender, ethnicity, Free School Meal Eligibility (FSME), Special Educational Needs (SEN) status and English as a First Language (EFL). FSME is used as a proxy measure for family poverty. Corrections to these variables, made to ensure their presence in each PLASC wave, are discussed in Appendix 1A, Section 1A.E (see in particular Table 1A.11). Note that EFL is included in the descriptive tables of this Chapter but it is excluded from regression estimation in Chapter Two. This is because EFL is highly correlated with the ethnicity variable, and estimation uses the latter since its richer categorisation of pupils is preferred.

[34] As noted in Appendix 1A, Section 1A.D, a pupil is deemed to have a valid KS1 test outcome if they achieve a recognised level of attainment in each KS1 test, or if records indicate that the pupil was eligible to sit for a KS1 test, but failed to do so. In the latter case the KS1 outcome is coded as missing in the sample for the purpose of calculating the KS1 average point score. Inspection of the data revealed that failure to achieve a test score outcome despite eligibility was a consequence of pupils being either 'absent' or 'disapplied' at the time of the test. For some pupils absence or disapplication occurs across all three KS1 subjects, such that their KS1 average points score is missing overall. These pupils are not dropped from descriptive Tables 1.9 to 1.12 presented in this Chapter, since their numbers are small, their records on background and mobility indicators are full, and the weighted average figures shown in the Tables are unaffected by their inclusion. However, in the regression estimation of Chapter Two these few pupils are dropped from the analysis, since estimation requires non-missing attainment data, and, as was stated above, missing details may be due to mobility. Section 1A.F of Appendix 1A indicates the slight sample size differences in the numbers of pure school movers and school-home changers shown in Tables 1.9 to 1.12 when pupils without a KS1 average point score are excluded.

attainment and the form of move made, analysis that is included both in the descriptive work of this Chapter and in the further statistical evaluation undertaken in Chapter Two. A complete set of background data and valid KS1 outcomes for each pupil is required so as to minimise the likelihood of missing details being correlated with moving behaviour.

For the KS1-2 cohort of 552,892 pupils, a total of 539,387 pupils have a full set of observations *on mobility indicators only*, as shown in Table 1.6 below. Therefore 13,505 pupil observations drop out in the process of merging the PLASC data to the KS1-2 cohort and in defining a sample size containing a full set of mobility indicators based on the original contents of the PLASC files.

Table 1.6: Defining a Full Sample: Associated Sample Size Changes in the KS1-2 Cohort

Sample type	Number of pupils	Sample change (number of pupils)
KS1-2 cohort (1)	552,892	
Initial full sample (2)	539,387	-13,505
Imputations (3)	4,515	
Full sample A (4)	**543,902**	+4,515
Missing pupil characteristics (5)	21,462	
Full sample B (6)	**522,440**	-21,462
Total sample change (7)		**-30,452**

Notes: In rows (2) and (4) the 'full' sample is defined as that where the KS1-2 cohort member has an observation on their school code, date of school entry, and home postcode in every PLASC wave. The initial full sample uses the original number of observations on these indicators, prior to any imputations or corrections. Full sample A indicates the number of additional pupil observations that are obtained following imputations. Only the imputations made (not the corrections) affect the size of full sample A. Row (6) additionally conditions pupils to have observations on their gender, ethnicity, EFL, FSME, and SEN in all five PLASC waves, plus a valid outcome in each KS1 test (averaged KS1 performance is used to indicate pupil attainment in the period prior to measured moves).

Some *imputations* are made to the mobility variables and row (4) of the Table shows how this initial full set is altered following the imputations procedure, which increases the sample size by 0.84 per cent. Necessary imputations to make were established through data inspection and involved replacing a missing pupil-level observation on the school code, the date of school entry, or the home postcode with that from the next PLASC wave when data entries in adjacent years to the missing year were the same.

Aside from imputations, *corrections* are also made, though these only apply to the mobility indicator of the home postcode of the pupil. Corrections required were also identified through visual inspection of the data. A pupil's postcode was replaced by the next most adjacent one where this was the same as in other years except for the year(s) to be corrected. This technique was applied in the following cases: (i) where the first and last characters of the home postcode differed in some years from others (while all other postcode characters were the same) (ii) where the postcode increased in length by one character in some years (also with all other characters unchanged). Other corrections made required the use of Royal Mail postcode data to adjust for cases where the Royal Mail had implemented postcode changes. Both imputations and corrections were carried out through a process of writing executable programme commands in the software package utilised for data analysis throughout this thesis ('Stata', version 10, Special Edition).

In addition to the mobility variables, inconsistent data on pupil characteristics can also be *imputed* using information from other years in which a consistent pattern is followed and therefore the pupil-level observation can be retained within the sample. This process was required and undertaken for only two pupil attributes, these being the ethnicity variable and English as a First Language, or EFL. After completing all possible imputations to pupil characteristics, both remaining non-correctable inconsistencies and missing data on attributes reduce the full sample size further, leaving a total of 522,440 pupils with details on mobility measures, pupil background factors and valid prior attainment outcomes across 2001/02 to 2005/06[35]. This represents a total sample loss from the original KS1-2 cohort of 30,452 pupils (as shown in rows (6) and (7) of Table 1.6 respectively), equivalent to 5.51 per cent of this cohort.

[35] Appendix 1A, Section 1A.E contains detailed information on: (i) imputations and corrections that are made to the mobility indicators; (ii) imputations that are made to characteristics (ethnicity and EFL); (iii) observations that are dropped because the pupil has no records on their ethnicity, FSME, or SEN status in all 5 PLASC waves; and (iv) observations that are dropped due to inconsistencies on characteristics that should remain unchanged over time (gender, ethnicity and EFL). Note that no imputations or corrections are made to KS1 or KS2 test outcomes.

1.7 Estimating School Moves and Home Moves

It was noted in Section 1.2 that a general definition of school moves is given by those occurring when a child enters or exits a school at a non-standard time point, whether or not each school change involves a move of home (Dobson and Henthorne, 1999). However, Sections 1.3 and 1.4 highlighted that such a composite indicator of mobility may be inadequate when consideration is made for both recent advances in government education policy and oversubscription rules applying in LEA-governed state schools, both of which suggest the importance of distinguishing between mover types. The aim of this empirical Section is to separate out and measure the amount of 'pure' pupil mobility versus 'school-home moves' made by the KS1-2 cohort of pupils in the NPD, as well as to discuss the implications of these results.

1.7.1 Composite measures of pupil mobility

In Table 1.7, two composite measures of pupil mobility in the KS1-2 cohort are estimated. These both conform to the general definition of pupil mobility referred to above. The purpose of estimating school moves by this method is to facilitate comparison of the findings with those gained under definitions that allow for separation of mobility forms.

Table 1.7: Composite Measures of Pupil Mobility Across KS1 to KS2 Year Group Transitions

Year group transitions	All moves (date of entry)	% of total sample	Non-standard moves (date of entry)	% of total sample	All moves (school code)	% of total sample	Non-standard moves (school code)	% of total sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2-3	116,627	22.32	23,125	4.43	113,799	21.78	23,083	4.42
2-3; 3-4	10,250	1.96	2,542	0.49	10,141	1.94	2,663	0.51
2-3; 3-4; 4-5	1,750	0.33	435	0.08	1,464	0.28	444	0.08
2-3; 3-4; 4-5; 5-6	423	0.08	138	0.03	347	0.07	138	0.03
2-3; 3-4; 5-6	1,115	0.21	343	0.07	956	0.18	352	0.07
2-3; 4-5	9,130	1.75	1,970	0.38	9,163	1.75	1,974	0.38
2-3; 4-5; 5-6	1,003	0.19	289	0.06	925	0.18	290	0.06
2-3; 5-6	6,447	1.23	1,283	0.25	7,178	1.37	1,333	0.26
3-4	22,666	4.34	20,196	3.87	22,227	4.25	20,265	3.88
3-4; 4-5	3,357	0.64	2,110	0.40	3,139	0.60	2,119	0.41
3-4; 4-5; 5-6	456	0.09	382	0.07	412	0.08	385	0.07
3-4; 5-6	1,896	0.36	1,515	0.29	1,737	0.33	1,524	0.29
4-5	32,572	6.23	17,546	3.36	32,338	6.19	17,681	3.38
4-5; 5-6	2,031	0.39	1,498	0.29	1,846	0.35	1,511	0.29
5-6	11,963	2.29	12,701	2.43	11,129	2.13	12,858	2.46
Total or % of total	**221,686**	**42.43**	**86,073**	**16.48**	**216,801**	**41.50**	**86,620**	**16.58**

Notes: The total sample size is 522,440 pupil-level observations in each of the five PLASC waves, from 2001/2002 to 2005/2006 inclusive (see Table 1.6). Pupils are aged between 6/7 and 7/8 during the transition from school years 2-3; aged between 7/8 and 8/9 during transition years 3-4; aged between 8/9 and 9/10 in transition years 4-5; and aged between 9/10 and 10/11 in transition years 5-6 (see Table 1.3).

Table 1.7 shows the number of pupils making one or more change of state school attended (that may also involve a move of home) as they transit across the school years of the KS1-2 phase of education. Composite measures of pupil mobility are presented that do (columns 1 and 5) and do not (columns 3 and 7) include those compulsory school moves that pupils have to make as part of their schooling process. These measures are estimated utilising both the date of school entry method (columns 1 to 4) and the school code approach (columns 5 to 8), as described in Section 1.6. In comparing figures attained under the inclusion of all school moves against those concerned with non-standard changes, it can be seen that most compulsory school moves take place between school years 2 and 3 (when pupils are aged 6/7 and 7/8 respectively). The majority of these necessary school moves include transfers from Infant to Junior school, yet they also comprise of changes from First School to Junior school and First school to Middle school (see Section 1.6).

In order to establish a set of non-standard school changes, two techniques are applied to the dataset so as to determine and net out required transfers. Firstly, the postcode of each school attended by the pupil is matched to the data on an annual basis (via the unique school code), using records on educational establishments as contained in the DCSF-provided 'Edubase' dataset. Where the postcode of the school attended by the pupil remains the same between one academic year and the next, but the recorded date of school entry or the school code changes over the same years for that pupil (depending on the approach used to measure composite pupil mobility), this is taken as an indication of a compulsory school shift. The assumption here is that if the schools are on the same site (as is often the case with Infant and Junior schools, for example), then the school move represents an expected change. Secondly, compulsory school changes are removed by assessing the mobility measure itself at the school level. Where all the pupils attending a certain school in one year move out of that school in the following year, this is considered to be a necessary school move.

Extracting evidence on all required school changes from the measures reduces the total amount of composite pupil mobility from 221,686 to 86,073 pupil observations under the date of school entry approach, and from 216,801 to 86,620 pupil observations with the school code method. Out of the full sample of 522,440 pupils, around 16.5 per cent make non-standard school moves, and this is true by both the date of school entry and the school code methods for estimating composite school change. In fact, Table 1.7 reveals a striking similarity between school mover estimates pertaining to the two different approaches. This finding gives confidence in both the estimation procedure and the accuracy of the data, and suggests a robustness of the results to differing ways of measuring pupil moves of school. It is worthwhile to point out at this stage that only those school move estimates derived under the date of school entry method will be taken forward from here on. This will allow analytical reporting to be more concise and based around a very slightly more conservative estimate of mobility.

Across all year group transitions, school (and possibly home) moves are most prevalent between school years 2 and 3, at 4.43 per cent of the full sample, even after correcting for compulsory transfers (column 4). Apart from this transition period, composite mobility is also high between school years 3 - 4 (3.87 per cent), 4 - 5 (3.36 per cent) and 5 - 6 (2.43 per cent). In terms of the number of school moves each individual pupil makes, the composite measure shows that it is most common for pupils to change schools just once, with single school moves representing a total of 14.08 per cent of the full sample. As the move count rises, the number of pupils making multiple moves falls. Between 0.25 per cent and 0.49 per cent of pupils make two school moves in the full sample (two school moves account for 2.09 per cent of the full sample overall), and the percentage of pupils making three school moves is at most 0.08 per cent of the full cohort sample (with three school moves making up 0.28 per cent of the full sample overall), where the latter pupils move between school years 2 - 3; 3 - 4 and 4 - 5 (ages 6/7 to 9/10). Only 138 pupils (0.03 per cent of the full sample overall) change aspects of their environment across *every* year group transition between KS1 and KS2. In terms of school move sequences, most multiple moves involve schooling interruptions that are made continuously, with only 0.25 per cent of the full sample making moves that include a gap of 2 school years (those in the transition category 2 - 3; 5 - 6).

1.7.2 Estimating 'pure pupil mobility' and 'school-home moves'

Table 1.8 presents the first step in analysis aimed at rooting out differences in school move estimates according to whether or not separation of mover types is accounted for. Here 'pure pupil mobility' is compared with 'school-home moves', both defined in Section 1.6. In all cases school moves are determined under the date of school entry approach and are exclusive of compulsory school transfers of the types mentioned earlier.

Table 1.8: 'Pure Pupil Mobility' and 'School-Home Moves' Across KS1 to KS2 Year Group Transitions

Year group transitions	'Pure pupil mobility'	% of full sample	'School-home moves'	% of full sample	'New' composite school mobility
	(1)	(2)	(3)	(4)	(5)
2-3	10,615	2.03	14,444	2.76	25,059
2-3; 3-4	471	0.09	1,454	0.28	1,925
2-3; 3-4; 4-5	15	0.00	283	0.05	298
2-3; 3-4; 4-5; 5-6	2	0.00	94	0.02	96
2-3; 3-4; 5-6	15	0.00	193	0.04	208
2-3; 4-5	466	0.09	988	0.19	1,454
2-3; 4-5; 5-6	12	0.00	160	0.03	172
2-3; 5-6	198	0.04	715	0.14	913
3-4	8,812	1.69	13,371	2.56	22,183
3-4; 4-5	267	0.05	1,284	0.25	1,551
3-4; 4-5; 5-6	13	0.00	251	0.05	264
3-4; 5-6	202	0.04	934	0.18	1,136
4-5	8,241	1.58	11,082	2.12	19,323
4-5; 5-6	180	0.03	1,030	0.20	1,210
5-6	6,057	1.16	8,093	1.55	14,150
Total or % of total	**35,566**	**6.81**	**54,376**	**10.41**	**89,942**

Notes: School moves are measured according to the date of school entry approach and are based on non-standard school changes.

A consistent pattern emerging from these results is one in which there is a dominance of conjunctional school-home moves over and above pure pupil mobility across all year group transitions featuring mobility and irrespective of the number of school moves made. At the aggregate level, school changes that include residential change are more than 1.5 times higher among this KS1-2 cohort compared with school moves only: 10.4 per cent of the full sample engage in school-home moves (column 4), while 6.8 per cent make isolated school changes (column 2). In line with the findings of the composite pupil mobility measure shown in Table 1.7 (columns 3 and 4), changers tend to make at most one school or school-home move, while pupil numbers are decreasing in the number of any kind of moves made. However, whereas school moves under the composite estimates of Table 1.7 were found to be higher during the transition between school years 2 - 3, here this holds true more for pupils making school moves only. For those making school-home moves once between school years 2 - 3, years 3 - 4, and years 4 - 5, their percentages of the full sample are quite similar, at 2.76 per cent, 2.56 per cent and 2.12 per cent respectively.

The 'new' composite measure reported in Table 1.8, column (5) does not appear, at first glance, to be comparable with that appearing earlier in Table 1.7, column (3) (the 'old' composite measure), and this is actually the case. The new composite version is the sum of pure pupil mobility (column 1) and school-home moves (column 3). Estimation of the old composite measure is based on the general pupil mobility definition identified in the literature. This old version does not distinguish between school movers of different types, whereas the new measure enforces this distinction. This is exactly where the reason for the discrepancy between the two estimates lies. Taking, for example, a pupil included in the mover category '2 - 3; 5 - 6', under the old composite measure no details are known about whether each of these moves are pure school moves, school-home moves, or one of each. Defining mover types separately, it may be established that the '2 - 3' portion of this move represents pure pupil mobility, while the '5 - 6' segment is a school-home move. Then mover type separation would result in a re-classification of the school moves of this pupil, such that their multiple move status is recorded once under the pure pupil mobility column (1) and again under the school-move column (3), but these counts on the pupil would be tabulated in different rows ('2 - 3' on the one hand, versus '5 - 6' on the other). So mover type separation enables multiple moves to be accounted for, but a composite sum total of the different types of moves is counterintuitive because there is a double-counting of pupils who make multiple moves of differing dimensions. The difference between the total number of school movers under the old and new composite measure reflects this. What this implies is that there is an inaccuracy in the count of pupils categorised as making multiple moves according to the old composite measure precisely because an individual pupil may not always make school moves of one particular type. However, this information is lost in the grouping together of mobile pupils as is done under the general definition of pupil mobility, suggesting that estimation based on a separation of mover types is much more informative in the case where a pupil changes schools more than once and under multiple move dimensions.

The findings shown in Table 1.8 bring to the fore an important area of concern that might be raised with regard to the current analysis, and that warrants further discussion at this stage. The issue of whether evidence of the operation of a choice system can be gleaned from data on *pupils in schools* is a significant one. More specifically, it could be argued that choice policies are exploited by households *immediately upon* their children formally entering compulsory education, or otherwise it could be suggested that choice is not exploited *at all* by parents. In the former scenario parents might have chosen a school for their child to attend that can be accessed from the current home location, such that right from the start of their schooling entry a pupil is at their preferred school. In the latter scenario, choice policies, which are designed to allow attendance at a preferred school *conditional on where a child lives*, might not be considered to be operating to their full effectiveness by parents. Then some households may prefer to engage in residential mobility, and to strategically select their home location in order to ensure that their child is better able to secure entry to a favoured school based in part on home proximity to the institution. In each of these cases, data on *pre-school entry* home moves and final home location in relation to the school the pupil initially enters could offer more insights into considering when the choice system is used and if it exists.

Evidence from the Population Censuses of 1991 and 2001 suggests that, of all children aged 1-15, the most residentially migrant group were those in the age range 1-4 (accounting for 42.03 per cent and 36.37 per cent of all migration activity among children aged 1-15 in 1991 and 2001 respectively; see Appendix 1A, Section 1A.A).

The prevalence of home moves when children are young indicated by this data implies that strategic schooling-related residential locations are being sought by parents, if residential change correlates highly with primary schooling preferences. In turn, this evidence suggests that the choice system is hardly utilised. Under both of the scenarios depicted above, and given the evidence from Census data, a priori one might expect to find *little* evidence of mobility of any form in data on a cohort of school-age pupils, as is assessed here. However, the results of Table 1.8 indicate otherwise, revealing a non-trivial amount of pure school change taking place in the primary school stage, of almost 7 per cent of the full sample. Thus, while it is likely to be the case that pre-compulsory school age mobility is an important omission from the in-school cohort dataset utilised here, it appears a valid and valuable exercise to consider the potential exploitation of choice policies by pupils in the schooling system[36]. Some degree of pure school moves may well reflect the use of choice and the search for better-quality schooling from the current home location relative to that which was secured from the outset of entry into formal education. More stringent testing of the link between pure pupil mobility and the choice system forms a key area of analysis that is presented in Section 1.9, when evaluation looks at the extent of entry into oversubscribed schools by pure school changers.

[36] The lack of information on the home location(s) of a pupil before they begin compulsory schooling is a shortfall of the evaluation that is discussed in further detail in Chapter Two, Section 2.7 ('Limitations of the Analysis').

1.8 Mobility and Pupil Characteristics

A significant advantage of using the NPD to distinguish between school movers varying in the type of move made is that the additional statistics this source provides on pupil-level attributes enable examination of whether pure school movers and school-home movers differ by their pre-move background. In addition, the longitudinal nature of the NPD is such that it allows for variation in the early academic attainment of the two mobile pupil groups to be assessed. More specifically, Table 1.3 indicated that at the start of the sample period, and prior to measurable moves taking place, pupils complete their KS1 exams, outcomes that may influence subsequent measured move activity and the type of move made, and therefore may provide important further content. Given the tendency for studies assessing pupil changes of school to pool together movers of all forms, evidence on the pre-move characteristics and academic performance of school movers, like the school mobility measure itself, is affected by imprecision in the mover definition[37]. Thus exploration of the attribute and attainment differences between the distinct mover types represents a natural extension to the analysis presented so far that serves to add value to the understanding of the nature of school change.

In Tables 1.9 to 1.12 shown below details on five pupil-level characteristics contained within every PLASC wave are presented for pure school changers versus school-home movers; these being gender, EFL, ethnicity, FSM eligibility and SEN status[38]. In terms of prior attainment, KS1 points scores averaged across the three KS1 exams in reading, writing and mathematics are also illustrated in these Tables for the two mover groups[39]. Only those pupils moving no more than twice are considered throughout, since it is evident from Table 1.8 that few pupils make multiple moves exceeding this amount (just 0.01 per cent of the KS1-2 sample engage in more than two school only moves, while 0.19 per cent of the full sample

[37] See the literature discussion of Section 1.2.

[38] Unless otherwise stated, the *pre-move* period percentages of pupils with a certain attribute by the mover type are reported (see the notes to each of Tables 1.9 to 1.12).

[39] Table 1A.6 of Appendix 1A details the KS1 levels-to-points scores conversion system that is used to convert KS1 levels given in the raw data of the NPD into workable figures that can be compared across different Key Stages. As stated previously, the characteristics of pupils without a KS1 average attainment record are included in the descriptive tables of this Chapter, but these pupils are excluded from the sample used in the regression analysis of Chapter Two. Table 1A.12 of this Appendix shows how the numbers of pupils moving school only or school-home changes when pupils with missing KS1 average points scores are excluded, where these very minor sample size adjustments are indicated for pupils moving once or twice.

make in excess of two school-home moves overall). 'Pure pupil mobility' and 'school-home moves' shown in Tables 1.9 to 1.12 are the same as those given in Table 1.8; therefore they are based on the date of school entry approach to measuring mobility and they exclude compulsory school moves of the type discussed in Section 1.6.

To begin with, Table 1.9 considers the unchanging attributes of pupils by the mover type, plus their KS1 average attainment, for pupils moving at most once[40]. What stands out here is that boys are more likely to move school only than to change both the school and home aspects of their environment: the difference in the weighted average between the two mover groups is highest for the characteristic of male gender, at 2.06 percentage points (column 3). Pupils with English as their first language also tend to make pure school changes more than school-home moves across each transition period. Interestingly, the ethnic categories of other white, Asian and black feature fewer school only movers relative to school-home movers, as indicated by the negative difference in the weighted average for these categories of pupils (at -0.30, -0.82 and -0.17 percentage points respectively – see columns 5 to 7). In comparison, pupils of white ethnicity are the most likely group to change only their school, findings that suggest the prevalence of school-home moves among ethnic minorities.

Turning to the pre-move academic attainment of the separate mover types, a slightly weaker KS1 Average Points Score (APS) is evident for one-time pure school movers relative to those pupils changing school and home once, at 14.58 versus 14.78 points respectively. Two important issues regarding this achievement measure are worthy of mention here. The first is the extent to which this indicator does capture *pre-move* academic attainment. In the sample frame under analysis, the initial window over which pupil moves can be gauged is between January 2002 and January 2003, these being the data collection times for the first two waves of PLASC. Amid these two points KS1 exams are taken, in the summer of 2002, so that there is a gap between the first PLASC wave and the time at which KS1 exams are sat for of some six to seven months (January 2002 to around July 2002; see Tables 1.3 and 1.5). As the

[40] The characteristics of EFL, gender and ethnicity should be unchanging over time, but examination of the data revealed there to be inconsistencies in these records year-on-year. Where possible these were corrected for, or otherwise the pupil was dropped from the sample. Further details of the sample changes concerning these indicators are given in Appendix 1A, Section 1A.E.

exact timing of any move made is not obtainable from PLASC information, pre-KS1 exams moves that cannot be accounted for may have taken place during this period, calling into question the pre-move status of this measure. This may only be a slight issue within the sample window, but one that is amplified when consideration is made for potential immeasurable moves happening before the entire sample period. As Table 1.1 showed, changes of school are high between year groups 1 and 2 (when the age range of pupils is 5/6 to 6/7), implying that mobility prior to the KS1 exam age of 6/7 represents an important omission in detail within the current KS1-2 cohort dataset[41]. The restrictions placed on the analysis of mobility by the lack of information on pre-school age moves in the dataset utilised here is an area that is discussed in more detail in Chapter Two (see Section 2.7).

The second issue arising in the use of average KS1 outcomes as a measure of prior achievement concerns the degree to which this indicator does reflect actual academic attainment, rather than some unobservable pupil or family background characteristics. It could be, for example, that KS1 performance captures an unobserved element of family behaviour such as parental interest in schooling, a factor that may influence attainment and the propensity for the family to move in order to seek out better schooling. In this case the KS1 APS will incorporate this unobservable and (in the utilised dataset) unmeasured family attribute that determines both attainment itself and the move likelihood, making it an 'endogenous' variable. Then, if evidence of attainment differences along the KS1 dimension for the separate mover types is found, this cannot be deemed to be depicting real variations in prior academic performance between the two mobile groups.

As pupil-level KS1 outcomes provide the only indicator of pre-move attainment in the dataset utilised here, no cross-checks or replacements with other variables can be carried out in order to establish the accuracy of this measure. Despite the potential flaws in this statistic, assessment of differences in pupil prior performance by the mover group seems valuable, given the lack of empirical evidence on their relative records of attainment presented in the literature on mobility to date. Therefore it

[41] See also the child migration statistics from the 1991 and 2001 Population Censuses, presented in Section 1A.A of Appendix 1A, which indicate a high amount of residential moves between the pre-compulsory schooling ages of 1-4.

serves best to emphasise the need to exercise caution in the interpretation of findings that concern the prior academic performance of the separate mover groups.

The penultimate row of the Table illustrates the characteristics of non-movers, that is, those pupils who change no aspect of their geographical environment throughout the entire sample period. Overall there are no discernable attributes that are unique to this stable group of pupils over and above movers, other than the percentage of pupils of unknown ethnic origin, which, at 1.69 per cent, is higher in comparison to both pure school changers (0.75 weighted average per cent) and school-home movers (0.57 per cent on average). In general, non-movers display characteristics and a prior attainment score that more closely resembles the school-home movers group, apart from in the black and unknown ethnic categories. The attributes and pre-move attainment of the full sample of pupils, shown in the last row of Table 1.9, are similar to those of the stable set of pupils. Hence, as was the case for stayers versus movers, there are no distinct differences in characteristics between the entire sample and movers, aside from in the 'unknown' ethnicity category, for which there is a higher relative percentage in the full sample, of 1.50 per cent.

Table 1.9: Mobility and Pupil Characteristics for Pupils Moving Once Across KS1 to KS2 Year Group Transitions

Panel A: Characteristics of 'pure' school movers moving once										
Year group transitions	**'Pure pupil mobility'** (1)	**% EFL** (2)	**% male** (3)	**% White British Isles** (4)	**% Other White** (5)	**% Asian** (6)	**% Black** (7)	**% Other** (8)	**% Unknown** (9)	**KS1 av. points score** (10)
2-3	10,615	89.90	51.79	80.24	1.83	7.49	4.84	4.06	1.54	14.73
3-4	8,812	92.68	52.08	86.16	1.03	5.04	4.35	3.11	0.32	14.50
4-5	8,241	93.75	51.80	87.83	0.95	4.47	3.35	3.01	0.40	14.66
5-6	6,057	93.92	52.86	88.53	1.24	4.28	2.59	2.89	0.48	14.33
Total or WA (%)	**33,725**	**92.29**	**52.06**	**85.13**	**1.30**	**5.54**	**3.94**	**3.35**	**0.75**	**14.58**
Panel B: Characteristics of 'school-home movers' moving once										
Year group transitions	**'School-home moves'** (1)	**% EFL** (2)	**% male** (3)	**% White British Isles** (4)	**% Other White** (5)	**% Asian** (6)	**% Black** (7)	**% Other** (8)	**% Unknown** (9)	**KS1 av. points score** (10)
2-3	14,444	89.37	50.85	80.37	2.18	7.07	4.74	4.30	1.35	14.69
3-4	13,371	90.56	49.74	85.38	1.52	5.95	4.13	2.82	0.21	14.84
4-5	11,082	90.70	49.74	85.56	1.34	6.43	3.93	2.53	0.22	14.81
5-6	8,093	92.09	49.26	87.08	1.03	5.62	3.23	2.82	0.23	14.80
Total or WA (%)	**46,990**	**90.49**	**50.00**	**84.18**	**1.60**	**6.35**	**4.12**	**3.21**	**0.57**	**14.78**
Percentage point difference in WA	-	**1.80**	**2.06**	**0.96**	**-0.30**	**-0.82**	**-0.17**	**0.14**	**0.19**	**-0.20**
Non-movers	-	**90.86**	**50.96**	**83.44**	**1.63**	**6.83**	**3.19**	**3.22**	**1.69**	**15.67**
Full sample	-	91.03	51.02	83.90	1.57	6.70	3.13	3.20	1.50	15.55

Notes: Mobility is measured according to the date of school entry approach, and is based on non-standard school changes only. 'EFL' stands for English as the First Language of the pupil. 'White British Isles' includes white British, Irish, and travellers of Irish heritage; 'Other white' includes any other white background, and gypsy/Romany; 'Asian' includes Bangladeshi, Indian, Pakistani, Chinese, and any other Asian background; 'Black' includes African, Caribbean, and any other Black background; 'Other' includes any other ethnic group, and mixed ethnicity; 'Unknown' includes pupils for whom information on ethnicity was either not obtained or refused. The Table reports the *pre-move* period percentages of pupils with each characteristic. The percentage point difference in the weighted average (WA) is equal to WA (panel A) less WA (panel B). 'Non-movers' consist of 233,291 pupils (equivalent to 44.65% of the full sample size of 522,440 pupils). Pupils are classified as non-movers if they *do not* make (i) compulsory or non-compulsory changes of school only; (ii) compulsory or non-compulsory changes of school and a conjunctional move of home; or (iii) home moves only over the entire window of 2002 to 2006.

Table 1.10 addresses fixed characteristics for multiple movers who change their school or school-home twice. Again there is evidence of higher pure pupil mobility relative to school-home moves for boys. Here the difference in the weighted average between the mover types, of 3.37 percentage points, is greater than was the case for pupils changing school versus school and home once. As for one-time movers, pupils with EFL tend to engage in multiple changes of school only, as opposed to multiple moves of schooling and residence. Noteworthy findings on ethnicity are that pupils moving twice and of white race are less likely to move school only than to change their school and home (the percentage point difference between the two mover types is -0.76 as shown in column 4), while pupils of an Asian background are more likely to engage in multiple changes of school only rather than school and home shifts. These results are in direct contrast to those for pupils moving once. This is particularly true for the Asian ethnic group, for whom there is a complete reversal of the dominant mobility type away from a slightly higher likelihood of their making a one-time school-home move and towards a much greater likelihood of pure pupil mobility among multiple movers of this ethnic origin. The weighted average percentage of Asian school only changers moving twice is 5.83 per cent of the overall sample of two-time pure school movers (panel A, column 6). This compares with a school-home movers weighted mean of 3.81 per cent (panel B, column 6), a positive difference in the weighted averages of some 2.02 percentage points. The final column of Table 1.10 shows that there is not a great deal of difference in the KS1 APS of two-time school only versus school-home changers, with prior attainment figures standing at 13.87 and 13.74 points respectively. These performance scores are lower than for those moving once, where the KS1 attainment of school only changers was 14.58 points compared to 14.78 points among school-home switchers (see column (10) of Table 1.9). However, that pupils moving twice and changing only their school have a slightly higher previous attainment record than multiple switchers of school and home is a reverse finding to the case for one-time movers.

Both the full sample of pupils and the group of students moving neither school nor home (nor both) across KS1-2 vary from those making multiple moves mostly by their ethnicity and KS1 attainment. Focusing on stayers relative to multiple movers, the stable group consists of a lower percentage of pupils of white ethnic origin (83.44 per cent) compared to school changers and school-home movers who move twice (their weighted averages are 86.83 per cent and 87.59 per cent - see column 4). Instead Asian pupils and those of unknown ethnicity feature more in the group of non-movers than among multiple movers, especially relative to school-home switchers moving twice. The weighted average percentages of multiple school-home movers of Asian and unknown ethnic origin are 3.81 per cent and 0.06 per cent in each case, compared with 6.83 per cent and 1.69 per cent shares in the stable set of pupils. In terms of previous attainment, the stable group fares better at KS1 than mobile pupils, achieving an average points score of 15.67, which is some 1.8 to 1.93 points higher than for two-time movers.

Table 1.10: Mobility and Pupil Characteristics for Pupils Moving Twice Across KS1 to KS2 Year Group Transitions

Panel A: Characteristics of 'pure' school movers moving twice										
Year group transitions	'Pure pupil mobility' (1)	% EFL (2)	% male (3)	% White British Isles (4)	% Other White (5)	% Asian (6)	% Black (7)	% Other (8)	% Unknown (9)	KS1 av. points score (10)
2-3; 3-4	471	91.72	53.29	84.08	1.06	8.07	3.18	3.18	0.42	14.29
2-3; 4-5	466	97.00	51.29	90.77	0.43	2.58	3.43	2.79	0.00	14.36
2-3; 5-6	198	92.42	57.07	82.83	0.00	7.07	3.54	5.56	1.01	12.95
3-4; 4-5	267	89.14	48.69	84.64	1.12	10.11	1.12	1.87	1.12	14.03
3-4; 5-6	202	97.03	57.43	89.60	0.00	1.98	5.45	2.97	0.00	13.22
4-5; 5-6	180	94.44	58.33	88.33	0.00	5.00	3.89	2.22	0.56	13.05
Total or WA (%)	1,784	93.67	53.48	86.83	0.56	5.83	3.31	3.03	0.45	13.87
Panel B: Characteristics of 'school-home movers' moving twice										
Year group transitions	'School-home moves' (1)	% **EFL** (2)	% **male** (3)	% **White British Isles** (4)	% **Other White** (5)	% **Asian** (6)	% Black (7)	% Other (8)	% Unknown (9)	**KS1 av. points score** (10)
2-3; 3-4	1,454	91.06	48.69	84.80	1.65	4.20	5.57	3.78	0.00	13.59
2-3; 4-5	988	90.79	51.21	85.02	1.72	3.95	5.67	3.64	0.00	13.89
2-3; 5-6	715	92.03	52.73	87.55	1.82	3.78	3.92	2.52	0.42	13.45
3-4; 4-5	1,284	93.15	50.86	89.02	1.32	4.21	2.49	2.96	0.00	13.84
3-4; 5-6	934	93.58	46.68	90.04	1.28	2.89	3.00	2.78	0.00	13.80
4-5; 5-6	1,030	93.88	51.36	90.00	1.07	3.50	2.62	2.72	0.10	13.86
Total or **WA (%)**	**6,405**	92.37	50.10	87.59	**1.47**	**3.81**	**3.93**	3.14	**0.06**	**13.74**
Percentage point difference in WA	-	**1.30**	**3.37**	**-0.76**	-0.91	**2.02**	**-0.63**	**-0.11**	**0.38**	**0.13**
Non-movers	-	90.86	50.96	83.44	1.63	6.83	3.19	3.22	1.69	15.67
Full sample	-	91.03	51.02	83.90	1.57	6.70	3.13	3.20	1.50	15.55

Notes: WA = weighted average (%). See notes to Table 1.9.

Further statistics on the characteristics of mobile pupils are shown in Tables 1.11 and 1.12, where again the focus is on pupils moving either once or twice. Two specific attributes are assessed here – FSME and SEN status – with the key distinction between these features and those considered previously being their capacity to change through time and in a way that may be related to the form of move made. For the one-mover category (Table 1.11) it is clear that pupils eligible for FSM throughout the transition period are marginally more likely to move school only than both school and residential setting. The percentage point difference in the weighted average between the two mover types is estimated at a positive 0.68. However, this is slight in comparison to the situation for non-FSM eligible pupils. In this case the weighted average difference between those undertaking isolated school moves relative to school and home transfers is a much higher 4.43 percentage points, suggesting the greater prevalence of pure pupil mobility among this group.

Table 1.11: Mobility, FSME and SEN Status for Pupils Moving Once Across KS1 to KS2 Year Group Transitions

Panel A: FSME and SEN status for 'pure' school movers moving once									
Year group transitions	**'Pure' pupil mobility (1)**	**% FSME (2)**	**% non-FSME (3)**	**% entering into FSME (4)**	**% exiting from FSME (5)**	**% SEN (6)**	**% non-SEN (7)**	**% entering into SEN (8)**	**% exiting from SEN (9)**
2-3	10,615	19.08	71.62	3.79	5.52	18.29	64.50	5.27	11.95
3-4	8,812	19.54	70.69	4.27	5.50	20.51	64.03	4.70	10.77
4-5	8,241	19.50	71.17	3.09	6.24	21.77	63.56	4.51	10.16
5-6	6,057	19.33	70.43	3.40	6.84	26.76	60.05	4.66	8.54
Total or WA (%)	33,725	19.35	71.05	3.67	5.93	21.24	63.35	4.83	10.59
Panel B: FSME and SEN status for 'school-home movers' moving once									
Year group transitions	**'School-home moves' (1)**	**% FSME (2)**	**% non-FSME (3)**	**% entering into FSME (4)**	**% exiting from FSME (5)**	**% SEN (6)**	**% non-SEN (7)**	**% entering into SEN (8)**	**% exiting from SEN (9)**
2-3	14,444	19.75	65.80	5.89	8.56	12.91	67.51	5.59	13.99
3-4	13,371	18.97	66.69	5.93	8.41	14.64	69.19	4.61	11.56
4-5	11,082	17.98	67.74	4.67	9.61	17.07	66.61	3.65	12.67
5-6	8,093	17.20	66.44	5.45	10.91	18.74	65.43	3.60	12.23
Total or WA (%)	**46,990**	**18.67**	**66.62**	**5.54**	**9.17**	**15.39**	**67.42**	**4.51**	**12.68**
Percentage point difference in WA	-	**0.68**	**4.43**	**-1.86**	**-3.24**	**5.85**	**-4.07**	**0.31**	**-2.09**
Non-movers	-	9.35	78.76	4.68	7.20	12.13	68.56	10.29	9.02
Full sample	-	9.69	74.86	6.18	9.28	12.24	65.77	11.15	10.84

Notes: Pupils with and without a statement of SEN are included in the SEN group. WA = weighted average (%). Columns (2) to (5) sum to 100% and columns (6) to (9) sum to 100% across each year group transition category. Columns (2), (3), (6) and (7) report the *pre-move* period percentages of pupils with each characteristic; columns (4), (5), (8) and (9) report the percentages of pupils with changing characteristics between the pre-and post-move periods. 'Non-movers' are as defined in the notes to Table 1.9. The full sample consists of 522,440 pupil-level observations.

In columns (4) and (5) of Table 1.11 crude findings on mobility and income changes are presented. Entitlement to FSM is determined by a means-testing process and requires household receipt of certain state-provided benefits, so that the indicator provides a proxy measure for low family income[42]. Pupils entering into FSME will have experienced negative household income changes that alter their entitlement circumstances, and those exiting from eligibility will have seen income rises among household members. Column 4 of the Table indicates that pupils who become eligible for FSM are less likely to move school only than they are to move school and home, but this pattern of behaviour is much more pronounced for pupils exiting from FSME. The difference in the weighted average between school changers versus school and home movers is -1.86 percentage points amid pupils that become eligible for FSM during the move period, as compared with a much greater -3.24 percentage point difference for pupils who come out of FSM entitlement. This suggests that income gains are associated more with school and home moves than are drops in income. However no inferences can be made about the direction of the link between mobility and proxy income changes from these findings without highly detailed data on their timing and circumstances, alongside evidence on other factors influencing these components. Additionally, the percentages of pupils moving school or school-home and entering into or exiting from FSME are low in general. The majority of pupils in this KS1-2 cohort are not entitled to FSM throughout the move period (between 70.43 and 71.62 per cent of pupils moving school only, and in the range of 65.80 to 67.74 per cent of school-home changers, as shown in column 3 of the Table), while about 20 per cent of pupils are entitled to FSM across the move duration. Therefore it appears that pupils from a more advantaged background make school only moves and for low income households school and home moves are almost as typical a mobility form as pure school changes.

Turning to SEN status, pupils with SEN are much more likely to engage in one-time school only changes than they are to move their school and home. The opposite is true for those without SEN, where across all move transitions such pupils are more likely to make school and home changes than isolated school moves. Again the directional flow of any relationship between SEN status and mobility cannot be established from these findings. It could be that a pupil with SEN changes their

[42] For further details see Appendix 1A, Section 1A.G. For a discussion of the validity of the FSME indicator as a proxy measure of family economic disadvantage see Chapter Two, Section 2.7.

school in order to find one with provisions for learning difficulties that better match their needs, or otherwise assessment of a new entrant to a school might result in that pupil being classified as having SEN. Instead for non-SEN pupils, their greater amount of mobility involving school and home change may reflect less of an immediate need to harmonise pupil learning capabilities with the school context. An important point to note is that SEN status is not independent of the school attended and in fact schools are responsible for identifying and categorising pupils in relation to this (McNally, 2009). However, diagnosis itself likely reflects learning difficulties that existed prior to formalised schooling, rather than classification as a consequence of poor learning in school, especially where SEN categorisation occurs when the pupil is very young. To comment briefly on the final two columns of the Table, pupils entering into (column 8) or exiting from (column 9) SEN during the move period illustrate similar patterns of moves as for pupils with (column 6) and without (column 7) SEN throughout the transition stage. However, the percentage point differences in the weighted averages between the two mover types are lower here, particularly for pupils entering into SEN (0.31 percentage points compared with 5.85 percentage points for pupils with SEN across all 5 waves of PLASC).

Among the sample of non-movers a much lower percentage of pupils are eligible for FSM and, by symmetry, a higher percentage of pupils are non-FSME than is the case for mobile pupils of either form who move once. About 9 per cent of the stable group are FSME compared with an average of between 18.67 and 19.35 per cent of movers, while 78.76 per cent of non-movers are not entitled to FSME relative to between 66.62 and 71.05 per cent of school-home or school only changers on average. The same situation holds for SEN and non-SEN immobile pupils relative to the mobile ones, though here the differences between movers and stayers are less marked; 12.13 per cent of the stable group are classified as having SEN (compared to between 15.39 and 21.24 per cent of movers), while 68.56 per cent of non-movers do not have recognised learning difficulties (relative to between 63.35 and 67.42 per cent of movers). Meanwhile, the percentages of stable pupils entering into or exiting from FSME lie between the weighted average percentages of pure school changers and school-home switchers moving once (4.68 per cent become entitled to FSM and 7.20 per cent leave FSME among stayers, compared with weighted average percentages of 3.67 to 5.54 among pure school changers entering into FSME and between 5.93 and 9.17 per cent for one-time movers exiting from FSME). In terms of SEN, non-movers feature a higher percentage of pupils entering into and a lower percentage of pupils exiting from educational needs than does the movers group in any transition category.

Points of comparison can also be made between the attributes of the full sample of pupils and the movers group. Table 1.11 indicates higher percentages of pupils entering into or exiting from FSME in the full sample, at 6.18 per cent and 9.28 per cent respectively (relative to maximum weighted averages of 5.54 per cent and 9.17 per cent respectively among one-time movers, as was mentioned above). In terms of pupils without SEN, at 65.77 per cent the full sample percentage sits between the weighted average of pure school changers (63.35 per cent) and school-home movers (67.42 per cent). Among those exiting from SEN, the full sample features a slightly higher percentage relative to school only movers (10.84 per cent versus a weighted average percentage of 10.59), while school and home movers are most likely to switch to non-SEN status (their weighted average is 12.68 per cent). In respect of the percentages of pupils who are and are not eligible for FSM, the percentage with SEN, and the percentage entering into SEN, the characteristics of the full sample of pupils are similar to those of non-movers. Therefore, for these attributes, the above comments made in reference to the immobile group relative to the movers group apply equally if percentages in the full sample and in the set of one-time movers are instead compared.

Table 1.12 provides descriptive details on the FSME and SEN status of pupils moving twice. Similarities in time-varying attributes and move patterns between one-time movers and multiple movers are evident here. First of all, as for pupils moving once, those engaging in two school or school-home switches and entering into or exiting from FSME during the move periods are less likely to move school only. The percentage point difference in the weighted average between school changers versus school-home movers is -6.38 for those multiple movers becoming eligible for FSM, as compared with a larger negative difference of -8.16 percentage points for pupils experiencing household income gains and exiting from FSME. Additionally, pupils with SEN-status who move twice are, like pupils moving once, more likely to undertake school only moves than school and home changes. The converse scenario is true for the non-SEN group of multiple movers, who, as for isolated changers, are less likely to change school only than they are to engage in school-home mobility.

Certain aspects of the characteristics of pupils moving twice stand out against those making one-off changes. Most noticeable is the very high tendency for pupils who are not entitled to FSM throughout the move periods to make multiple moves of school only rather than school and home. The percentage point difference in the weighted average between the mover types is 15.09 here, compared with a 4.43 percentage point difference for pupils who are mobile once during the sample window. In contrast to both non-FSME pupils moving twice and FSME pupils moving once, there is evidence that pupils entitled to free school meals are marginally more likely to make multiple school-home transfers (column 2). As was the case for one-time movers, this suggests that pupils from better-off backgrounds comprise multiple pure school changers, whilst income-disadvantaged pupils are almost as likely to make multiple school-home moves as they are to engage in two school changes. The remaining point of comparison between the findings of Tables 1.11 and 1.12 is that pupils entering into SEN and moving twice are less likely to change their school only than they are to move school and home. This is indicated by the negative sign on the percentage point difference in the weighted average between the two multiple mover groups (-0.83 percentage points, see column 8 of Table 1.12), and is the opposite outcome to that for pupils who enter into SEN and move once.

Table 1.12: Mobility, FSME and SEN Status for Pupils Moving Twice Across KS1 to KS2 Year Group Transitions

Panel A: FSME and SEN status for 'pure' school movers moving twice									
Year group transitions	**'Pure' pupil mobility (1)**	**% FSME (2)**	**% non-FSME (3)**	**% entering into FSME (4)**	**% exiting from FSME (5)**	**% SEN (6)**	**% non-SEN (7)**	**% entering into SEN (8)**	**% exiting from SEN (9)**
2-3; 3-4	471	20.38	61.36	9.55	8.70	15.29	59.45	12.95	12.31
2-3; 4-5	466	17.38	63.95	6.87	11.80	13.52	54.29	13.95	18.24
2-3; 5-6	198	23.23	45.96	9.09	21.72	26.77	38.89	16.16	18.18
3-4; 4-5	267	22.10	56.55	11.61	9.74	20.60	55.43	11.61	12.36
3-4; 5-6	202	24.75	46.53	13.86	14.85	29.21	37.13	18.81	14.85
4-5; 5-6	180	23.89	46.11	16.67	13.33	27.22	47.78	13.89	11.11
Total or WA (%)	**1,784**	**21.02**	**56.39**	**10.31**	**12.27**	**19.68**	**51.51**	**14.13**	**14.68**
Panel B: FSME and SEN status for 'school-home movers' moving twice									
Year group transitions	**'School-home movers' (1)**	**% FSME (2)**	**% non-FSME (3)**	**% entering into FSME (4)**	**% exiting from FSME (5)**	**% SEN (6)**	**% non-SEN (7)**	**% entering into SEN (8)**	**% exiting from SEN (9)**
2-3; 3-4	1,454	25.31	39.06	18.98	16.64	9.90	56.05	15.61	18.43
2-3; 4-5	988	20.24	43.32	15.69	20.75	9.72	52.23	14.98	23.08
2-3; 5-6	715	19.44	41.26	15.10	24.20	9.93	47.55	19.30	23.22
3-4; 4-5	1,284	22.98	41.36	15.97	19.70	12.54	55.45	14.33	17.68
3-4; 5-6	934	18.74	42.51	16.27	22.48	13.06	51.07	14.24	21.63
4-5; 5-6	1,030	19.90	41.36	16.80	21.94	14.76	55.24	12.43	17.57
Total or WA (%)	6,405	**21.58**	**41.30**	**16.69**	**20.44**	**11.65**	**53.54**	**14.96**	**19.86**
Percentage point difference in WA	-	**-0.56**	**15.09**	**-6.38**	**-8.16**	8.03	**-2.02**	-0.83	**-5.18**
Non-movers	-	**9.35**	**78.76**	**4.68**	**7.20**	**12.13**	**68.56**	**10.29**	**9.02**
Full sample	-	**9.69**	**74.86**	**6.18**	**9.28**	**12.24**	**65.77**	**11.15**	**10.84**

Notes: Pupils with and without a statement of SEN are included in the SEN group. WA = weighted average (%). Columns (2) to (5) sum to 100% and columns (6) to (9) sum to 100% across each year group transition category. Columns (2), (3), (6) and (7) report the *pre-move* period percentages of pupils with each characteristic; columns (4), (5), (8) and (9) report the percentages of pupils with changing characteristics between the pre-and post-move periods. 'Non-movers' are as defined in the notes to Table 1.9. The full sample consists of 522,440 pupil-level observations.

Looking at how the attributes of FSME and SEN status among immobile pupils compare with those for multiple movers, it is evident that FSME (non-FSME) pupils are highly less (more) likely to feature among non-movers and this group also consists of non-SEN pupils to a greater extent than does the movers group. Variability in FSME status is much lower for stable pupils, with the percentages of the immobile sample who enter into or exit from FSME always being below comparable weighted average percentages for both pure school switchers and school-home changers moving twice. In respect of SEN status, the percentage of non-movers with SEN is above that for multiple school-home movers, at 12.13 per cent for the former relative to an 11.65 weighted average percentage for the latter. Given that SEN classification is determined at the school-level, it is unsurprising that non-school changers experience minimal variation in their SEN classification, which is likely to have been established early on in the child's entry to the school and consequently reflects learning difficulties existing before the onset of formalised schooling[43].

To summarise the findings from this stage of the analysis, it has been established that there are clear differences in the characteristics of pure school movers and pupils who change their school and home. One important pattern that has emerged is the relative tendency for pupils from a less well-off family background to engage in school-home changes and pure school moves to a similar degree, irrespective of the move frequency, while better-off, non-FSME pupils, are much more likely to undertake pure school switches, particularly among those making multiple moves. This pattern is evident from the percentage point difference in the weighted average compared both within and across FSME and non-FSME pupils (see columns (2) and (3) of Tables 1.11 and 1.12, for pupils moving once or twice respectively). In the Section that follows, evidence on the types of moves made and which kinds of pupils are more likely to make them is placed in the context of school choice policies. The aim of this exercise is to gauge some understanding of the effectiveness of the scheme in creating changes to the way education is accessed and therefore the potential for school choice to enhance educational opportunity and the future life chances of pupils.

[43] It should be noted that the discussion presented in this paragraph also applies if a comparison is made between the full sample of pupils and multiple movers, in reference to these specific attributes. This is because of similarities in the percentages of pupils with these characteristics in the immobile group and in the full sample (as shown in the last two rows of Table 1.12).

1.9 Considering Entry to Oversubscribed Schools

It was explained in Section 1.4.1 that LEA-governed Community and Voluntary-controlled schools characterised by applications for places that exceed school capacity adopt oversubscription criteria in order to rank potential entrants. One such procedure for prioritising entry relates to catchment area occupancy, in which pupils inhabiting homes in a radius of close geographical proximity to the school will rank higher on the school waiting list. It was suggested that this aspect of the admissions procedure distorts the notion of school choice, since it reduces the potential for schooling access to be less dependent on residential location. In Table 1.8 above a distinction was made between school movers only versus school-home movers, and it was noted that there is more school change involving a move of home than there is pure pupil mobility in the cohort under assessment. This finding implies that the link between the school attended and the home setting still matters when it comes to schooling choices. However, whether this holds true may be illustrated to some extent by the successfulness or otherwise of pure school movers in gaining entry to oversubscribed LEA-governed state schools relative to school-home movers.

In Table 1.13, findings from a first attempt at evaluating the potential for school movers of the differing forms to move to oversubscribed schools are presented. For simplicity, the analysis focuses only on those pupils moving either to oversubscribed Community or VA schools and on those changers making only one move of school, or school-home. As Table 1.2 showed, most pupils in the state primary school sector attend Community or VA schools (83.65 per cent in total in 2005/06). Multiple movers may change the type of school that they attend in each move made (e.g. a pupil moving schools three times may switch from a Community, to a VA, back to a Community school). This complicates matters since oversubscription rules vary for more autonomously governed VA schools compared with Community schools. In fact, as discussed in Section 1.4.1, VA schools are more likely to place emphasis on factors such as religious commitment rather than catchment area satisfaction when ranking excess pupil numbers, suggesting less of a geographical link between the school attended and the home location for pupils in VA schools.

An oversubscribed school is classified as such in the sample if the ratio of the total number of pupils in the school to school capacity exceeds one, where annual pupil roll and school capacity measures are obtained from the Edubase data source as referred to earlier. These ratios are based on a three-year average of annual pupil numbers and school capacity figures, so as to minimise the margin for error in the oversubscribed schools indicator that might occur were it calculated using annual ratios only[44]. In the full sample under analysis around 5,500 primary schools are oversubscribed according to this definition of an above-capacity institution (and using three-year averaged data), equivalent to almost 37 per cent of the near 15,000 primary schools featuring in the dataset.

[44] Note that ratios do not use averaged annual total pupil numbers and school capacity data over the five sample waves (2001/02 to 2005/06 inclusive) because records on these variables are not available in all five years for all schools, such that using a five year average would constrain measurement on entry into oversubscribed schools. A 3-year average is the next best alternative that can be used both to overcome the lack of full data availability on these indicators and to allow for a reduction in the error margin on the subscription rate. For a discussion of the limitations of the oversubscription measure see Chapter Two, Section 2.7.

Table 1.13: Entry to Oversubscribed Schools

Panel A: 'Pure' school movers						
Year group transitions	**'Pure pupil mobility'** (1)	**With school type & school capacity data in the move period** (2)	**% entering over-subscribed Community school** (3)	**% of which coming from an under-subscribed school** (4)	**% entering over-subscribed VA school** (5)	**% of which coming from an under-subscribed school** (6)
2-3	10,615	7,153	27.81	52.59	8.77	55.50
3-4	8,812	7,781	26.40	61.88	8.73	60.97
4-5	8,241	7,776	24.31	62.06	8.45	62.56
5-6	6,057	4,494	22.96	63.18	7.37	57.40
Total / WA (%)	**33,725**	**27,204**	**25.61**	**59.70**	**8.44**	**59.40**
Panel B: 'School-home movers'						
Year group transitions	**'School-home moves'** (1)	**With school type & school capacity data in the move period** (2)	**% entering over-subscribed Community school** (3)	**% of which coming from an under-subscribed school** (4)	**% entering over-subscribed VA school** (5)	**% of which coming from an under-subscribed school** (6)
2-3	14,444	13,177	25.55	55.09	6.27	55.81
3-4	13,371	12,990	25.05	56.91	5.90	57.63
4-5	11,082	10,921	24.07	57.59	5.78	54.99
5-6	8,093	7,814	23.39	59.68	5.03	53.18
Total / WA (%)	**46,990**	**44,902**	**24.67**	**57.02**	**5.83**	**55.68**
Percentage point difference in WA	-	-	**0.94**	**2.68**	**2.61**	**3.72**

Notes: WA = Weighted average (%). Movements from an undersubscribed school (columns 4 and 6 of panels A and B) refer to any of the four school types (Community, Foundation, VA or VC). Pupils making one 'pure' school move account for 94.82 per cent of all pure school movers. Across all school-home movers, pupils moving once account for 86.42 per cent of the total (see Table 1.8). Percentages shown in columns 3 to 6 use the 'pure pupil mobility' and 'school-home moves' figures of column 2, panel A and B respectively, for the specific move period.

The findings of Table 1.13 show that pupils making one pure school move are *marginally more likely* than pupils making one school-home move to enter an oversubscribed Community school (column (3) of panels A and B respectively). This is true across all year group transition categories except 5 - 6, where school-home mover entry is 0.43 of a percentage point higher (at 23.39 per cent versus 22.96 per cent for school only changers). The weighted average figures indicate that some 25.61 per cent of pupils switching schools once enter oversubscribed Community schools on average, compared with 24.67 per cent of one-time school-home movers, a difference of nearly one percentage point (0.94). Thus it appears that some families do gain access to oversubscribed Community schools from their current place of residence, as the pure pupil mobility figures show. However, the fact that school-home movers are only slightly less likely to enter these schools suggests the continued importance of the link between the school attended and residential location in the Primary school stage, a situation that may be being reinforced by the catchment area criteria of filled-to-capacity LEA-governed schools.

Interestingly, the estimates of Table 1.13 reveal a regular pattern in each of the year group shifts for pupils moving to oversubscribed VA schools: pupils making one pure school move are *consistently much more likely* than those making one school-home move to enter a capacity-constrained VA school. The weighted average for pure school changers moving once stands at 8.44 per cent, relative to 5.83 per cent among pupils making one school-home move, a substantial difference of 2.61 percentage points. This evidence is in support of a more tenuous link existing between school and home proximity among pupils in VA schools, given the tendency for these schools to adopt oversubscription criteria related to their ethos.

To summarise the results found thus far, among this KS1-2 cohort pure school movers changing schools once are more likely than pupils making one school-home move to gain entry to both oversubscribed Community and VA schools. Their relative strength lies in gaining entry to filled-to-capacity VA schools in particular, as the difference in the weighted average percentages across the two mover types and school types indicates. In general it must be emphasised that these findings should be interpreted with caution. The observation that pure school movers are gaining access to Community schools operating above full potential could simply be because their home setting already conforms to the catchment area clause. Indeed, for some pupils, the current home location may be contained within the catchment area of several Primary schools, particularly in areas with a higher density of Primary education providers, such that catchment areas of different schools overlap the same home. In this case, one cannot infer that the pure school move was attributable to the possibilities allowed by school choice settings. Otherwise, isolated school change of this kind may reflect some proportion of delayed place allocation at a preferred popular school for which a pupil was on an admissions waiting list, such that the school move into an oversubscribed school occurs at a non-standard time point and without necessitating a change of home. At the same time, the assertion that the link between the school and the home still matters and could be being strengthened by LEA-governed schools' catchment area rules necessitates evidence on the reasons for the move of school and home. If the school and home move occurred as a result of upward employment mobility, for example, then access to a higher quality, popular school may be more an outcome of the job-related move, rather than the consequence of a calculated move of home done so as to ensure access to a preferred school. All of these points indicate the need for more substantive information on the nature of school and school-home moves before any firm conclusions can be drawn about the effectiveness or otherwise of school choice policies.

Taking heed of these concerns, columns (4) and (6), panels A and B of Table 1.13, look for evidence of the existence or otherwise of an effective quasi-market for schools. Estimation considers whether the school move made to either a Community or to a VA school with an excess demand for places involves pupils coming from a school (of any type) with spare capacity. If a pupil is able to make a pure school change from an institution that has no restrictions on admissions (due to unfilled places) to one where entry constraints apply, then this may signal that choice exploitation is possible despite the existence of these constraints. In turn, this would offer some indication of the effective operation of a choice system, particularly if such moves are made into above-capacity Community schools, where oversubscription admissions rules tend to resort back to school-home proximity. On the other hand if moves of this manner take place to a greater extent among school-home changers, this may suggest that proximity factors act as a barrier to the effective functioning of a market-place for schooling.

The results indicate that school only movers are *much more likely* than school-home movers to make school changes motivated by school choice policies among almost all year group transitions for those entering filled-to-capacity Community schools (column (4) compared across panels A and B). Only for transition group 2 - 3 is this pattern in reverse: 52.59 per cent of those pure school movers joining an oversubscribed Community school do so having previously been in an undersubscribed school, as compared with 55.09 per cent of school-home changers. On average, school only movers are 2.68 percentage points more likely to switch schools in pursuit of quality gains relative to pupils moving school and home (the weighted average for the former mover type is 59.70 per cent and for the latter 57.02 per cent).

Meanwhile, for joiners of oversubscribed VA schools who previously attended a school with spare places, those making a school only move also seem to be *much more likely* to exploit school choice opportunities than school-home movers (column (6) compared across panels A and B). This is weakly not the case for the transition period 2-3, where entry to oversubscribed VA schools by school-home movers coming from undersubscribed schools is just above that for pure school switchers (at 55.81 per cent versus 55.30 per cent respectively). The weighted average is 3.72 percentage points higher for school only changers, suggesting that moves motivated by school quality gains feature more among this group and also relative to pupils entering oversubscribed Community schools from an undersubscribed school (where the difference in the weighted average between the two mover types was noted as being 2.68 percentage points). In line with earlier findings, this evidence reinforces the assertion that catchment area occupancy is of less relevance as a criterion for ranking pupils when VA schools are oversubscribed.

Overall, it would appear from the estimates in Table 1.13, that some school moves are rationalised by an interest in exploiting quality differences between local schools, and that such school moves are able to take place without necessitating a home change[45]. However, as mentioned above, there are shortcomings to the analysis that

[45] Analysis of the data revealed that the school-level average percentage of pupils achieving Level 4 at KS2 (across the three subjects of English, maths and science) was 80.18% in oversubscribed schools compare to 76.98% in undersubscribed schools, a difference of 3.2 percentage points, or 4.16%. This suggests that there are quality gains to be made from transferring between primary schools under the choice system.

necessitate caution when interpreting these findings. Bringing in information on the characteristics of pupils moving once (as discussed in Section 1.8), it is likely that school change motivated by choice will be undertaken by males, pupils of white ethnic origin, and non-FSME pupils with a better-off family background. In contrast, ethnic minorities and pupils from low-income households are marginally less likely to be represented among those exploiting the opportunities for education advances offered by choice policies.

1.10 Summary and Discussion

In this study the dimensions of pupil movement between schools have been described and assessed for one cohort of pupils of different attributes, as they progress through the primary years of state schooling in England. This evaluation makes a significant contribution to education research for several reasons. Firstly, no empirical evidence available to date provides details on the amount of school change that does and does not involve a move of home for a nationally-representative cohort of pupils tracked throughout their primary years of schooling in public-sector education. Indeed, the literature discussion presented in this Chapter has highlighted that pupil mobility is frequently inadequately defined, with no distinction made between pure school change and school-home moves. Secondly, there are also no statistics on how participation in these different kinds of moves varies by the social background and characteristics of pupils. Thirdly, no empirical evaluation has so far attempted to set move behaviour by pupils differing in their attributes in the context of the most significant development in education policy of the last twenty years, that of the school choice system. Information on all of these areas of analysis has been uncovered for the first time here, a situation that has been made possible by the onset of the NPD.

The policy of school choice seeks to raise access to schools from the current home location among *all* pupils, irrespective of their social background and where they live, as a means for driving up attainment standards and educational equality. Empirical descriptive statistics presented here suggest that some school change does take place independently of a move of home, though this is more common among pupils from better-off families. There is also evidence of the pursuit of education quality gains in the form of school only moves to oversubscribed Community institutions that, as a consequence of their popularity, employ criteria for ranking excess entry demand which includes the proximity of the home to the school. While these findings imply some degree of effectiveness in the operation of school choice, and a reduction in the traditional school-home link, moves of these kinds are also likely to feature among pupils from economically advantaged backgrounds. This calls into question the capability of choice policies to offer better standards and equality in educational opportunity when inefficiencies in the way choice is administered generate entry-to-school restrictions. Consequently, this raises concerns over the potential for future life chances to be enhanced through changes in spatial dimensions such as schooling.

In Chapter Two that follows the relationship between mobility and pupil characteristics (including pupil prior attainment), as well as that between mobility and school choice will be formally assessed through statistical regression analysis. The intentions of this undertaking are to subject the findings established here to more rigorous testing, as well as to allow for greater degrees of complexity in the way factors affecting mobility can be expressed and evaluated. This process will serve to enrich and potentially reinforce the preliminary findings on the move patterns of pupils differing in their attributes and on the general effectiveness of school choice policies that have been determined so far.

Chapter Two: Testing the Relationships between Mobility, Pupil Characteristics and School Choice at the Primary Stage of Education

2.1 Introduction

Pupil mobility during the primary school phase of education in England features both isolated changes of institution and combined school-home shifts, with these moves frequently taking place at non-compulsory stages of transfer. Preliminary empirical evaluation presented in Chapter One revealed that for a cohort of 522,440 pupils transferring between state schools in the KS1 to KS2 primary years of learning over the period 2002 to 2006, 10.4 per cent changed school and home, while 6.8 per cent moved schools, at times other than the compulsory points of transfer. Further analysis considered the association between each form of school change and two particular areas of interest among pupils moving once or twice, namely (i) the characteristics and prior academic attainment of movers and (ii) the exploitation of choice policies measured through movements to oversubscribed schools by pupils coming from under-capacity institutions.

In looking at the attributes of students moving once, it was shown that boys and pupils of white ethnicity are more likely to be pure school changers than school-home movers, whereas the latter group of mobile pupils consists in the main of girls and students of Asian, black, or minority-white ethnic origin. In terms of their economic background, one-time movers who shift only their school are frequently from better-off families (non-FSME) than those making combined school and home transfers, while pupils without recognised learning difficulties (non-SEN) feature more among school-home movers. The main points of contrast between pupils moving once and those moving twice are that the latter encompasses students of Asian ethnicity among their school only shifters, while pupils of white ethnic origin are more likely to engage in multiple changes of school and home. Additionally, two-time movers were found to have lower prior attainment at KS1 than pupils moving once, though for both single and multiple movers the pre-move KS1 performance differences between pure school changers and school-home shifters were relatively small.

Assessment of the relationship between mobility and entry into oversubscribed schools considered only those pupils moving once and coming from a school with below-capacity pupil numbers, in order to shed some light on the existence of a quasi-market for schooling. This analysis revealed that among pupils coming from undersubscribed schools, school only movers are more likely than combined school-home changers to gain entry to oversubscribed schools of both the Community and the VA type, though their relative strength lies in entry to the latter. This was construed as some indication of the presence of school change motivated by the pursuit of school quality gains and therefore the operation of choice policies in the primary stage of the English education system.

In this Chapter statistical regression analysis will be employed in order to test the school change-pupil characteristics[46] and the mobility-school choice links in a more formal setting. This means that throughout this analysis the focus is on *moving* pupils only, so that regression estimation involves an assessment of the relationship between factors associated with mobility and the form of move that the pupil makes. Then the aim of this work is to determine influences behind the separate types of move, *given that the pupil does move either school or school-home*[47]. This constitutes a restriction of evaluation to a selected sub-sample of the full cohort, with non-movers excluded. The general applicability of findings to the entire sample is thus limited here. Extrapolation of the empirical investigations conducted below to include the full sample and to establish the factors determining whether pupils change schools in the first place would require use of the Heckman procedure to

[46] Note that from this point forward, where the relationship between mobility and pupil characteristics/attributes is referred to in the text as a focus of this Chapter, this will also incorporate the KS1 average points score of the pupil (as a measure of pre-move attainment). However, in the regression analysis that follows, prior attainment will be modelled as a separate explanatory variable to the other pupil characteristics (where these come from the PLASC part of the NPD, and are represented by the vector $\boldsymbol{X}$ in regression equations 1 and 2 shown below).

[47] In Section 2.5 regression analysis considers the relationship between choice-related school change (as the dependent variable) and both the form of move made and pupil characteristics (as regressors). This is the *only* part of the Chapter in which the probability that a pupil moves school only or school-home is *not* used as the outcome measure in estimation.

correct for the specification error of sample selection bias[48]. Employing econometric evaluation of this kind forms an important potential area for future research work.

In Chapter One the distinctions in the background and school type entry of the differing mover types were discussed in a descriptive set-up. The statistical approach used here represents an important extension to the previous process of evaluation for several reasons. Firstly, a descriptive study is limited to the examination of one-to-one, bivariate links between mobility and each factor assumed to affect moving, while instead a regression framework enables the simultaneous assessment of *multivariate* correlations between the move outcome and a host of independent variables. Secondly, and related to the first point, a multivariate regression model estimates the *direct* influence of each explanatory variable on mobility whilst holding constant the effect of all other regressors included in the equation. To give some examples of why these issues matter, the connection between FSM eligibility and school change has so far been examined in a bivariate manner, in which other observable variables that might account for some of this connection, such as ethnicity, have not been controlled for. In a regression set-up, the impact of ethnicity and FSME on mobility can be jointly specified, and the coefficient on FSME that is estimated by the model establishes the net effect of this indicator on the move outcome, keeping constant the influence of all other modelled covariates, including ethnicity measures. Likewise the relationship between school moves and entry to oversubscribed schools was assessed in the previous Chapter, but without controlling for plausibly associated factors, such as the characteristics of mobile pupils. This relationship can be properly ascertained through regression estimation in which pupil attributes are additionally controlled for. In a more general sense, regression modelling is crucial if the net effect of each independent component on the move decision is to be correctly determined. Lastly, the partial regression coefficient attached to each independent variable summarises in one single parameter the magnitude of association between that regressor and the dependent outcome, while hypothesis testing identifies the degree of statistical significance of each coefficient estimate as an indicator of the strength of the measured relationship. Consequently these aspects of the regression method allow for more clarity and precision in

[48] The seminal paper in which this procedure is presented, and to which the reader should refer for further details, is as follows: Heckman, J. J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*, 47(1): 153-161.

estimation of associations. Overall, the procedure of regression analysis enables a priori assumptions about the relationships between observable dimensions and school change to be empirically evaluated and scrutinised in a more rigorous setting than can be derived through descriptive assessment alone.

In Section 2.2 that follows, equations used to describe the relationship between school change and pupil characteristics, and that between mobility and school choice, are laid out. Here the regression models that will be used in the process of estimation are also presented. Regression analysis makes use of the linear probability model, the logit and the probit model, all of which differ in their functional form. Results pertaining to each model are compared in order to assess whether findings vary by the functional form specified.

Sections 2.3 and 2.4 show regression results pertaining to estimation of the mobility-pupil attributes and the mobility-choice equations respectively. Findings reveal a negative relationship between pure school change and the characteristic of free school meal eligibility, while there is some suggestion of entry into oversubscribed Community schools that may reflect the exploitation of choice policies. Section 2.5 presents another slant to regression estimation by looking at the choice-mobility-pupil attributes relationship. Here school choice-related moves form the dependent variable and analysis addresses the association between choice-type school change, pure school mobility and pupil characteristics, with the aim of establishing if certain types of pupils are getting to exercise choice. Under the most conservative model specification, estimation indicates that there are no clear relationships between moves from under-to-above-capacity schools and pupil attributes, while there is a positive link between 'choice' moves and pure school change. In Section 2.6 the mobility-choice relationship is returned to and evidence on choice-related moves given in Section 2.4 is more thoroughly assessed, in an attempt to understand whether results vary by the region or by the FSME status of pupils. A distinction is made between pure school change into oversubscribed schools in London relative to other areas, where estimation shows that isolated school moves occur largely in London. When the entire sample is split between FSM eligible and non-eligible pupils, findings indicating a higher probability of isolated school change among non-FSME pupils. These outcomes suggest that choice policies are still limited in their overall effectiveness. Section 2.7 discusses the shortcomings of analysis that uses the

National Pupil Database, a data source on which both Chapters One and Two are based. Finally, Section 2.8 offers some summarising comments.

2.2 Regression Analysis

The process of empirical evaluation undertaken in this section utilises exactly the same KS1-2 cohort of primary school pupils that formed the basis of investigation in Chapter One, with estimation focusing solely on those pupils engaging in mobility of one form or the other. Table 1.8 of that Chapter indicated pure pupil mobility among 35,566 pupils (of which 33,725 pupils (94.82 per cent) move once and 1,784 pupils (5.02 per cent) move twice) and school-home change for 54,376 pupils (with 46,990 pupils (86.42 per cent) moving once and 6,405 pupils (11.78 per cent) moving twice). These figures provide a general guide to the number of pupil-level observations on which regression estimation will be based, although the actual sample sizes will depend on the exact relationship being modelled and whether this includes supplementary data not yet exploited.

In a regression equation that specifies the relationship between mobility and other covariates, the move outcome can be expressed as a discrete choice variable taking the value of 0 or 1, depending on the form of move made. Throughout all regression models developed in this Section, school only changers will be coded 1 and school-home movers coded 0, so that reported parameter estimates indicate associations between isolated school shifts and other factors, with school-home movers acting as the baseline reference group. This coding allocation reflects the recurrent emphasis on the efficacy of school choice as a core focus of analysis, where, as the discussion of Chapter One outlined, *choice can be deemed to be operative if pupils gain access to a school (particularly a popular one) without moving home*. Continuing along this line, it follows that regression output be displayed throughout from the stance of pure school changers.

2.2.1 Modelling the relationship between mobility and pupil characteristics

Probability models constitute the principal specification to use when the dependent variable is a dummy indicator of binary choice. The following equation offers a general expression for the relationship between mobility and pupil characteristics:-

$$y_{iksj,t} = \alpha + \beta X_{i,t-1} + \sum_{k=6}^{9} \delta_k Age_{k,t-1} + \sum_{j=1}^{149} \omega_j LEA_{j,t-1}$$

$$+ \lambda KS1_{i,t=2002} + \sum_{k=6}^{9} \theta_k \left(Age_{k,t-1} \times KS1_{i,t=2002}\right) + \varepsilon_{iksj,t-1} \qquad (1)$$

That is, the probability, y, that pupil i of age k (where $k = 6$ to 9) in school s within LEA j moves school only ($y = 1$) or school and home ($y = 0$) between period *t-1* (the pre-move year) and period t (the year of the move) depends on:-

- a set of individual pupil characteristics, $\boldsymbol{X}$, pertaining to pupil i in time *t-1*, where $\boldsymbol{X}$ includes dummy variables for the gender, ethnicity, FSM eligibility and SEN status of the pupil prior to moving, and has an associated vector of sample parameters $\boldsymbol{\beta}$;
- a group of 'age' dummies (with coefficients δ_k) that control for the age of the pupil in time *t-1* and therefore act as controls for the timing of the move in the KS1-2 phase;
- a set of 'LEA' dummies (with coefficients ω_j) that capture unobserved time-invariant LEA-specific effects common to all pupils attending schools within the same LEA j at time *t-1* (there are 149 LEAs in the sample);
- pre-move attainment, measured as the average points score achieved by the pupil in their 'KS1' exams (which are taken by cohort members in the summer of 2002), a parameter with associated coefficient λ, and;
- an interaction expression between each 'age' dummy and pupil-level 'KS1' prior attainment, with parameters θ_k, where this term allows for a changing influence of the timing of the move on mobility according to pre-move achievement scores.

The process of model building is sequential and variable inclusion follows the order given by equation (1). Prior to the incorporation of LEA dummies, the regression specification includes a set of higher-level Government Office Region (GOR) dummies that capture time-constant unobservable regional factors which have the same effect on all pupils attending schools within a common GOR in time *t-1*. These can be expressed by the term $\sum_{g=1}^{9} \sigma_g GOR_{g,t-1}$, where g represents the GOR, and σ_g the associated coefficients[49]. When lower-grouping-level LEA dummies are subsequently estimated in the regression, all regional controls drop out as their informative content is contained within the LEA dummies[50]. In equation (1) the term α is a constant and ε is an error term that incorporates unobservable pre-move (*t-1*) random disturbances for pupil i which impact on their move outcome. Regression model (1) can be summarised as specifying the relationship between mobility and a range of pupil-level variables contained within PLASC, net of any explanatory power attributable to the timing of the move, area-related effects, and pupil prior achievement at KS1 (both alone and interacted with the age dummies). Thus the overall aim of regression estimation using equation (1) is to establish whether, and if so which, pupil-based factors impact on the likelihood of a pure school change versus a school-home move.

[49] There are nine GORs in total, which are listed in the notes to Table 2.1.

[50] All GOR and LEA controls relate to the location of the school attended by the pupil at time *t-1*, rather than to the location of the pupil's home. To the extent that Primary school pupils *do not* attend schools within the GOR or LEA in which they live, these area-based factors will not capture neighbourhood effects associated with the home setting, effects that may matter to the move outcome. Complexity involved in the mapping of home postcode information contained in PLASC to the relevant GOR and LEA codes has meant that this process has not been possible for the purposes of this research. However, two recent studies have shown that pupil attendance at a school which involves crossing an LEA boundary is very low at the Primary school stage, so that mostly all pupils attend schools within the LEA in which they live. Around 5% of pupils attending Community primary schools cross LEA boundaries in the London region, and just 3% do so elsewhere in England (see Gibbons *et al.*, 2006 and Gibbons *et al.*, 2009). GORs cover a wider geographical space than LEAs, making school attendance that involves the crossing of GORs highly unlikely. Given these points, the area-based controls used in regression estimation here can be viewed as incorporating neighbourhood effects to some degree, and therefore the potentially relevant relation between home location and mobility.

2.2.2 *Modelling the relationship between mobility and school choice*

Estimation of the relationship between mobility and entry into oversubscribed schools by pupils coming from institutions operating below capacity is defined by the following regression equation:-

$$y_{iksj,t} = \alpha + \sum_{s=1}^{3} \xi_s Type_{s,t-1} + \sum_{s=1}^{3} \zeta_s Type_{s,t} + \eta Choice_{i,t} + \sum_{s=1}^{3} \rho_s \left(Choice_{i,t} \times Type_{s,t}\right)$$
$$+ \gamma_1 Z_{s,t-1} + \gamma_2 Z_{s,t} + \beta X_{i,t-1} + \sum_{k=6}^{9} \delta_k Age_{k,t-1} + \lambda KS1_{i,t=2002}$$
$$+ \sum_{k=6}^{9} \theta_k \left(Age_{k,t-1} \times KS1_{i,t=2002}\right) + \sum_{j=1}^{149} \omega_j LEA_{j,t-1} + \varepsilon_{iksj,t-1} \quad (2)$$

Here the probability, y, that pupil i of age k and in school s within LEA j enters that school by moving school only ($y = 1$) or by making a combined school and home move ($y = 0$) between the pre-move year (period $t-1$) and the move year (period t) is related to:-

- a set of dummy indicators for the 'type' of school attended by the pupil in each period, with associated coefficients that are estimated separately for each school type and denoted by ξ_s and ζ_s in time $t-1$ and time t respectively. For simplicity, state primary schools are classified into three distinct types – Community, VA, or 'other' – where the latter category incorporates attendance in Foundation or VC schools;
- a 'choice' dummy variable (with coefficient η) which equates to 1 when a pupil moves from a school with spare capacity to an oversubscribed school, and equals 0 when a pupil moves from and to schools of other capacity combinations between time $t-1$ and time t[51]. Thus this regressor accounts for a relationship between mobility and school choice;
- an interaction term between the 'choice' dummy and the dummy for the school 'type' that the mobile pupil enters into (with coefficients ρ_s), where this is estimated separately for pupils entering Community, VA and 'other'

[51] Specifically, other combinations of capacity levels for the school a pupil leaves at time $t-1$ and the school a pupil joins at time t that are given the value of zero in the choice dummy are as follows: undersubscribed to undersubscribed, undersubscribed to exactly-subscribed; exactly-subscribed to undersubscribed, exactly-subscribed to exactly-subscribed, exactly-subscribed to oversubscribed; oversubscribed to undersubscribed, oversubscribed to exactly-subscribed, oversubscribed to oversubscribed.

schools. Hence this indicator considers the association between entry into filled-to-capacity schools of each type by pupils coming from undersubscribed schools, and school only change;

- a set of school-level characteristics, **Z**, for the school the pupil attended previously (with associated coefficients γ_1) and for that which they move to (with sample parameters γ_2). These vectors contain per school-level controls for: the percentage of pupils eligible for free school meals, the percentage of pupils of non-white ethnic origin, the school size (measured as the total number of pupils in the school), and the pupil-teacher ratio.

All other controls listed in equation (2) appear in regression model (1) and are as described in Section 2.2.1. They account for pupil-level characteristics, the timing of the move (age dummies), prior KS1 attainment (expressed both on its own and additionally interacted with the move timing), and area-specific factors (LEA dummies). As was the case for equation (1), model (2) is built up sequentially in the order shown and includes a set of higher-level regional dummies prior to estimation with LEA dummies (at which point all GOR dummies drop out from regression estimation). All GOR and LEA controls relate to the location of the pre-move school attended by the pupil. Overall, equation (2) highlights the relationship between entry into popular schools and the form of move made, when an array of additional factors (including school-and pupil-level variables and area-related controls) that might account for some of the estimated association are adjusted for. Therefore this regression assesses whether some mobility occurs as a result of households exercising their right to benefit from the possibilities for access to improved school quality offered through choice policies.

2.2.3 Regression estimation using probability models

Equations (1) and (2) will be estimated using three different types of probability model that differ in their functional form, namely the linear probability model, and logit and probit model specifications[52]. Estimation based on the linear probability model has two important drawbacks that warrant discussion at this stage. Firstly, as

[52] See, for example, Chapter 19 in Greene, 2000, for a more detailed discussion on these probability models, in which the dependent variable is discrete.

the name suggests, this specification fits a linear trend to the data, and as a consequence derives model predictions that are not constrained to always lie within the [0, 1] interval. Therefore linear estimation using the Ordinary Least Squares (OLS) method is not guaranteed to produce predictions that resemble probabilities. In terms of equations (1) and (2) this problem translates into predicted values of y that may exceed 1 or be less than 0, outcomes that do not align with the probabilistic nature of the dependent variable and therefore imply potentially incoherent model results.

Secondly, the error term in the linear probability model is not homoscedastic. In fact, the variance of the disturbances is correlated with the explanatory variables in the regression equation, so that $\varepsilon_{iksj,t-1}$ is heteroscedastic. Then OLS produces estimators that are unbiased but not efficient, that is, the sample parameters do not have minimum variance within their class[53]. If heteroscedasticity in the error term is not taken into account then this might result in the estimation of lower standard errors than would otherwise be derived in the presence of homoscedastic disturbances, in turn giving higher t- and F-statistics and the possible rejection of a null hypothesis that might usually have been accepted (Greene, 2000; Gujarati, 1995).

These pitfalls of the linear probability model are not insurmountable. The problem of heteroscedasticity in the error term can be resolved during the process of estimation by clustering standard errors at a particular group level to which the unit of analysis (in this case the pupil) belongs. Clustering accounts for both correlation within groups and heteroscedasticity across groups. Throughout regression estimation undertaken here, clustering takes place at the level of the (time t-1) individual school, so as to adjust for both correlation in the error term among all pupils within a school and inter-school non-equal variance in the disturbances[54]. In terms of the potential for the linear probability model to generate predictions that lie outside of the [0, 1]

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[53] In repeated sampling an estimator β_e is an unbiased estimator of β if the expected value of β_e equals the true β (Gujarati, 1995).

[54] The econometric software package 'Stata' (version 10, Special Edition) is used throughout the empirical evaluation conducted in this thesis. In practical terms, adding the command 'robust' to the end of the regression command line in Stata allows for heteroscedasticity in the error term across pupils to be corrected for. If the expression 'cluster' (at the school-level) is instead added to the end of the regression command line then both inter-school heteroscedasticity in the disturbance and correlation in the error term within schools are accounted for, so that the function of the 'robust' command is encompassed by the 'cluster' command alone (since pupils are grouped within schools). In all regression estimations undertaken here (pre-move) school-level clustering is carried out (as indicated in the notes to the tabulated results presented in this Chapter).

interval, this is of more concern if the goal of estimation is to establish probability predictions relating to specific sample units. For example, say that analysis aims to determine the probability of a school move only for a girl of Asian ethnic origin who is not entitled to FSM and attends a school in which there are 549 other students. OLS estimation evaluates the mean value of *y* at average values of the explanatory variables. If the characteristics of pupils like that of the example are not close to the average attributes of the sample then the point prediction that is obtained from the model may well lie outside of the [0, 1] range. However, evaluation made here is predominantly concerned with assessing the effects of changes in the independent variables on the change in *y*, evaluated at the regressor sample means. Hence this problem associated with the linear probability model is unlikely to be of importance.

The logit and probit models offer two alternative specifications to the linear version that do not suffer from the drawbacks associated with the latter. The probability distributions underlying the logit (logistic cumulative distribution) and the probit (standard normal distribution) are such that both models allow for non-linearities in the relationship between the dependent variable and covariates, the outcome of which is that their probabilities always lie within the [0, 1] interval. Moreover, the underlying assumption of both of these models is that their error terms are independent and identically distributed (i.i.d), with a mean of zero and a homoscedastic variance of σ^2 (Greene, 2000)[55]. Estimation of logit and probit regressions therefore takes place to check for validity in findings across model specifications. In terms of the reporting of results, marginal effects will be shown for both the logit and probit models; these are evaluated at the sample means of the explanatory variables. Regression output pertaining to all three probability models will be presented where there are differences across model results. Otherwise, where findings are the same throughout, only those deriving from linear probability model estimation will be set out in the main text, with estimation from all other models reported in Appendix 2A.

[55] Nevertheless, clustering of the standard errors at the school-level is carried out in estimation of both the logit and probit models, so as to account for intra-school correlation in the error term.

2.3 Regression Results: Mobility and Pupil Characteristics

The relationship between mobility and pupil-level attributes is considered for those pupils moving either school only or school-home at most twice. As was argued in Section 1.8 of Chapter One, very few pupils in the cohort examined make more moves than this during the entire KS1-2 phase. Table 2.1 starts off by assessing the nature of the association between school change and pupil attributes for those moving once. Equation (1) is estimated by OLS, using the linear probability model. In the first column of the Table results from a simple specification are presented, in which mobility is regressed on the fixed characteristics of pupils, namely their gender and ethnic group. Coefficient estimates pertaining to boys, and pupils of other white or Asian ethnicity are all highly statistically significant (at the 1 per cent significance level) in this preliminary regression. Findings suggest that boys are 2 percentage points *more likely* to move school only than are girls over the 2002 to 2006 window. The baseline ethnic group is that of pupils of white British ethnic origin and all other ethnicity types are always to be considered relative to this reference category. Sample parameters on both the other white and Asian ethnic groups are negative, at -5.2 and -3.6 percentage points respectively, implying that pupils of these ethnic backgrounds are *less likely* to move school only than are pupils of white British ethnicity. The opposite is true for pupils of unknown ethnic origin, who are *more likely* to change only their school than are white British pupils, though the degree of statistical power of this estimate is marginal (the coefficient estimate of 0.068 is significant at the 10 per cent level).

Table 2.1: Linear Probability Model Estimates of the Relationship Between Mobility and Pupil Characteristics: One Move

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Gender = Male	0.020***	0.013***	0.013***	0.013***	0.013***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Ethnicity =	-0.052***	-0.047***	-0.002	0.011	0.010	0.010
Other White	(0.017)	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)
Asian	-0.036***	-0.032**	-0.019	0.002	0.000	0.000
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Black	-0.013	-0.006	0.043***	0.063***	0.064***	0.064***
	(0.011)	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)
Other	0.008	0.014	0.039***	0.046***	0.049***	0.049***
	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)	(0.011)
Unknown	0.068*	0.062*	0.071**	0.067**	0.068**	0.069**
	(0.037)	(0.036)	(0.036)	(0.032)	(0.032)	(0.032)
FSME		-0.040***	-0.042***	-0.038***	-0.041***	-0.041***
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
SEN		0.047***	0.049***	0.046***	0.033***	0.032***
		(0.004)	(0.004)	(0.004)	(0.006)	(0.005)
Age = 7		-0.026***	-0.016*	-0.015*	-0.015*	0.060***
(transition yrs 3 - 4)		(0.010)	(0.010)	(0.009)	(0.009)	(0.020)
Age = 8		0.002	0.011	0.011	0.011	0.042**
(transition yrs 4 - 5)		(0.010)	(0.010)	(0.009)	(0.009)	(0.021)
Age = 9		0.002	0.012	0.009	0.008	0.111***
(transition yrs 5 - 6)		(0.012)	(0.012)	(0.011)	(0.011)	(0.023)
KS1 Average					-0.002***	0.001
Points Score (APS)					(0.001)	(0.001)
Age = 7 x KS1 APS						-0.005***
						(0.001)
Age = 8 x KS1 APS						-0.002
						(0.001)
Age = 9 x KS1 APS						-0.007***
						(0.002)
GOR dummies	No	No	Yes	No	No	No
LEA dummies	No	No	No	Yes	Yes	Yes
Number of obs.	80,715	80,715	80,343	80,713	80,173	80,173

Notes: The dependent variable is a dummy indicator taking the value of 1 if a pupil moves school only and 0 if a pupil moves school and home between years *t-1* and *t*. All explanatory variables listed in the Table refer to the pre-move year (*t-1*), except for KS1 APS, which refers to 2002, the year in which this cohort sat for their KS1 exams. The sample number of pupils moving once is 80,715, of which 33,725 (41.78%) make pure school moves and 46,990 (58.22%) make school-home moves over the KS1-2 phase. For all ethnicity groups, 'White British Isles' is the reference category (for a description of ethnic types included in each group see the notes to Table 1.9. Chapter One). For the timing of the move, age = 6 (transition years 2-3) is the reference category. Nine regional dummies are included for GORs as follows: North East, North West, Yorkshire & the Humber, East Midlands, West Midlands, East of England, London, South East, and South West. For all regions, the GOR reference category is London. GOR data is obtained from the Edubase dataset, which is linked in to the KS1-2 cohort data at the school level. LEA dummies are included for 149 LEAs. FSME stands for Free School Meal Eligibility; SEN stands for Special Educational Needs. Robust standard errors (shown in parentheses) are clustered at the time *t-1* school level. *** = statistically significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

Column (2) introduces pupil characteristics that can change over time into the regression equation, as well as age dummies that account for the timing of the move. The addition of these factors affects the magnitude, though neither the sign nor the statistical significance, of the estimated coefficient on gender. Boys are still more likely to undertake isolated school change (as opposed to school-home moves) than girls, but the sample parameter is now 0.013, a drop of 0.7 percentage points relative to the estimate in column (1).

Importantly, the results of column (2) show that Free School Meal Eligibility (FSME) and SEN status are both strong predictors of pure school change, with their effects on the move outcome working in opposing directions. FSME is a proxy indicator for family poverty and the negative coefficient on this variable suggests that pupils from worse-off economic backgrounds are *less likely* to move school only, or conversely, they are more likely to engage in combined school and home transfers relative to non-FSME students[56]. Pupils with SEN, on the other hand, are *more likely* to change only their school than are those without SEN. Both of these findings are statistically significant at the 1 per cent level. Interpreting these results using as a benchmark the sample percentage of pupils moving once who make a pure school move, of 41.78 per cent, they imply that the status of being eligible for FSM *decreases* the probability of a pupil making an isolated school move by 4 percentage points, to 37.78 per cent, an overall drop of 9.57 per cent. Equivalent interpretation for the coefficient on SEN (of 4.7 percentage points) suggests that having SEN status is associated with an 11.25 per cent *rise* in the probability of school only change by a pupil who moves once.

Evidence on the timing of the move is presented relative to the age 6 dummy as the baseline reference age, or equivalently relative to pure institution change during the transition between school years 2 and 3. Only the coefficient on the age 7 dummy carries any statistical value (at the 1 per cent significance level), with β estimated as -2.6 percentage points. This suggests that school only change is most likely early on in the educational track of a pupil (years 2 to 3), after which point combined school and home moves carry more weight during transition years 3 to 4. All other age dummy coefficients have no impact on the dependent variable, indicating that the

[56] Criteria for the receipt of FSM are described in Appendix 1A, Section 1A.G. The validity of this indicator as a proxy measure of family poverty is discussed in Section 2.7.

timing of the move is not a strong predictor in the likelihood of undertaking school only shifts.

The next two columns of Table 2.1 bring into equation (1) location-based controls that have a similar effect on the probability of moving for pupils attending time *t-1* schools in the same area. Column (3) introduces regional dummies in the form of GORs and column (4) replaces these with LEA dummies as more well-defined geographical units of analysis. The results found here tally with those obtained under the specification of column (2) with regards to gender, FSME and SEN status. Noticeable distinctions are in the findings concerning the ethnicity categories and, to a lesser extent, the age 7 dummy. The results from columns (1) and (2) on pupils of Asian or 'other white' ethnicity completely lose their statistical importance under the inclusion of area effects, and are also reversed in the model with LEA dummies. Estimates shown here reveal instead that mobile pupils belonging to black or 'other' ethnic groups who move once are ***more likely*** to change only their school (or, equivalently, less likely to make multi-environment changes) relative to the baseline case of pupils of white British ethnicity. Statistical significance in the coefficient estimates on these variables occurs even at the 1 per cent significance level. Again using as a benchmark the sample percentage of pupils moving once who engage in isolated school moves, of 41.78 per cent, parameter estimates suggest that black (other) ethnicity is associated with a rise in the probability of pure school change of 4.3 percentage points (3.9 percentage points), or 10.29 per cent (9.33 per cent), when GOR dummies are added to the regression and a greater 6.3 percentage points (4.6 percentage points), or 15.08 per cent (11.01 per cent), under the more stringent specification which includes LEA dummies in place of the GOR controls. For pupils of 'unknown' ethnic origin, the principal difference in the results of columns (3) and (4) of the Table in comparison to those in the previous two columns concerns the extent of statistical significance on the estimated coefficient. This increases to the 5 per cent level to suggest that area-based adjustments matter. On the other hand the coefficient on the age 7 dummy drops in statistical relevance (to the 10 per cent level) when location factors are taken into account.

The final two columns of Table 2.1 introduce into regression analysis supplementary details on pupil factors in the form of a control for pre-move attainment, measured through the KS1 Average Points Score (APS) of the pupil, and variables that account for the interaction of the timing of the move with averaged KS1 outcomes. In the discussion following Table 1.9 (Section 1.8) of Chapter One, two points of concern were raised over the validity of this indicator. The 'pre-move' status of KS1 attainment was called into question by the notion of there being unmeasured mobility early on in the sample window and/or before the start of the period under analysis (that is, before 2002, or year 2 of primary schooling). Additionally, and perhaps of greater concern, was the issue that this variable may include unobservable components as well as, or even aside from, prior attainment, so that it cannot be deemed to be measuring only early performance. Specifically, it was suggested that KS1 achievement may be capturing some unobservable family attribute, such as parental interest in schooling, an aspect of household behaviour that might impact on both schooling attainment across all learning stages and the move propensity. The potential for correlation between this indicator and the dependent variable leads to the problem of endogeneity, and hence uncertainty surrounding the use of the KS1 achievement measure in regression estimation. For these reasons, econometric evaluation involving this variable has been modelled last, after the effects of all exogenous pupil factors and area controls on the move outcome have been taken into account[57].

In column (5) prior attainment is added to the regression equation. Despite high statistical significance in this measure, its estimated λ coefficient is marginal, at 0.2 percentage points. The interpretation of this statistic is that a 4-point rise in KS1 performance – approximately a 1 standard deviation increase in the sample mean KS1 APS of pupils moving once, which stands at near 15 points[58] – is associated with a fall in the probability of a pure school move of just 0.8 percentage points. This is equivalent to a 1.91 per cent drop in the sample percentage of one-time school only switchers (of 41.78 per cent). The inclusion of this variable also exerts little change on other explanatory factor coefficient estimates, with those deriving from the model specification of column (4) still pertaining in most cases. Only the size of the parameter on the SEN status variable changes to a noticeable extent, so that a

[57] The SEN status of a pupil is determined by the school, and therefore may also be an endogenous explanatory variable that is correlated with the move outcome. However, it is plausible to suggest that, at young ages, SEN classification reflects learning difficulties that do not relate to the school attended and are instead associated directly with the child's pre-school entry development. In this case SEN status is a (fixed) characteristic of the child that the school diagnoses over time.

[58] Table 1.9 of Chapter One showed that the weighted-average KS1 prior attainment score of one-time pure school movers was 14.58 points, while that of school-home movers was 14.78 points, so that these scores average out to precisely 14.7 points (or, rounded up, to 15 points).

switch from non-SEN to SEN status by a pupil is now associated with a rise in their probability of pure school change of 3.3 percentage points, whereas this was a positive and higher 4.6 percentage points in column (4).

Column (6) includes interaction terms of the age dummies with KS1 attainment. When the KS1 APS of the pupil is zero these terms evaluate to zero, and in this case the age dummies on their own indicate the impact of the timing of the move[59]. At positive values of KS1 averaged outcomes, the move timing effect is captured in the age dummies and the interaction expressions combined for each transition stage. Therefore the interactions account for the changing impact of the move timing at varying dimensions of prior KS1 scores. It is interesting to find that the δ coefficients on all age dummies are positive and statistically significant here, ranging between 4.2 and 11.1 percentage points. Thus relative to the reference group of pupils moving once across school years 2 and 3, one-time movers at all other stages of transition are *more likely* to move school only. However, these move timing estimates are diminishing in rising previous attainment scores for students moving between school years 3-4 or 5-6 in particular. These pupils are instead *less likely* to change only their school than are students with a weaker performance background who also move between year groups 3-4 or 5-6. This is shown by the statistically significant and negative coefficients on the interaction effects between KS1 attainment and the age 7 and age 9 dummies respectively (relative to the positive coefficients on the isolated age 7 and age 9 dummies)[60]. Moreover, pupils with a KS1 APS greater than 12 points and moving between transition years 3 and 4 are *less likely* to make a pure school shift relative to the reference group of pupils moving between school years 2 and 3. This is because the *total effect* of the age 7 dummy is negative at KS1 mean attainment scores higher than 12 points. For movers between school years 5 and 6, KS1 performance above 15.9 points is associated with a higher likelihood of school-home moves relative to the reference transition category[61]. Given that one-time

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[59] To see this, note that in equation (1) when the KS1 APS of the pupil is zero all interaction terms defined by $\sum_{k=6}^{9}\theta_k\left(Age_{k,t-1}\times KS1_{i,t=2002}\right)$ evaluate to zero. Therefore the entire impact of the move timing is captured by the age dummy alone.

[60] The coefficient on the *'age=8 x KS1 APS'* interaction variable shown in Table 2.1 (which represents pupils moving between school years 4 and 5) is also negative, but it is not statistically significant.

[61] For pupils moving between school years 3-4 the *total effect* of the move timing is given by [0.060+(-0.005 x KS1 APS)], where the former figure is the coefficient on the age = 7 dummy and the latter is the coefficient on the interaction of the age = 7 dummy with KS1 APS. Evaluation of the value of KS1 APS at which [0.060+(-0.005 x KS1 APS)] = 0 gives the result of 12 points. Attainment scores

movers have an average attainment of almost 15 points at KS1 (see Table 1.9, Chapter One), it is likely that only for those pupils moving between school years 3 and 4 is the positive relation between the move timing and pure school change mitigated or reversed by high KS1 attainment. This latter suggestion is consistent with the negative and marginally statistically significant coefficient attached to the age 7 dummy shown in column (5), a parameter that indicates the effect of the move timing when all model explanatory variables, including in this specification KS1 APS, are evaluated at their sample mean values. Overall, it is evident that regression estimation which also includes move timing-prior attainment interaction covariates does not have a substantial impact on other model coefficients. In addition, although the λ coefficient on KS1 APS was significant in column (5), this loses any statistical value in the final regression of column (6), and the estimated parameter is small in size in both cases. This suggests that the KS1 prior attainment measure is not a strong predictor of the type of move made.

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higher than this lead to a negative coefficient overall, suggesting that school-home change is more likely among pupils with a KS1 APS above 12 points and moving between transition years 3-4 relative to the reference group of pupils moving between school years 2-3. For students moving between school years 5-6, the total effect of the timing of the move is given by [0.111+(-0.007 x KS1 APS)]. This equals zero when KS1 APS equals 15.9, and is negative at prior attainment values above this, indicating a higher probability of school-home moves.

Table 2.2 shows regression findings from evaluation of the link between mobility and pupil characteristics among those changing school, or moving school and home twice. Equation (1) is again estimated by OLS, using the linear probability model specification:-

Table 2.2: Linear Probability Model Estimates of the Relationship Between Mobility and Pupil Characteristics: Two Moves

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Gender = Male	0.023***	0.016**	0.016**	0.017***	0.017***	0.017***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Ethnicity = Other White	-0.120***	-0.113***	-0.091***	-0.093***	-0.085***	-0.086***
	(0.025)	(0.024)	(0.026)	(0.024)	(0.025)	(0.025)
Asian	0.083**	0.087**	0.087**	0.062***	0.068***	0.068***
	(0.038)	(0.037)	(0.036)	(0.023)	(0.023)	(0.023)
Black	-0.027	-0.021	-0.001	-0.028	-0.020	-0.019
	(0.019)	(0.019)	(0.018)	(0.018)	(0.019)	(0.019)
Other	-0.003	0.005	0.015	0.004	0.006	0.006
	(0.022)	(0.022)	(0.021)	(0.019)	(0.019)	(0.019)
Unknown	0.452***	0.441***	0.440***	0.385***	0.430***	0.430***
	(0.096)	(0.096)	(0.091)	(0.080)	(0.084)	(0.084)
FSME		-0.064***	-0.073***	-0.056***	-0.054***	-0.053***
		(0.011)	(0.012)	(0.009)	(0.008)	(0.008)
SEN		0.047***	0.047***	0.055***	0.062***	0.061***
		(0.009)	(0.009)	(0.007)	(0.009)	(0.009)
Age = 7 (transition yrs 3 - 4)		-0.059**	-0.053*	-0.036*	-0.036*	-0.044
		(0.030)	(0.028)	(0.020)	(0.020)	(0.038)
Age = 8 (transition yrs 4 - 5)		-0.048	-0.041	-0.037**	-0.038**	-0.012
		(0.031)	(0.030)	(0.018)	(0.018)	(0.036)
Age = 9 (transition yrs 5 - 6)		-0.087***	-0.078***	-0.046***	-0.045***	0.023
		(0.025)	(0.023)	(0.016)	(0.016)	(0.038)
KS1 Average Points Score (APS)					0.002	0.003
					(0.001)	(0.002)
Age = 7 x KS1 APS						0.001
						(0.003)
Age = 8 x KS1 APS						-0.002
						(0.003)
Age = 9 x KS1 APS						-0.005*
						(0.003)
GOR dummies	No	No	Yes	No	No	No
LEA dummies	No	No	No	Yes	Yes	Yes
Number of obs.	16,378	16,378	16,348	16,365	16,197	16,197

Notes: The sample number of pupils moving twice and making the same kind of move in each phase is 8,189 (see Chapter One, Tables 1.10 and 1.12). Counting each move phase separately among those moving twice results in a doubling of the total number of moves, to give 16,378 observations, of which 3,568 (21.79%) represent pure school moves and 12,810 (78.21%) represent school-home moves over the KS1-2 phase. Robust standard errors (shown in parentheses) are clustered at the time *t-1* school level. *** = statistically significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level. For further details on the dependent variable and the explanatory variables see the notes to Table 2.1.

Again in each column of the Table equation (1) is built up successively, until estimation reaches the complete model that includes a full set of controls for pupil characteristics, the timing of the move, LEA-specific factors, and KS1 previous attainment plus its interactions with the age dummies. Column (6) of Table 2.2 illustrates the results derived from estimation of this stringent model, which can be compared with those of column (6) in Table 2.1. When multiple movers are assessed the findings show that boys are highly statistically significantly *more likely* to change school only than are girls. The coefficient on the gender dummy, of 1.7 percentage points, is slightly above that obtained from identical model estimation based on pupils moving once, but with the same degree of statistical value.

There are other similarities in the predictive power of pupil attributes in determining the kinds of moves made by one-time and two-time movers, but there are also some noteworthy differences in the sizes of estimated coefficients on certain independent variables. The β parameter on FSME, for example, is negative and statistically significant at the 1 per cent level as it was for pupils moving once, suggesting that these pupils are *less likely* to engage in school only transfers than are non-FSM entitled pupils. But here the coefficient is greater in magnitude, at -5.3 percentage points (compared to -4.1 percentage points previously). The percentage of pupils in the sample who move twice and only in respect of their school is 21.79 per cent. What this suggests is that the attribute of eligibility for FSM is associated with a fall in the probability of school mobility for pupils moving twice of 24.32 per cent, a weightier drop than for one-time movers (9.81 per cent). This is driven by differences in the sample percentages of pure school changers by the move frequency (which, at 41.78 per cent, is higher for pupils moving once).

Perhaps the most dramatic changes in parameter estimates between movers of different rates are on the explanatory variables of SEN status and 'unknown' ethnic background. At 6.1 percentage points, the coefficient on SEN for multiple movers is almost double that for one-time changers (3.2 percentage points) but with the same high level of statistical significance. Thus having SEN status is linked to a *rise* in the probability of pure school change of 27.99 per cent among two-time movers and 7.66 per cent among those moving once. For pupils classified as having 'unknown' ethnicity, the effect of this attribute on the probability of a school only switch is *positive* relative to the reference group of pupils of white British ethnic origin, an outcome that also held for one-time movers. However, here the impact is also far higher: the parameter estimate on the dummy for the 'unknown' ethnic category is 43.0 percentage points among pupils moving twice, compared with 6.9 percentage points for students moving once. Consequently a huge probability gain in the likelihood of a pure school shift (nearing 200 per cent) is associated with the characteristic of 'unknown' ethnic origin among two-time switchers (for those moving once the per cent rise in the probability is 16.52). This statistic additionally carries more significance in the multiple changers regression (at the 5 per cent level) relative to in the case of single moves (where the coefficient estimate is significant at the 10 per cent level).

Two classifications of ethnicity that matter to the determination of multiple move probabilities, but not for one-off moves, are those of 'other white' and 'Asian'. Pupils of the former ethnic origin are *more likely* to make two moves of school-home than are the baseline case of pupils of a white British ethnic background, while Asian pupils are *more likely* to engage in pure school changes relative to pupils of white British ethnicity. Evaluating the coefficient on 'other white' against the benchmark of the sample percentage of two-time school-home movers (78.21 per cent) suggests that having this attribute is linked to an increase in the probability of school-home switches of 8.6 percentage points, or 11 per cent. For pupils of Asian origin the benchmark for comparison is the sample percentage of multiple changers moving only their school, of 21.79 per cent. At 6.8 percentage points, the coefficient on the Asian ethnic category implies that this characteristic is associated with a rise in the likelihood of pure school mobility of 31.21 per cent. Both of the estimated coefficients are statistically significant at the 1 per cent level, indicating their high relevance in predicting move type probabilities for multiple movers.

One further point of distinction to be made between the regression results of column (6) for pupils moving once (Table 2.1) versus those moving twice (Table 2.2) relates to the significance of KS1 previous attainment as an explanatory variable. It was noted in the discussion to Table 2.1 that on its own this indicator is statistically significant, but when interacted with the age dummies KS1 APS loses any statistical value. In general, the coefficient estimate on this pre-move attainment measure was found to be small. In the results of Table 2.2 shown here this variable is not associated with the move outcome even at low levels of significance. Therefore it appears that for this cohort of pupils, early achievement scores on KS1 exams (which are taken in the summer of 2002) are unrelated to move propensities between KS1 and KS2, or equivalently between the years 2002 to 2006. The 'pre-move' status of this explanatory variable and the potential for it to be an endogenous determinant of mobility were two points of concern that were raised in reference to its use in regression estimation. The fact that this variable is not a good predictor of the move outcome, while other observable pupil-level indicators and geographical controls are, suggests that the exclusion of a prior attainment measure from equation (1) may not lead to an omitted variable bias in regression results.

Relative to the inferences drawn from the descriptive study of pupil characteristics and KS1 achievement by the move frequency carried out in Chapter One (Tables 1.9 to 1.12 inclusive), regression analysis undertaken here has revealed similar findings across the board. However, further key results have arisen through the process of formal testing of the mobility-pupil attributes relationship that could not have been gleaned through bivariate evaluation alone. One important advantage of regression estimation is in enabling within-characteristic comparisons to be made. Thus, in terms of the pupil-level attribute of ethnicity, all regressions have involved assessing pure school change among all ethnic categories with respect to the case for pupils of white British ethnicity. For pupils moving once, this detail has indicated a greater probability of school only change among pupils of black, 'other' and unknown ethnic origin relative to pupils from a white British background, information that was not fully clarified in the descriptive context. Among those changing aspects of their environment twice, the descriptive study established that school change was most likely for pupils of an Asian background, and the results presented here have shown that this finding is statistically significant when compared to the situation for pupils of white British ethnicity. Additionally, regression estimation has revealed that pupils in the ethnic group 'other white' are less likely to make multiple school only moves relative to pupils of white British ethnic background, a result that is also highly statistically significant. Again this outcome was only weakly indicated by the descriptive assessment and has become more evident through in-depth regression analysis.

Furthermore, in terms of the pupil characteristic of eligibility for FSM, regression testing has established a measure of the size and statistical significance of the disparity in the likelihood of school only moves for FSME versus non-FSME pupils, taking into account a host of controls that might be responsible for the estimated effect. Although bivartiate analysis indicated differences in moves by FSME status, no conclusions could be drawn about the net impact of FSME on school mobility and therefore the importance of this characteristic to determining move patterns. However, regression results have provided clear evidence that this attribute matters both for pupils moving once and for those changing school only, or school and home twice, even under the most restrictive model specification (see column 6 of Tables 2.1 and 2.2).

Returning to the discussion on probability model estimation, thus far regression analysis has focused on the linear probability model and only the results that this specification delivers have been presented. Equation (1) was also estimated using the logit and the probit model with the same process of sequential model formation as for Tables 2.1 and 2.2. As stated earlier, parameter estimates are in the form of marginal effects in these models, and are evaluated at the sample means of the explanatory variables, as is the case for the linear version. Tables 2A.1 to 2A.4 in Appendix 2A show that regression analysis using these functional forms produced near identical estimates as given here, indicating that the problems associated with the linear model have been accounted for in estimation and this probability model specification fits the sample well[62].

[62] It should be noted that, under logit and probit model estimation, predicted probabilities of a pupil moving school only (y = 1) by the move frequency are derived by the model and are used in the interpretation of marginal effects. In the case of the linear probability model, coefficients are instead evaluated using the actual sample percentages of pupils moving once or at most twice. Logit and probit model predicted probabilities are bounded between zero and one and therefore tend to be lower than actual sample percentages. This means that the impact of incremental change in the explanatory variables tends to be underestimated under the linear probability model relative to the non-linear specifications.

2.4 Regression Results: Mobility and School Choice

Statistical methods are also applied in order to formally test the relationship between mobility and one measure that is suggestive of the operation of a quasi-market in the primary education system, this being pupil movement from an undersubscribed to an over-capacity school. For reasons set out in Section 1.9 of Chapter One, only those pupils making one move of school, or school and home, are assessed here. Estimation of equation (2) first uses the linear probability model and involves step-by-step model development. Table 2.3 below sets out the findings from initial regression analysis:-

Table 2.3: Linear Probability Model Estimates of the Relationship Between Mobility and Entry to Oversubscribed Schools: One Move

Independent Variable	(1)	(2)	(3)	(4)	(5)
Choice dummy=pupil moves to oversubscribed school	0.040*** (0.008)	0.018** (0.008)	0.017** (0.008)	0.017** (0.008)	0.016** (0.007)
Choice dummy x VA school	0.009 (0.014)	0.015 (0.014)	0.016 (0.014)	0.015 (0.014)	0.017 (0.014)
Pupil moves to VA school	0.076*** (0.007)	0.084*** (0.007)	0.084*** (0.007)	0.081*** (0.007)	0.081*** (0.007)
Pupil moves from VA school	0.011 (0.007)	-0.007 (0.007)	-0.007 (0.007)	-0.011 (0.007)	-0.007 (0.008)
% FSME (old school)		0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001** (0.000)
% FSME (new school)		0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Pupil-teacher ratio (old school)		-0.006*** (0.001)	-0.007*** (0.001)	-0.006*** (0.001)	-0.006*** (0.001)
Pupil-teacher ratio (new school)		-0.002** (0.001)	-0.002** (0.001)	-0.001 (0.001)	-0.001 (0.001)
School size (old school)*100		-0.027*** (0.002)	-0.026*** (0.002)	-0.026*** (0.002)	-0.026*** (0.002)
School size (new school)*100		0.013*** (0.002)	0.013*** (0.002)	0.013*** (0.002)	0.010*** (0.002)
% non-white (old school)		-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
% non-white (new school)		0.002*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
Pupil characteristics	No	No	Yes	Yes	Yes
GOR dummies	No	No	No	Yes	No
LEA dummies	No	No	No	No	Yes
Number of observations	72,123	70,707	70,422	70,405	70,421

Notes: The dependent variable is a dummy indicator taking the value of 1 if a pupil moves school only and 0 if a pupil moves school and home between years *t-1* and *t*. The sample number of pupils moving once is 80,715, of which 33,725 (41.78%) make pure school moves and 46,990 (58.22%) make school-home moves over the KS1-2 phase. Pupil characteristics that are controlled for are as listed in Tables 2.1 and 2.2 (column 6 specification). GOR dummies are as listed in Table 2.1; LEA dummies are included for 149 LEAs. FSME stands for Free School Meal Eligibility. All regressions also control for 'other' school types that the pupil comes from and goes to (where 'other' includes Foundation and VC schools), as well as the interaction between coming from an undersubscribed school of any type and entering an oversubscribed school of the 'other' type (coefficient estimates on these additional controls are not reported in this Table). Robust standard errors (shown in parentheses) are clustered at the time *t-1* school level. *** = statistically significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

The first column of the Table estimates a basic specification of equation (2), in which the move outcome is regressed on dummies for the type of school that the pupil came from and that which they entered into, the choice dummy, and the interaction of choice with the post-move school type. It should be emphasised that every regression specification shown in Table 2.3 includes *all* three types of school in any explanatory variable expression where the school type is referred to, as was shown in equation (2). That is, estimation uses the three categories of schools - Community, VA, and 'other' (which includes Foundation and VC schools) - throughout. However, for the purpose of simplification, only the coefficients on $Type_{s,t-1}$, $Type_{s,t}$, and ($Choice_{i,t}$ x $Type_{s,t}$) pertaining to VA schools in particular are reported in Table 2.3 (and not those for schools in the 'other' group), while Community schools form the reference category against which VA (and 'other') school types are compared.

It is worthwhile to point out at this stage the dual interpretation of the choice dummy. Thus far this has been defined as being equal to 1 when a pupil moves from an undersubscribed to an oversubscribed school, and 0 for moves between schools of any other capacity level combinations. However, since regression estimation includes 'choice x school type' interaction terms evaluated for each school type relative to the reference group of Community schools, this choice indicator can be considered as the residual interaction term, which is precisely the reference group's interaction effect (i.e. that for Community schools). Therefore choice equals 1 when a pupil engages in school change from a below-capacity school of any type to an oversubscribed Community school and 0 when a pupil makes any other capacity level combinations of moves into a Community school. This means that the choice variable acts as a measure of the extent of mobility into LEA-governed Community schools that might reflect choice exploitation.

In column (1) the coefficient on the choice variable is estimated as being positive and highly statistically significant, suggesting that this regressor is an important predictor of pure school change. Pupils moving from under-capacity schools of any type to over-capacity Community schools are 4 percentage points *more likely* than those entering Community schools by any other means to change school only. While the KS1-2 cohort sample percentage of pupils moving once who are school only movers is 41.78 per cent, this parameter implies that movement from an institution with spare pupil places to a capacity-constrained Community school is associated with a rise in the probability of isolated school change to 45.78 per cent, equivalent to an increase of 9.57 per cent. Thus this finding provides a preliminary indication that a quasi-market might be at work in Community schools during the primary school years.

Pupil movement into a school of the VA type is the only other explanatory factor to carry statistical power in column (1) of the Table. The parameter on $Type_{s,t}$ for pupils joining VA schools is a positive 7.6 percentage points and is significant at the 1 per cent level. What this implies is that if a pupil enters a VA school then they are *more likely* to do so by changing only their school relative to the reference group of pupils being admitted into Community schools. This indicates that entry into VA schools is less likely to depend on relative school and home geographical closeness as on other factors that reflect the admissions policy of these schools.

A further point to raise in relation to the regression output of column (1) is that the coefficient on the interaction term between choice and movement into a VA school is positive – pupils moving from an undersubscribed school to a VA school that is filled to capacity are 0.9 percentage points more likely to make that move by changing only their school relative to pupils transferring from below capacity institutions to over-capacity Community schools (the reference group). However, it is interesting to note that no degree of statistical significance is attached to the sample parameter on this interaction variable. This is an important result, as it indicates that pupils coming from undersubscribed schools and entering into Voluntary-aided schools are statistically *just as likely* as those joining Community schools to do so by moving school only, when the entrant school is oversubscribed. This might be construed as evidence of the effective operation of school choice policies across both school types. Otherwise, it may indicate the use of proximity in location between the school and the home as a criterion for ranking pupil entry into oversubscribed VA schools, as it is for admissions into above-capacity Community schools.

The next four columns of Table 2.3 develop model (2) further by additionally controlling for school-level features (column 2), pupil-level characteristics (column 3), and area effects in the form of regional factors (column 4) or LEA dummies (column 5). It is evident from inspection of the findings across all of these steps of model development that results are similar at each stage and here only the estimates pertaining to the final stringent model specification will be discussed. Relative to outcomes from regression analysis undertaken in the first column, in which strong and positive explanatory power was found on entry into VA schools and the choice dummy, coefficient estimates in column (5) are marginally higher on the former variable, but both lower in magnitude and statistically weaker in terms of the latter. The parameter on the choice indicator falls to 1.6 percentage points when the model with full controls is estimated. The implication of this is that for a pupil coming from an undersubscribed school of any type and joining an oversubscribed Community school, the probability that they do so by changing just their school is only 3.83 per cent higher relative to the reference category. The statistical power of this variable falls from 1 per cent significance in column (1) to 5 per cent significance in the last specification. Thus any potential school choice effect in operation in state Community schools that this indicator may be capturing has been reduced by the more rigorous model set-up.

Changes in the coefficients on both entry into VA schools and the choice dummy are driven purely by the inclusion of school contextual effects in the model, rather than through the addition of variables relating to pupil-level attributes and area-based factors. It is unsurprising that the coefficient on the choice dummy in particular drops following the inclusion of school characteristics in the model. Contextual factors such as the size of the school that the pupil enters into will influence the amount of pure school change from under-capacity institutions to above-capacity Community schools that can occur, which is precisely the move pattern that the 'choice' variable captures. The main advantage of explicitly modelling these observable school-level attributes in the regression equation is that their explanatory power is netted out of the estimation process, thereby enabling analysis to more clearly evaluate if institutional arrangements in the form of oversubscription criteria employed by popular Community schools – like the catchment area occupancy rule – might be affecting choice-related school change. Table 2.3 reveals a high degree of statistical value attached to certain school-level controls. In terms of the pupil-teacher ratio, only that applying in the school the pupil came from impacts on the move outcome. Column (5) shows that a unit increase in the pupil-teacher ratio in the period $t-1$ pre-move school *decreases* the probability of a pure school move for pupil i by 0.6 percentage points. Both the size of the school the pupil leaves and that which they enter into are relevant independent variables. Results show that there is a negative effect on the dependent outcome of raising the size of the former school, while in terms of the school the pupil enters into, a rise in pupil numbers has a positive effect on pure school mobility. The coefficient on the old (time *t-1*) school size is -2.6 percentage points while that on the new (time *t*) school size is exactly 1 percentage point, and both of these estimates are statistically significant at the 1 per cent level. Interpreting these parameters at the sample percentage of one-time movers who make pure school changes, of 41.78 per cent, they imply a *fall* in the probability of school change for a pupil coming from a school increasing in size by 100 pupils of 6.22 per cent and a *rise* in the chance of a pure school move for a pupil joining a school raising its size by 100 students of 2.39 per cent.

Turning now to school-level ethnicity, and specifically the percentage of pupils in the leaving and joining school of non-white ethnic origin, again there are opposing impacts of this indicator on the move outcome by the move period. Coefficient estimates suggest that a 1 percentage point rise in the number of non-white pupils in the school the student leaves is associated with a *fall* in the probability of school only change of 0.1 percentage points. Conversely, increasing the percentage of non-white pupils in the joining school by 1 percentage point *raises* the probability of school only change for a pupil by 0.3 percentage points. These effects are slight, but of high statistical importance. Finally, the coefficient on the percentage of pupils with FSME in the school the pupil came from only gains statistical value in the final specification of the Table, and suggests that a 1 percentage point rise in the number of pupils eligible for FSM in the pre-move school *increases* the probability of a pure school move for pupil *i* by 0.1 percentage points above the sample percentage for pupils moving once, to 41.79 per cent, a small change of 0.24 per cent.

In general the impact of school contextual effects on the move outcome follows an expected pattern. It appears that signs of disadvantage in the pre-move school, in the form of low teaching resources and pressure on school provisions, decrease the probability that a pupil leaves that school by making a pure school shift. This is evidenced by the negative coefficients on the pupil-teacher ratio and the school size in reference to the old school. Meanwhile, an increase in the percentage of non-white pupils in the school the pupil goes to seems to attract more school only changers. These results might be anticipated, since previous analysis has shown that school-home moves are higher among pupils with difficult economic circumstances, who likely attend weaker institutions, while ethnic minority pupils frequently have good academic performance, suggesting that the schools they attend could attract students interested in exploiting the pure school mobility opportunities potentially provided by choice policies[63]. On the other hand, the finding that raised FSM eligibility in the pre-move school is also linked to a higher pure school move probability appears to contradict the established result of multi-environment changes being linked to family economic disadvantage. However, this outcome is a fully consistent one if consideration is made for the possibility that it is the pupils from better-off backgrounds within the school who are engaging in pure school shifts to other institutions, and are doing so to a greater extent if there are many FSM-entitled students in the school of origin. One further point of note is the finding that school capacity increases in the school the pupil joins are associated with pupil entry that involves a school only change. This evidence seems to support the notion that greater supply-side flexibilities in a school, in terms of pupil capacity expansion, might make a difference to the operation of school choice policies (Sibieta, *et al.*, 2008).

Descriptive analysis on the relationship between mobility and a measure of school choice, defined as entry into oversubscribed schools by pupils coming from under-capacity institutions, was presented in Section 1.9 and Table 1.13 of Chapter One. Looking back at the findings made there and those derived from formal regression estimation here, clear parallels can be drawn across all results, while the statistical approach has also introduced additional detail on the mobility-choice relationship. In the first instance, a firm finding is that mobility into VA schools is much more likely to be associated with an isolated school move by the pupil. Descriptive work considered entry into oversubscribed VA schools by the mover type, for pupils coming from a school of any capacity level (see columns (3) and (5) of Table 1.13), while regression estimation has involved assessing the comparable though broader association between school change and general entry into a VA school (defined by $Type_{s,t}$). The persistent and increasing size of the coefficient on $Type_{s,t}$ for VA school joiners achieved in every regression specification shown in Table 2.3 indicates the strength of the association between moves into VA schools and pure pupil mobility.

[63] A report by the formerly-named Department for Education and Skills (DfES, 2006) has shown that pupils of Indian, Chinese and Asian ethnic origin (in addition to those of white and Irish ethnicity) perform better than other ethnic groups across every Key Stage.

A suggestion that was made in Chapter One following similar derivation of this effect was that VA schools use rules other than school-home proximity, such as a declaration of religious affiliation, when deciding on their admissions in general and possibly also when they are oversubscribed. Statistical evaluation has further reinforced this line of thought.

Another key result that is evident throughout is the link between school only change and school choice, where findings have consistently shown that transfers from under- to oversubscribed schools of both the Community and the VA type are more likely to feature pure school change than school and home moves. However, regression testing has allowed for a comparison between all school types to be made[64], and this has indicated that the apparent greater likelihood of pure school moves from under-to over-capacity schools among VA school entrants relative to Community school joiners that was noted in the descriptive work does not have any statistical weight. Regression evaluation has also been able to take account of observable school contextual effects. These have been shown to be important to the estimation of the relationship between pure school change and moves from under-capacity schools of any type to filled-to-capacity Community schools, which is reduced by their inclusion. Overall it is clear that a greater depth of analysis is possible in a regression framework relative to that which can be achieved through descriptive examination.

The exercise of repeating regression estimation of equation (2) using both the logit and the probit model specifications resulted in an almost identical set of findings being established as are shown in Table 2.3. Hence reporting of regression output relating to these models is included in Appendix 2A (see Tables 2A.5 and 2A.6). The linear probability model has again been shown to be an appropriate model to use for the purposes of evaluation undertaken here.

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[64] The 'other' school types of Foundation and VC schools are included in regression testing, though, as stated at the beginning of this Section, results pertaining to this category of schools are not reported in this Chapter.

2.5 Assessing the Association between School Choice, Mobility and Pupil Characteristics

The findings presented in Sections 2.3 and 2.4 of this Chapter suggest a further question to be posed at this stage, as an interesting slant on the enquiry into move patterns established so far. The issue of the relationship between choice-related school change, the form of move made, and pupil attributes is one that acts to combine and re-assess previous investigations from an alternative view-point, and serves to offer evidence on whether pupils with certain attributes are benefitting from choice policies more than others. A change to the focus of regression estimation takes place in this case, with the choice dummy becoming the dependent variable, as indicated in the specification set out below.

2.5.1 Modelling the relationship between school choice, mobility and pupil characteristics

An equation to describe the relationship between choice-related school change, mobility, and pupil-level attributes can be expressed as follows:-

$$Choice_{iksj,t} = \alpha + \psi Move1_{iksj,t} + \beta X_{i,t-1} + \overbrace{\sum_{k=6}^{9} \delta_k Age_{k,t-1} + \lambda KS1_{i,t=2002}}^{\Pi}$$

$$\overbrace{+ \sum_{k=6}^{9} \theta_k \left(Age_{k,t-1} \times KS1_{i,t=2002}\right) + \sum_{s=1}^{3} \xi_s Type_{s,t-1} + \sum_{s=1}^{3} \zeta_s Type_{s,t}}^{\Pi}$$

$$+ \varphi\left(\Pi \times Move1_{iksj,t}\right) + \gamma_1 Z_{s,t-1} + \gamma_2 Z_{s,t} + \sum_{j=1}^{149} \omega_j LEA_{j,t-1} + \varepsilon_{iksj,t-1}$$

(3)

Here the dependent variable $Choice_{iksj,t}$ measures the probability that pupil i of age k, in school s and LEA j makes a choice-type move between periods $t-1$ and t. This regressand equals 1 when a pupil moves from an undersubscribed institution to an above-capacity school between the pre-and-post move periods of t-1 and t, and equals 0 when a pupil moves between schools of any other capacity-level combinations over these time periods. As can be seen from inspection of this equation relative to those presented previously in this Chapter, the choice dummy is regressed on components of the mobility-pupil attributes equation (1) and the school change-school choice equation (2), modelled and described in Sections 2.2.1 and 2.2.2 respectively. Specifically, equation (3) includes all explanatory variables featuring in equation (1), plus indicators for the three different types of school that the pupil can come from or go to (Community, VA, and 'other'), and controls for the characteristics of the pre-move and new school, all of which are contained in equation (2). The further dimension added here is a set of interaction terms between each pupil characteristic, each type of school the pupil comes from and enters into, and the form of move made. The latter variable is denoted by $Move1_{iksj,t}$, which equates to 1 if pupil i of age k and attending school s within LEA j enters the time t school by changing only their school and equals 0 if the pupil accessed the school by making a combined school-home move between times t-1 and t. All interaction expressions are captured in the term 'Π x $Move1_{iksj,t}$' and their associated vector of coefficients is given by φ. The purpose of these interaction terms is to allow the impact of pupil characteristics and the pre/post-move school type on the choice dummy to vary according to the form of move made. As was the case for previous regression analyses, sequential model building takes place in the estimation process, and variable inclusion follows the order denoted in equation (3). Estimation includes a set of LEA dummies in each regression specification, to control for area-specific effects that are common to all pupils attending the same pre-move school within LEA j. In general equation (3) indicates the relationship between choice-related school change, mobility and pupil-level attributes when the potential influence of other explanatory variables, such as school-level characteristics and area factors, have been taken into account. Thus estimation aims to determine whether pupils with particular characteristics and move patterns are more likely to engage in school choice and enter into popular, well-performing institutions.

2.5.2 Regression results: School choice, mobility and pupil characteristics

Findings from regression evaluation of equation (3) are presented in Table 2.4 below, where OLS analysis uses the linear probability model specification. On the basis of the discussion presented in Section 1.9 (Chapter One), only those pupils moving once are considered here. Column (1) models the impact of the form of move made and all pupil-level attributes on the choice dummy. The second column adds to this control variables for the type of school the pupil leaves and enters into, which leads to very slight changes in coefficient estimates. Examination of the results presented in column (2) reveals that the ψ parameter on $Move1_{iksj,t}$ is positive and statistically significant at the 1 per cent level, implying that pupils who make pure school shifts are 3.3 percentage points more likely to move from an under-to-oversubscribed school than are those students who change both their school and home. In terms of ethnicity classifications, there are clear signs of a higher likelihood of choice-type moves among pupils of non-white ethnicity in particular. For example, relative to the baseline category of pupils of white British ethnicity, pupils of black ethnic origin are 4.7 percentage points more likely to move from a below to an above-capacity school.

Interestingly, findings shown in column (2) suggest that there is no association between the proxy measure of family poverty and choice-related school change. The coefficient on FSME is small in magnitude and has no statistical power, such that pupils who are entitled to free school meals are just as likely as non-FSME students to move from an under-capacity to an oversubscribed school. Meanwhile, pupils with SEN are statistically significantly less likely to make 'choice' moves than are their non-SEN counterparts: the coefficient on SEN status is negative, at -1.0 percentage points. Evaluating this result using as a benchmark the sample percentage of pupils moving once and from an undersubscribed to a filled-to-capacity school, of 19.16 per cent, the implication is that having SEN status is linked to a 5.22 per cent drop in the probability of a choice-type school transfer[65]. The last four rows of column (2) show parameter estimates and standard errors pertaining to controls for the school type. Only pupil entry into a VA school carries a positive and statistically relevant (at the 1

[65] The sample number of pupils moving once is 80,715. Among these, 15,464 pupils (19.16%) make a choice-type move transfer from a below capacity to an above capacity school, with 9,038 (58.45%) doing so by moving school only and 6,426 (41.55%) doing so by moving school and home.

per cent level) association with the choice dummy. Students joining VA schools are 2.6 percentage points more likely to move from an undersubscribed school of any type to a school that is oversubscribed than are pupils joining Community schools.

Table 2.4: Linear Probability Model Estimates of the Relationship Between Entry to Oversubscribed Schools and Pupil Characteristics: One Move

Independent Variable	(1)	(2)	(3)	(4)
Pupil moves school only (Move1 = 1)	0.034***	0.033***	0.076***	0.079***
	(0.004)	(0.004)	(0.029)	(0.029)
Gender = Male	0.001	0.001	0.004	0.004
	(0.003)	(0.003)	(0.004)	(0.004)
Ethnicity = Other White	0.027**	0.025*	0.032*	0.009
	(0.013)	(0.013)	(0.017)	(0.016)
Asian	0.032***	0.032***	0.039***	0.008
	(0.010)	(0.010)	(0.011)	(0.010)
Black	0.048***	0.047***	0.039***	0.014
	(0.011)	(0.011)	(0.012)	(0.012)
Other	0.036***	0.035***	0.024**	0.012
	(0.010)	(0.010)	(0.011)	(0.011)
Unknown	-0.005	-0.004	0.006	-0.002
	(0.022)	(0.022)	(0.026)	(0.025)
FSME	0.001	0.001	0.002	-0.003
	(0.004)	(0.004)	(0.005)	(0.005)
SEN	-0.010**	-0.010**	-0.003	-0.002
	(0.004)	(0.004)	(0.005)	(0.005)
Pupil moves to VA school		0.026***	0.022***	0.046***
		(0.006)	(0.006)	(0.006)
Pupil moves from VA school		-0.009	-0.001	-0.009
		(0.007)	(0.007)	(0.008)
Gender = Male x Move1			-0.006	-0.005
			(0.007)	(0.006)
Ethnicity = Other White x Move1			-0.022	-0.011
			(0.027)	(0.027)
Asian x Move1			-0.023	-0.016
			(0.016)	(0.016)
Black x Move1			0.019	0.016
			(0.019)	(0.019)
Other x Move1			0.027	0.021
			(0.019)	(0.019)
Unknown x Move1			-0.023	-0.044
			(0.043)	(0.043)
FSME x Move1			-0.002	0.003
			(0.008)	(0.008)
SEN x Move1			-0.020**	-0.016*
			(0.009)	(0.009)
Pupil moves to VA school x Move1			0.007	0.003
			(0.010)	(0.010)
Pupil moves from VA school x Move1			-0.021*	-0.017
			(0.011)	(0.011)
School-level characteristics	No	No	No	Yes
Number of observations	71,836	71,833	71,833	70,421

Notes: The dependent variable is a dummy indicator that equals 1 if a pupil moves from an undersubscribed to an oversubscribed school – that is, a *choice*-related move – and 0 if a pupil moves between schools of any other capacity-level combinations over time periods *t-1* and *t*. Additional pupil characteristics that are controlled for include (i) age dummies; (ii) KS1 APS; (iii) the interaction of age dummies and KS1 APS; and (iv) all of (i) to (iii) interacted with *Move*1 (see Table 2.1 and associated notes). All regressions also control for 'other' school types that the pupil comes from and goes to ('other' includes Foundation and VC schools) and their interactions with *Move*1. Column 4 includes controls for school-level characteristics of the pre-and-post move school attended by the pupil, as listed in Table 2.3. All model specifications include 149 LEA-level dummies to account for area-based effects (coefficient estimates on all of these additional regressors are not reported in this Table). Robust standard errors (shown in parentheses) are clustered at the time *t-1* school level. *** = statistically significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

Column (3) of Table 2.4 includes interaction terms between each pupil characteristic, the type of school the pupil comes from and goes to, and the form of move made. With these expressions added, the ψ coefficient on *Move*1 captures the effect of pure pupil mobility for the omitted category, determined by all remaining interactions (such as non-FSME x Move1 *and* non-SEN x Move1 *and* Female x Move1 *and* pupil entry into a Community school x Move1, etc.). This increases by 4.3 percentage points from the column (2) estimate, to 7.6 percentage points. Moreover, in this specification, parameter estimates on pupil attributes (denoted by the vector β in equation (3)) and on the pre-and-post move school type (symbolised by vectors ξ_s and ζ_s respectively in model (3)) measure the association between these variables and the choice dummy when the pupil shifts both school and home between periods *t-1* and *t* (that is, when *Move*1 equals 0). Then the interaction terms themselves indicate the *additional effect* of pupil characteristics and the school type on choice-related school change when the pupil makes a pure school move. As the findings of column (3) show, the magnitudes of coefficient estimates on pupil attributes and the type of school the pupil comes from and goes to (and their degree of statistical significance) remain relatively stable when interaction terms are incorporated in regression analysis. Only in the case of the pupil characteristic of SEN status does the β estimate drop in value to the extent that statistical relevance is no longer applicable (while the standard error is almost invariant across the regressions of columns 2 and 3). Instead, the parameter on the interaction between SEN status and *Move*1 is negative and statistically significant at the 5 per cent level. These findings imply that SEN pupils who move school and home are just 0.3 percentage points less likely to change from an under-capacity to an above-capacity school than are non-SEN school-home changers. Meanwhile, pupils with SEN status who move school only are, in total, 2.3 percentage points less likely to make a 'choice' move than are non-SEN pure school switchers. Thus these results show how the form of move made matters for choice-related school change among pupils in the SEN status group.

It is noteworthy to discuss the findings concerning pupil entry to a VA school, and the interaction of this variable with *Move*1. At 2.2 percentage points, the sample parameter on the former regressor remains positive and is only moderately altered following model expansion, while that on the latter interaction expression, although smaller in size, is also positive at 0.7 percentage points (column 3). What these estimates suggest is that, whether they move both school and home or school only, pupils entering VA schools are more likely to make choice-type school moves than are pupils joining Community schools. Thus this evidence reinforces the notion that VA schools place emphasis on the satisfaction of criteria other than school-home proximity (such as religious ethos) when they are above-capacity.

In the final column of the Table, the full regression specification outlined in equation (3) is estimated, featuring controls for both the characteristics of the school the pupil attended previously and that which they subsequently joined (sample parameters on these variables are not reported in Table 2.4). Among these additional regressors are the percentages of non-white pupils in the pre-move school and in the new school. Following the inclusion of these indicators, it can be seen that there is a fall in the magnitude (and a loss in the statistical significance) of each β coefficient attached to the pupil-level ethnic categories of Asian, black and 'other'. The likely cause of this change is a high amount of positive correlation between these pupil-level variables and the school-level ethnicity measures. Further results of interest concern the ζ_s coefficient on pupil entry into a VA school, which more than doubles in size under the model with a full set of controls, to 4.6 percentage points, while the coefficient derived on the interaction of $Move1$ and entry to a VA school shrinks but remains positive, at 0.3 percentage points. Again, these findings points towards differences in institutional arrangements employed by VA schools as compared to Community schools in the event of oversubscription, in which entry priority based on the school-home link can be reinstated in Community schools but in VA schools non-locational factors seem to matter more. Overall, it is evident that when a more detailed regression model is estimated, only the coefficients on pure school change ($Move1_{iksj,t}$ equals 1) and pupil movement into a VA school retain strong sizes and statistical significance, while there are no clear associations between the set of pupil characteristics and transfers from below-capacity to oversubscribed schools[66].

[66] Equation (3) was re-estimated using both the logit and the probit model, in a pattern of sequential model building shown by Table 2.4. Results were similar across the various functional forms, suggesting that the linear probability model is an appropriate one to use for estimation of equation (3). For the purpose of succinctness, estimates pertaining to the logit and probit model regressions are excluded from Appendix 2A.

2.6 Breaking down the Relationship between Mobility and School Choice by Region and FSME Status

Exploration of variations in the estimated link between mobility and school choice along the lines of region and pupil-level FSM eligibility forms the focus of analytical work presented here. Regional differences in the probability of pure school change among pupils moving once are examined by dividing the sample up between London and other areas. Likewise the characteristic of FSME status is used to split the sample of one-time movers into two categories of pupils that differ according to their entitlement to FSM, so that isolated school change probabilities by the two groups can be compared.

The first angle of evaluation aims to establish more information on whether pure school change is motivated by school choice. Analysis that divides the sample between London and other regions within England might offer more detail on the operation of choice for several reasons. In the first place there are features unique to large cities such as London which might suggest that estimated school only moves in this region reflect factors other than a school choice system. As a densely populated space it is likely that education provisions are more abundant in London than in other parts. Additionally, geographical classifications such as postcodes cover more units in London. Thus there is a greater chance of the home location of a pupil being within the catchment area of more than one state primary school in London relative to elsewhere[67]. In this case the oversubscription criteria of school and home geographical proximity that is employed by LEA-governed Community schools may be satisfied several times over from the current place of residence. Then pure school moves into popular schools in this area may simply reflect the lack of need to move home in order to gain access to such schools rather than any indication of choice. Moreover, transport systems in conurbations like London are more readily available, making daily travel to schools that are further away from the home more accessible to parents of primary age children. All of these points suggest that it is necessary to separate out estimates of school mobility between undersubscribed schools of any type and oversubscribed Community schools for pupils in London relative to students in other regions. This is because if pure school change between schools of these capacity levels is evident in London but not in other regions then this suggests

[67] This notion of overlapping catchment areas was discussed in Section 1.9 of Chapter One.

that the estimates shown in Table 2.3 are only picking up the effect of London. If this is the case, then previous estimates provide little evidence of school moves motivated by choice. On the other hand, if moves of this kind are also taking place in other regions, this gives more assurance that prior estimates are indicative of choice polices in operation. Thus this regional breakdown aims to capture the extent to which the findings of Table 2.3 on the association between mobility and the school type, as well as school change motivated by school choice considerations, can be largely attributed to unique area effects.

Assessment of the mobility-school choice relationship for FSME versus non-FSME pupils is the second line of enquiry that is taken as a result of the importance of this indicator in determining the move outcome. It was shown in Tables 2.1 and 2.2 that the attribute of pupil eligibility for FSM is negatively associated with pure school change for students moving once or twice. Consideration of whether this result arises when school-level capacity constraints in the new school are accounted for serves to provide information on the persistence of any limiting effect of FSME on schooling behaviour, including that relating to school choice exploitation.

Table 2.5 presents regression results from the regional divide of the sample, as well as the split by FSME status. In all cases equation (2) is estimated using a linear probability model with a full set of controls, as per column (5) of Table 2.3, while, for simplicity, only the coefficient estimates pertaining to the $Type_{s,t-1}$, $Type_{s,t}$, $Choice_{i,t}$ and $Choice_{i,t}$ x $Type_{s,t}$ variables are reported. Columns (1) and (2) of the Table show regression output for London and other regions (where the latter are defined in the notes to the Table). Focusing on the findings for London, estimation indicates a highly significant and positive coefficient on the choice dummy of 4.9 percentage points. This suggests that in the London region pupils moving once from an undersubscribed school of any type to an above-capacity Community school are *more likely* to do so by making a pure school move than are pupils in this area who enter Community schools via any other capacity level combinations. So the probability that a pupil in London makes an isolated school change to gain entry into a popular Community school is 11.73 per cent higher relative to the sample percentage of pupils moving once who change only their school (of 41.78 per cent), at 46.68 per cent. However, it is evident that this situation is not repeated outside of London. Column (2) shows that the choice dummy carries no statistical value for other regions (t-statistic = 1.25), such that there is a *similar likelihood* of pure school change into Community schools for pupils in these areas, whatever the capacity levels are in the schools they move from and enter into. The implication of this finding is that the statistically strong positive coefficient on the choice indicator that was estimated in column (5) of Table 2.3 largely captures the effect of the London region only. Thus, it appears that there is limited evidence of the potential existence of a quasi-market for schooling. This is true to the extent that London features overlapping catchment areas and good transport links that make home moves an unnecessary component of entry into oversubscribed schools.

Other important regional variation that is highlighted by columns (1) and (2) is the *greater* probability that entry into VA schools (as opposed to the reference group of Community schools) involves an isolated school shift for pupils in London compared to elsewhere. The coefficient on the $Type_{s,t}$ dummy stands at 14.1 percentage points for London relative to 6.9 percentage points for other regions. The fact that this coefficient has equally high statistical power across all areas reinforces the stated notion that admissions to VA schools focus on the satisfaction of criteria concerning issues such as religious commitment above geographical factors, making entry by pure school change more possible.

Table 2.5: Mobility and Entry to Oversubscribed Schools: Examining Variations by Region and Pupil FSME Status

Independent Variable	London (1)	Other regions (2)	FSME (3)	Non-FSME (4)	FSME: London (5)	Non-FSME: London (6)	FSME: Other regions (7)	Non-FSME: Other regions (8)
Choice dummy=pupil moves to oversub. school	0.049***	0.010	0.017	0.016*	0.056**	0.044**	0.007	0.012
	(0.014)	(0.008)	(0.011)	(0.009)	(0.022)	(0.018)	(0.013)	(0.010)
Choice dummy x VA school	0.033	0.013	0.043*	0.008	0.053	0.019	0.037	0.006
	(0.029)	(0.015)	(0.026)	(0.015)	(0.051)	(0.036)	(0.029)	(0.017)
Pupil moves to VA school	0.141***	0.069***	0.102***	0.074***	0.176***	0.123***	0.081***	0.065***
	(0.016)	(0.008)	(0.014)	(0.008)	(0.029)	(0.018)	(0.016)	(0.009)
Pupil moves from VA school	-0.008	-0.004	-0.023*	-0.001	-0.011	-0.005	-0.020	0.001
	(0.017)	(0.008)	(0.013)	(0.008)	(0.032)	(0.018)	(0.014)	(0.009)
Number of observations	11,342	59,063	18,671	51,750	3,820	7,522	14,845	44,218

Notes: See the notes to Table 2.3. All regressions include a full set of controls as specified in column 5, Table 2.3. 'Other regions' includes eight GORs as follows: North East, North West, Yorkshire & the Humber, East Midlands, West Midlands, East of England, South East and South West. Robust standard errors (shown in parentheses) are clustered at the time *t-1* school level. *** = statistically significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level.

In terms of FSME status, regression analysis suggests that pupils who are entitled to free school meals are *just as likely* to transfer from below-capacity schools of any type to above-capacity Community schools by making an independent school change as are non-FSME students (see columns 3 and 4). While the parameter estimate on the choice variable for FSME pupils is not statistically relevant, that for non-FSME pupils is marginally statistically significantly different from zero (at the 10 per cent level of significance), a finding which would initially imply that the latter group make more choice-type school change. However, the coefficient on the choice dummy for pupils from worse-off backgrounds is slightly above the estimate pertaining to non-FSME students, at 1.7 percentage points compared with 1.6 percentage points respectively. Then in overall terms parameter estimation indicates similarity in the likelihood of choice-related school moves among pupils from better-off backgrounds and those from poorer families.

Interestingly, there are signs that FSM-eligible pupils are *more* successful at gaining entry into VA schools relative to Community schools by moving school only, and this effect is larger for this group than for non-FSME pupils. This is indicated by the positive coefficient on entry into VA schools of 10.2 percentage points (column 3), which compares with a coefficient estimate of 7.4 percentage points for non-FSME students (column 4). Interpreted at the sample percentage of pupils moving once who change only their school, of 41.78 per cent, the probability that a pupil who is FSME joins a VA school by making a single school move is 24.41 per cent higher. Comparatively, for non-FSM eligible pupils the probability is 17.71 per cent higher. Further evidence of VA school admissions by FSME pupils through isolated school change is shown by the parameter estimate on the interaction term between the choice dummy and the VA school type. At 4.3 percentage points, this is marginally statistically significant and higher than the coefficient estimate on this variable for non-FSME pupils (0.8 percentage points). This means that if two FSME pupils move from an undersubscribed school of any type and one pupil enters an oversubscribed Community school while the second pupil joins an above-capacity VA school, the second pupil is *more likely* to have made a pure school change only. Overall, the findings from columns (3) and (4) of the

Table *do not* give rise to the notion that FSME pupils are gaining access to plausibly higher quality Community schooling through choice policies.

The final four columns of Table 2.5 assess regional variation in moves by the level of pupil disadvantage. In other words, in this section of the Table the informative content of columns (1) to (4) is combined. The most notable findings derived here relate to the specifications that look at FSME pupils in particular. First of all, comparing across columns (5) and (6) of the Table, it can be seen that pupils in London who are eligible for FSM are *more likely* than non-eligible pupils in this area to move from undersubscribed institutions of any type to over-capacity Community schools just by changing their school. While estimates are statistically significant at the 5 per cent level for both eligible and non-eligible pupils, at 5.6 percentage points the coefficient on the choice dummy indicator is 1.2 percentage points higher for pupils from worse-off backgrounds. The sample percentage of FSME pupils in London who make one pure school change is 36.36 per cent, and that for non-FSME pupils is very similar, at 35.11 per cent. Interpreted at these values, the increase in the likelihood of a choice-type move that is implied by the difference in these coefficient estimates is 22.90 per cent for FSME students relative to those from wealthier families[68]. If any of this measured effect is capturing school choice moves, rather than features such as the home being located in an overlapping catchment area, then this suggests that FSME pupils in this region might be gaining access to popular and potentially better-performing Community schools through the quasi-market.

There is no evidence of school change motivated by the pursuit of improved schooling for FSME and non-FSME pupils in other regions. The parameter estimated on the choice dummy in columns (7) and (8) is not statistically relevant. This is in line with the

[68] This percentage increase is calculated using the coefficient estimates on the choice dummy pertaining to FSME and non-FSME pupils shown in columns (5) and (6) of Table 2.5 and the sample percentages indicated in the text as follows: (5.6/36.36)*100 = 15.402%; (4.4/35.11)*100 = 12.532%; and ((15.402-12.532)/12.532)*100 = 22.90%. The 95% confidence interval for the estimated η for FSME pupils is (0.0123 to 0.1000) and that for non-FSME pupils is (0.0093 to 0.0796). Overlapping confidence intervals on these two parameter estimates would suggest there is a similarity in the likelihood of choice-related school moves among pupils from better-off backgrounds and those from poorer families located in the London area. However, the difference in the magnitudes of the coefficients between the two groups and the resultant percentage effect implied by this difference indicate a stronger likelihood of choice-related school change among FSME pupils relative to non-FSME pupils in the London region.

findings of columns (1) and (2), where it was noted that pure school change from under-capacity schools to over-capacity Community schools was largely in effect in London only, hence it is unsurprising that further breakdown by FSME status does not change the initial result.

An enduring finding across all regions and all FSME status groups is that pupils entering into VA schools are *more likely* to do so by making a pure school move than are pupils joining Community schools. This impact is stronger among FSM-entitled pupils, whether they are in London or other regions. The coefficient on entry into a VA school is 17.6 (12.3) percentage points and 8.1 (6.5) percentage points for FSME (non-FSME) pupils in London and other regions respectively. Finally, there is no indication of regional or FSME status variation on the variable of choice interacted with the school type of VA schools. This means that pupils moving from undersubscribed schools of any type to over-capacity VA schools are *just as likely* to do so by making a pure school change as are movers from under-capacity schools of any type to over-capacity Community schools.

Overall, regional and pupil background considerations have shown that there is not sufficient evidence of a quasi-market in operation in the state primary school sector, to the extent that its existence can be effectively measured by isolated school moves from under-capacity schools to above-capacity Community schools. However, regression estimation evidence of FSME pupils in London making these kinds of moves is an interesting result, as it suggests there may be some potential for less-advantaged pupils to gain access to improved learning in this region through choice exploitation, so long as some of these school changes reflect choice-related moves.

As was the case for previous regression analysis, the practice of re-estimating equation (2) on the regional groups and according to pupil FSME status using logit and probit models produced much the same results. Thus findings from this process are reported in Appendix 2A (see Tables 2A.7 and 2A.8).

2.7 Limitations of the Analysis

The empirical evaluation carried out throughout Chapters One and Two has been based on the NPD linked to school-level data. There are limitations placed on the effective analysis of mobility patterns and their link to school choice and pupil characteristics that are associated with the use of these data sources, particular the NPD. Here the natures of these limitations are addressed in detail.

In the first instance, the focus of both Chapters One and Two has been to look at mobility for a single cohort of pupils as they progress through state-provided schooling at the Primary stage of education, given that recent government initiatives pertaining to the education sector involve state schools only. The PLASC dataset is an ideal form of secondary data to use in this respect. However, there are gaps in the coverage of the PLASC data which matter for the analysis of mobility patterns. One caveat is that only migration taking place within England features in the KS1-2 cohort sample. Complete patterns of moves corresponding to *all* years of schooling among international migrants (including refugees and asylum seekers), and among those pupils moving from elsewhere within the UK who enter a school in England for a certain length of time, cannot be established. At best only the test results pertaining to a single Key Stage may exist for such pupils. For schools in the cities and metropolitan areas of England this type of pupil entry and exit will make up a large proportion of their school joiner-leaver activity. Then all mobility measures will be understated by that amount of movement that reflects cross-country migration, and this shortfall of the data can produce a non-trivial flattening of regional variation. Additionally, where households opt out of state provided education and buy into the schooling provisions of the private fee-charging sector and for those moving in the opposite direction, residential and school changes assessed using PLASC will be understated by the omission of independent school pupils in the data. Moreover, children who are schooled at home and who may or may not be instructed in line with the requirements of the National Curriculum will not feature in the data since they will not be enrolled in a publicly-provided learning institution. In the dataset all of these exclusions from PLASC – international migrants, independent school pupils, and home-tutored children – are likely to form those observations where there is attrition at some point in the sample presence, as detailed in Table 1.4 and Table 1.6 of Chapter One[69].

In terms of the methods for estimating the amount of mobility presented in this work, in all approaches there is no means for assessing multiple *within academic year* pupil moves, since the administrative data on the school roll used here is collected only once per year. Provision of tri-annual PLASC data represents a major step forward for future projects concerning mobility. However, the fact that PLASC is able to provide a longitudinal panel of observations on the same pupil as they move through the schooling years does mean that multiple year-on-year moves of both school and home can be considered, assessment that was not readily achievable prior to NPD availability.

A greater concern attached to the estimation of the amount of move activity is that this is restricted to the observations on mobility indicators within the sample window. In the sample frame considered here, there is the potential for some moves to be taking place towards the end of the KS2 phase of education that cannot be observed in the data, leading to the underestimation of total moves over the entire KS1-2 phase. In particular mobility taking place between January 2006 (when PLASC 2005/2006 is collected) and the summer of 2006 (when KS2 tests are taken) is unaccounted for in the data (see Chapter One, Table 1.5). However, this is a very small gap in the data of at most 6 months, assuming that pupils take their KS2 tests in July at the very latest. The extent of these non-measured moves also appears trivial when set against the likelihood that much mobility actually takes place outside of the entire KS1-2 cohort sample frame altogether. The evidence presented in Chapter One, Table 1.1 revealed combined school-home mobility to be at its highest during the school year 1 to 2 transition[70]. If pre-school entry mobility holds for the current sample, which is sure to be the case, such moves cannot presently be observed. This means that the analysis will omit important early years moving behaviour that matters not only for the count of cumulative moves made and

[69] See also Appendix 1A: Table 1A.2 reports the number of pupils in KS1 or KS2 only, and how many of these are classified as independent school pupils. Tables 1A.4 and 1A.5 show how many pupils in the KS1-2 cohort are and are not in PLASC.

[70] Child migration statistics based on the Population Censuses of 1991 and 2001 are presented in Appendix 1A, Section 1A.A. These also reveal a high amount of residential mobility in the pre-compulsory schooling ages of 1-4.

their type but also in terms of the accurate definition of non-movers in the KS1-2 cohort. As the longitudinal nature of the PLASC dataset widens in the future, this will increase the breadth of detail on cumulative mobility, including that taking place in the pre-compulsory school-age years, given that PLASC also collects information on pupils in nursery schools. In this case, examination of a cohort of KS1-2 pupils for whom nursery-level observations are also available would serve to strengthen mobility (and immobility) estimation. Despite this drawback of the present study, it should be emphasised that the analysis undertaken here, which tracks both the extent and type of moves made by one cohort of pupils over a long period of schooling, has not been feasible on such a large scale prior to the introduction of PLASC, thus the dataset already acts a significant resource for researchers.

Further limitations of evaluation concern the use of specific variables in this study, where there are two main problem areas. One of these is the FSME indicator, which is the only measure of family poverty available in PLASC. This 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 source of well-collected information on the wealth of the household pertaining to each individual pupil featuring in PLASC.

The other variable of concern is the school oversubscription measure. This indicator is calculated using the division of the total number of pupils to school capacity, details that are obtained from the DCSF-provided Edubase dataset. Where the result of this division exceeds one, a school is classified as being oversubscribed. The problem with this measure lies in the accuracy of the school capacity component in particular. This figure is based on the size and quantity of "classbases" within a school, where a "classbase" is "a classroom or area designated as the registration base for one class" (DfES, 2002, pp. 5, paragraph 22). It is the responsibility of each LEA to assess the capacity of all maintained schools under its jurisdiction. The statistic is not required to be recalculated on an annual basis, unless there are physical alterations to the usable space, changes which schools are responsible for informing the LEA of (*ibid*). Where there are unreported changes in the capacity measurement, or where there are inaccuracies in the assessment of the available space, there will be either an overestimation or an underestimation of the true capacity of the school, creating downwards or upwards bias in the oversubscription calculation respectively. The extent to which this is a problem is limited by consideration for the fact that LEAs are legally obliged to provide this information to the DCSF under the Education Act 1996 (*ibid*). Additionally, it was noted in the empirical work where the oversubscription variable was used, that there were missing observations in the annual provisions of its relevant components. In order to overcome this data shortfall, calculation was based on three-year averages rather than a single year. An important drawback to using averaged data is that the process of averaging masks year-on-year variation in the component indicators. Then it could be, for example, that within at least one of the years across which mean subscription rates were calculated a school may have been below capacity, and it was during this time that the pupil might have entered an otherwise oversubscribed school on average. Despite this weakness, averaged data offers the second best alternative to the provision of an accurate annual capacity measure, while the procedure of averaging might itself allow for some reduction in the margin of error in the capacity indicator, where this exists, and consequently in those parts of the estimation that use it. As data resources potentially begin to offer both quantitative and qualitative evidence of the relation between parental schooling preferences and actual school admissions numbers, more detailed and reliable measures of school capacity and oversubscription may become available in the future.

Finally, an additional area of analysis limitation is the potential for there to be variable omissions in regression estimation that may matter to move patterns. It could be, for example, that the finding that boys are consistently more likely to engage in pure school change than are girls is due to the relatively higher rate of school exclusion among boys. In this case their school change is dominated by behavioural issues, information on which is not provided in the dataset utilised here. While pupil-level details such as these would be of immense value to the analysis, a much greater omission is the lack of any qualitative data pertaining to the decision-making processes within the family. In particular, there are no indicators on the reasons for moving home or issues that affected the choice of school. Nor are there any measures of factors that influence the use of choice, such as the value parents attach to education and their interest in the academic success of their child(ren). All of these aspects likely carry substantial weight for the findings presented here. The decision to move home may be related to the search for or acquisition of better employment opportunities, for example. Where the home relocation involves a change of school, this represents a secondary outcome rather than the direct reason for the home move, but may show up as a school choice-related move if enhanced income from employment enables improved quality areas and schooling provisions to be accessed[71]. Additionally, variations in choice usage by families differing in their social background may reflect disparities in the worth they place on education and the characteristics that they look for in schools. In this case, the lack of evidence of successful choice exploitation among economically worse-off households may be a consequence of their lower evaluation of the educational benefits to be derived from accessing higher-performing schools. These areas might all be better assessed in the future as the potential to link the NPD to birth cohort studies and survey data rises[72]. The variable omissions of the kinds mentioned obviously matter for this study of mobility, since the results found may be driven by components that are unaccounted for. Nevertheless, the research undertaken here makes an important initial contribution in the direction of isolating and assessing the amount of different types of school moves made by pupils varying in their attributes and relating this to the concept of school choice, evaluation that has not been possible before the onset of a relatively new and extremely rich pupil-level data source in the form of the NPD.

[71] This point was also made in the descriptive work of Chapter One, Section 1.9.
[72] See the overall Conclusion to the thesis for a further discussion of the points raised here in respect of omitted qualitative information on decision-making processes, and the potential for this gap in knowledge to be filled by future research involving the use of survey data.

2.8 Summary and Discussion

A rigorous evaluation of the determinants of mobility in a regression framework has formed the focus of this study. Empirical analysis has aimed to establish a clearer understanding of the relationship between school change and pupil characteristics as well as the association between mobility and school choice. In this respect a statistical approach is a useful tool in that it allows explanatory factors to have a simultaneous impact on the move outcome, thereby going well beyond the level of inference that can be drawn from descriptive bivariate assessment alone.

It has been shown here that there is clear variation in the type of move made along the lines of pupil attributes. One finding that persists in all model specifications is that pupil eligibility for free school meals is strongly negatively correlated with pure school change, so that these pupils are more likely to engage in combined school and home moves than are non-FSME students. Whether this effect continues through to models of school choice has formed an important secondary question. Estimates have revealed that school only movement from undersubscribed institutions to Community schools that are above capacity is prevalent in London, while there is very little evidence of this type of mobility happening elsewhere. At the same time both FSME and non-FSME pupils have been shown to make these kinds of moves within the London region, with the former group doing so to a greater extent than the latter.

While this finding might appear to indicate the operation of a quasi-market for schooling on some level, the fact that a measured effect is only evident in London, and not in other regions of England, suggests that other aspects may be at work instead. One of these is the likelihood of greater clustering of education provisions in densely populated areas, so that the home is located in the catchment area of several primary schools in the London region in particular. In this case the pupil admissions ranking criteria of proximity to the school that is employed by above-capacity Community schools may be fulfilled without necessitating a move of home, resulting in a reduced need for strategic home relocation in order to satisfy oversubscription admissions rules. Another explanation of the result concerns the provision of a better transport infrastructure in a large city, so that home-to-school travel distances are shrunk. If all of these features are typical of London, then this suggests that there is at best a weak amount of school change during the primary education stage that reflects choice-related access to improved schooling. However, that these kinds of moves appear to take place among both FSM-eligible and non-eligible pupils in London gives some indication that family wealth might not act as a full deterrent to entry to popular schools.

Research undertaken elsewhere provides further evidence to indicate the limited operation of school choice policies in London as for in other regions. In fact, studies suggest that there is a persistence of the school-home link in determining school admissions, shown through a relationship between school-home proximity and house prices, particularly in the case of houses located in the vicinity of institutions with strong academic performance that are likely to be oversubscribed. Recent analysis of house prices and school quality in the UK has shown that parents of primary school-age children are relocating to a residence within the catchment area of a high-performing local primary school in an attempt to secure a place for their child in the establishment, often paying significant house price premia in order to do so. Estimates suggest that a 10 percentage point rise in the number of pupils achieving Level 4 national target grades in their end of KS2 tests adds around a 3 per cent property price premium to houses in London and the surrounding Metropolitan areas (Gibbons and Machin, 2006). This indicates that parents believe it to be worthwhile to make strategic home moves to assure a higher chance of entry to a good quality school for their child(ren). The implication of this is that where a pupil lives in relation to the school is still considered to matter among parents, so that from their perspective unconditional schooling access is recognised as not being fully operational.

The implications of this study are that school choice policies have a long way to go if pupils are to benefit from their potential to raise access to better education services and reduced home location related constraints on the supply of education. One area that needs to be addressed is the notion that popular schools have to impose conditions on entry because supply-side rigidities in the form of infrastructure limitations place restrictions on school expansion. Allowing schools with a long-term record of failure to close and be taken over by schools that are doing well might help to address the issue of building supply inflexibilities. However, as the discussion on institutional reform in 'Key Concepts' and in the following section (Part II) of this thesis make clear, school exit rarely happens and often low-performing schools face improvement strategies rather than closure. All-in-all, if the key policy goals of raised standards of attainment and equality in educational opportunity are to be addressed through a quasi-market for schooling that seeks to achieve these objectives through enhanced and fair schooling access, then substantial steps still need to be taken in order to ensure that the scheme delivers on its goals.

Part II

Chapter Three: The Impact of Institutional Change on the Pupil Intake Profile of Schools: Focusing on the Academies Programme

3.1 Introduction

Government expenditure on education has seen real term increases averaging about 4.3 per cent per year since 2000, with per-pupil spending in the state schools sector rising by 6.4 per cent per year net of inflation since the Labour government came into power in 1997 (Holmlund *et al.,* 2009; Sibieta *et al.,* 2008). Following the 1988 Education Reform Act, the administering of the vast majority of state school finances has been devolved from Local Education Authority (LEA) allocation among schools to direct central government distribution to the governing bodies of individual schools, under the 'local management of schools' scheme. At the same time a system of pupil-led funding has been created, 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' that is determined by the LEA (West and Pennell, 1997; Sibieta *et al.,* 2008). These changes in the way the education budget is transferred to schools have been implemented as a means for granting schools more autonomy over their financial operations, in turn allowing schools to be self-managed.

Education policy in England has pursued the notion of equality of opportunity delivered through an effective and competitive education system accessible by pupils irrespective of their background and geographical location. The Labour government has launched an attack on low state school standards, adopting a "zero tolerance of underperformance" approach to dealing with the issue (Labour Party, 1997). Despite this political stance and the rise in the real value of education funding coupled with increasing school budgetary control, there exists a persistent tail of underperforming state secondary schools at the bottom end of the attainment distribution. These schools feature 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 that revolve around institutional change as a means for school renewal have been instigated. One particular high-profile scheme that was announced in March 2000 and has been in operation in state secondary schools since September 2002 is that of the Academies programme. This initiative involves the rejuvenation of a failing secondary school in an area of disadvantage through delegation of school control to a private sponsor. The Academy sponsor is given the flexibility to adopt innovative approaches in the functioning of the school in return for a committed financial contribution, in an attempt to reform the school into a viably competitive education provider. Thus Academy schools are exempt from the LEA control that is characteristic of most state secondary schools and they instead have an independent status. On the whole the scheme has sought to achieve three main aims: (1) to raise 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. There are currently 133 Academies (June 2009), with plans to extend their coverage to 15 per cent of secondary school education provision by 2015. The scheme has received a greater platform of significance following the 2008 government announcement of the National Challenge, 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 GCSEs (including English and Maths) by 2011. Under this initiative all such weak schools will be given the option to convert to an Academy school (DCSF, 2008; Curtis *et al.*, 2008; see 'Key Concepts').

In Part II of this thesis the effectiveness of institutional transformation in the form of the Academies model will be assessed with specific reference to whether the scheme is capable of delivering inclusive access to the renewed school for pupils in disadvantaged areas (aim (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 is of particular significance in this respect as the popularity of these schools has increased over time, with applications for places frequently exceeding school capacity, suggesting that as these new types of schools re-establish themselves they may be more able to 'cherry pick' pupils to enter the school from the pool of applicants. Such an outcome calls into question the capability of a scheme that offers school improvement to a target group, through increased access to potentially better quality schooling, to bring about change to that audience. In turn this outcome produces uncertainty over the extent to which the initiative can achieve both its specific objective of more inclusion and the general government aims of raising standards of academic attainment and reducing education inequality.

Delivery on goal (3) of the Academies programme will be assessed here by looking at how the pupil profile of Academies changes once they open 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 will be used to consider (i) how the academic quality and composition of pupils entering year 7 of Academy schools differs from both that in their predecessor versions and in other similar schools that do not convert to Academy status; and (ii) how the whole school composition of Academies differs 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.

The outline of this chapter is as follows: Section 3.2 presents a short history of the Academies programme and outlines the key features of Academy schools. Section 3.3 sets out the objectives of the scheme that were established at its inception. Section 3.4 presents evidence on what is known so far about the effectiveness of the programme, concentrating on standards of GCSE attainment in Academy schools. In Section 3.5 the capacity of the scheme to achieve one of its key aims of inclusion is questioned in light of the conflict of interests that satisfaction of this objective creates. In particular, the requirement to target areas of deprivation characterised by disadvantaged pupils contrasts with the pressure on Academies to incorporate a diverse mix of pupils and deliver standards of excellence, and these issues are raised here. This sets the scene for the empirical focus on the effectiveness of school improvement, with details on the dataset used for this purpose and the results from statistical analysis laid out in continuation Chapters Four and Five.

3.2 The Academies Programme

In this section the historical foundations of the Academies Programme are summarised and the key features of Academy schools as distinctive institutions differing from traditional state secondary schools are presented.

3.2.1 Brief History

As is the case for many recent education policy initiatives, the legislative origins of the Academies programme lie in the 1988 Education Reform Act. This Act established the foundations for the formation of a quasi-market in the provision of education, where the ultimate aim was to raise school standards and effectiveness through competition-like forces. Significantly, the Act also created a system of school self-management by allowing schools to receive their annual revenue funding direct from central government as opposed to through standard LEA administration (Machin and Vignoles, 2005). 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 its 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 lay the legislative groundwork for the introduction of Academies, which were first launched onto the secondary schools arena in March 2000 in a speech on transforming the secondary phase of education by the then Secretary of State for Education, David Blunkett[73]. The first three Academy schools officially opened early on in the 2002/2003 academic year and since then the scheme has witnessed steady growth followed by a more recent flourish of heightened activity. Academies, like CTCs, were originally described as "independent state schools" (Curtis *et al.,* 2008, pp. 22, in reference to the

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

then Prime Minister, Tony Blair) and the key features that led to this term are set out below.

3.2.2 Key Features

(i) Autonomy – In contrast to other state schools, Academies are fully managed by their governing body and are independent from LEA control. As a result the LEA has no direct funding link to the Academy as it does for all maintained schools in its jurisdiction. Instead Academy funding comes straight from central government as a block grant, an aspect that can reduce transaction costs in the financial management of Academies, with the resultant savings said to enable higher per pupil funding and teacher salaries (Gadkowski, 2007).

(ii) Governance – Conversion to Academy status leads to the governing body of the school being created afresh. Small in size, there can be anywhere between 6 to 16 governors on the board, though it is common to have 13 members, the majority of whom (usually around seven) are appointed by the Academy sponsor, subject to approval by the central government education department (the DCSF) (Astle and Ryan, 2008)[74]. Stakeholder governors feature heavily on the governing body so that sponsor representatives can "determine the ethos and leadership of the academy, and ensure clear responsibility and accountability."[75] 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 is drawn up between the school and the 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

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

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

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 Academy schools gives them management autonomy, with the majority sponsor-appointed board of governors largely holding responsibility for steering the operations of the school.

(iii) Sponsorship – Sponsors of Academies can originate from a number of different fields such as business, religious organisations, the voluntary and charitable sectors and individual philanthropy. They can either be invited by government to sponsor a school or otherwise they may volunteer to get involved in the scheme independently (Gadkowski, 2007). In return for a financial contribution to the Academy, sponsors enter into a schools partnership with the government and are granted management control of the school as well as the freedom to shape aspects of the school through the Funding Agreement[76]. Specifically, sponsors tend to influence factors such as the curriculum, where they may introduce innovative curriculum practices, and they can choose the subject(s) in which the school specialises. They also 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[77] were initially covered by government through their school

[76] The requirement for a sponsor to make a financial contribution will no longer exist for Academies opening from September 2011 (see Key Feature (iv)). Funding agreements tend to omit any detailed targets relating to the academic performance of the Academy (Gadkowski, 2007).

[77] 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 cost around £24 million to build

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). Academy builds are now covered entirely by the Building Schools for the Future (BSF) capital programme, under which school constructions undertaken since 2005/06 have been financed[78]. The sponsor's capital contribution was replaced by an endowment fund that goes towards expenses that are unrelated to the school build, but has more recently been removed altogether[79].

All non-capital costs that relate to Academy schools are financed entirely by central government. They include an initial start-up grant for books, materials and classroom equipment, which is 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 are eligible for a grant to cover transitional costs and financial outlays that are involved in the process of Academy preparation. This fund is available over the first two to three years of Academy school opening, or longer if the Academy does 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).

Running costs of the school are covered under a "general annual grant" which the Academy receives directly from the Secretary of State. Funding allocated to the

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on average, and around £27 million if the build is completely new. 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).

[78] For a further discussion of the BSF programme see 'Key Concepts'.

[79] In July 2006 an endowment model of sponsorship was introduced. Here sponsor proceeds of £2 million go into a charitable endowment fund, the payment of which is normally expected to be spread over 5 years with an initial fee of £500,000 due in the first year. According to the DCSF Standards Site, disposal of this endowment is undertaken by the Academy trust and is to be spent on "measures to counteract the impact of deprivation on education in their local communities." More recently, it has been announced that *new* Academy sponsors will no longer be required to make a financial contribution to the school, and this applies to Academies opening from September 2011 (see http://www.dcsf.gov.uk/pns/DisplayPN.cgi?pn_id=2009_0158 accessed 8 September 2009; the quote made here is taken from: http://www.standards.dcsf.gov.uk/academies/what_are_academies/sponsorship/?version=1 accessed 21 August 2008; see also Rogers and Migniuolo, 2007).

Academy 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 government has stated 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 further provides 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[80].

(v) Admissions – Independence from the LEA in an Academy means that the governing body is the school's admissions authority. Details on the admissions policy are contained within the Funding Agreement of each Academy school. Where an Academy replaces a predecessor school or schools, it is expected that most pupils from the old school(s) will be given the option of readmission to the Academy school[81]. Since the 2002 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[82]). However, selection of this kind is only permitted where the school specialises in particular subjects, namely sports or physical education (PE), the visual arts, the performing arts, modern foreign languages, information technology and design and technology[83]. In practice most specialist schools, including Academies, do not undertake admissions selection based on some indicator of talent in

[80] 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 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.
[81] See http://www.standards.dcsf.gov.uk/academies/faq/?version=1#582283 (accessed 21 August 2008).
[82] 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).
[83] See http://www.standards.dcsf.gov.uk/academies/faq/?version=1#582277 (accessed 21 August 2008).

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 are described as being "fully inclusive all ability schools" that must comply with the School Admissions Code, where enforcement of this is the responsibility of the Secretary of State for Education[84].

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 Academy schools are only 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, set their own oversubscription admissions conditions and this is done according to ranking categories that are 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 Academy schools mentioned here – namely their independence from LEA control and their discretion to set their own admissions arrangements within compliance of the legal requirements of the Code[85] – suggest that there is room for variation in intake patterns once a school converts to Academy status. This is because predecessor schools were not organised along these more autonomous

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

[85] For the sample of Academy schools (as well as their predecessors and non-Academies) to be analysed in the Chapters that follow, 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 Code came into effect for September 2007 admissions. As was discussed in Chapter One, Section 1.4.1, the 1999 and 2003 Codes came attached with fewer statutory adherence requirements than subsequent versions. Thus 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 (see also West *et al.*, 2009).

lines. These specific features, together with the stated aims of the Programme, provide the motivations for comparing the composition of pupils entering Academy schools with that of pupils entering the predecessor version(s) in particular.

(vi) Staffing – In Academies the school principal is appointed by the sponsor(s) initially and after that by the governing body, while school governors take 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). Academy schools have a far greater degree of flexibility over staff employment contracts relative to LEA-controlled schools. The governing body of the Academy can 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[86]. Academies are not required to follow national frameworks relating to staff pay and conditions[87]. However, despite these freedoms, most staff from the predecessor school(s) are 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 hold. Otherwise, a common variant of staff terms used by Academies involves lengthening the working day, or year, or both (Rogers and Migniuolo, 2007) Additionally, Academies can operate performance related pay measures including the payment of bonuses to their staff for good performance; they can also offer other financial incentives such as childcare subsidies and contributions to relocation expenses (Astle and Ryan, 2008).

(vii) Accountability – Academies governing bodies are directly accountable to the Secretary of State for Education in the main, though they are additionally answerable to

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

[87] Specifically, Academies do not have 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).

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, the Academy is fully inspected within one to three years, more commonly in their third year (Gadkowski, 2007[88]), although less formal monitoring visits do take 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 is encouraged in Academies, and the governors and senior managers of the school are given 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 Academies are set out in detail and the means by which the features of these schools are expected to help them deliver on their goals are discussed.

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

3.3 Aims and Objectives

In February 2003 the DfES 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]"[89]

Originally, the Academies programme concerned the replacement of "seriously failing schools"[90], in which the underachieving predecessor school or schools that went before were rebuilt and rebranded into an Academy. In this respect Academies were established "where significant changes in the nature and management of schools were needed" (DfES, 2000). Otherwise the initial Academy set-up involved a new school development

[89] PwC (2003, pp. A1). See also Curtis *et al.* (2008). Note that the formerly named Department for Education and Skills (DfES) is now known as the Department for Children, Schools and Families (DCSF).
[90] 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 can replace more than one pre-existing failing school at a time, though the rebuild usually uses 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).

in an area of sustained low educational attainment. Hence objective (1) emphasises that Academy schools play a key role in community regeneration. These schools are 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 formation is in 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, Academies are largely intended to cater for pupils most exposed to the local area deprivation that is a feature of Academy school establishment, so that it is likely that the social background and educational attainment of these pupils will reflect the relatively deprived circumstances of the area they inhabit.

Objective (2) places Academies in the realm of choice-oriented government education policies, as schools of innovation that are 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 existing provisions, a gap that is 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 are to be at the forefront of local improvement. Academies are 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 Academies programme is such that it is perceived as being able to attain the first objective. The new school building that results from the scheme is considered a flagship feature of symbolic value that contributes to raised expectations of change and provides a visible demonstration of local community investment and reform taking place (Curtis *et. al.*, 2008; Astle and Ryan, 2008). This redevelopment of school facilities is aimed at fostering 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 is also considered a means by which standards can be raised. The sponsor is assumed to bring a vision and values to the school that define and renew its ethos. His or her business experience, expertise and network of contacts 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 is seen as a way to allow 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 can 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 Academies – 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 expect will provide the mechanisms through which performance improvements are 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 programme involves all serve to create 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 can inject further choice and a diversity of supply into state education thus relates to the ability of this new 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 is 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 Academies can also achieve the local area benefits of the first aim.

In respect of goal (3), a potentially higher pupil capacity in an Academy provides one channel through which the school is expected to incorporate a more inclusive and socially diverse range of pupils. Places offered at the Academy may be greater in number to the extent that the new school building or the remodelled version can accommodate a larger quantity of pupils than the predecessor school(s). Another means for achieving this goal comes through the admissions rule of 'banding', which 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 should enable them to cater to the final objective.

A system of expanded school capacity and over-subscriptions rules that intend to offer fair chances of admission to pupils from across the ability range might ensure a more balanced academic intake into an Academy and allow the school to be more inclusive without changing the quality distribution of its pupil entrants. On the other hand the requirement of Academies to raise achievement standards might create an incentive for these schools to try to adopt more 'exclusive' normal admissions practices and skew their intake distribution towards students of a more favourable background, including pupils of higher ability and better composition quality. Indeed the fact that Academies are their own admissions authority sets in place the potential for intake patterns to differ from those in the previous LEA-governed school[91].

[91] In Appendix 3A, Section 3A.D, the prior school types of schools that converted to Academies are discussed, in reference to the sample of 33 Academies that will form the basis of this research. About 72% and 3% of Academy predecessors were Community and Voluntary-controlled schools respectively in this

The aim of this study is to compare the pupil profile of Academy schools to that in both predecessor institutions and similar schools that do not turn into Academies. Evaluation will consider the prior attainment and background composition of year 7 entrants, and aspects of whole school-level composition, in Academies relative to these other schools. Thus the purpose of evaluation is to determine the extent to which aim (3) of the Academies Programme in particular has been satisfied. To date no previous research exists in this specific area. In terms of objective (1), preliminary analysis that considers the academic performance of early cohorts of Academies at the GCSE stage relative to achievement levels of their predecessors has been conducted. The competition effects of Academies, implicated by aim (2), have not yet been assessed. As the number of Academy schools increases it may be that their competitiveness with other local area schools becomes more relevant (depending on the relative success of Academies) and this type of analysis provides one possible area for future research. Findings from the research into GCSE attainment changes in Academies are summarised at the start of the next section, in order to provide some initial information on what is known about the effectiveness of the programme so far.

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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.

3.4 Academy schools and GCSE performance

Recent co-authored research (Machin and Wilson, 2008) conducted a school-level analysis of changes in GCSE performance in 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, is presumed to be delivered 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.

The study considered Academy schools opening under 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 is measured by the percentage of pupils getting 5 or more A*-C grades at the GCSE stage (when pupils are aged 15/16). Table 3.1 below 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):-

Table 3.1: 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.

Across almost all cohorts there is no evidence of a positive 'Academy effect' on GCSE performance for schools that switch 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 improves 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.

In the study reviewed above, the GCSE attainment of all four cohorts of Academy schools largely consists 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[92]. 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 has converted into an Academy, it faces 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 be 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 will yield higher levels of GCSE attainment. In this case the 'Academy effect', which is entirely attributable to pupil learning in the Academy, will appear improved relative to that attached to earlier cohorts admitted by the predecessor school(s). This will boost the chances of the Academies Programme as a whole delivering on aim (1) of the policy, where this goal requires the schools to contribute to driving up standards through increasing levels of achievement among their own pupils. In fact, Curtis *et al.* (2008, pp. 16-17)

[92] The GCSE performance of 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.

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' take place immediately after conversion, raised pupil performance at the GCSE stage after five years of Academy opening can certainly be more easily achieved, resulting in a greater chance of the accomplishment of this intermediate aim, albeit with a delay of one year. However, employing a strategy of this kind may have 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, which will consider the capability of the policy to satisfy aim (3) in light of the requirements of aim (1), and in the section that follows this research focus is discussed in further detail.

3.5 Focusing on Pupil Profile Changes in Academy Schools

The school reform initiatives discussed in the 'Key Concepts' section of this thesis are concerned to differing degrees with raising the educational opportunities of socially disadvantaged pupils above all, in recognition of "the impact that disadvantage has on reading, performance, attendance, achievement, further education and lifelong learning" (Matthews and Kinchington, 2006, pp. 104). In this respect, the role of Academies is profound, with these schools having recently been hailed as engines for upward social mobility and justice, capable of transforming education and "providing a ladder, in particular, for less advantaged children to get on, and gain the very best education and qualifications, irrespective of wealth and family background" (Adonis, 2008, pp. 3). Academies are seen as having a critical role to play in the eradication of failure in general, a situation that is characterised by the long tail of underperforming schools at the bottom end of the performance distribution. At the same time, these renewed schools are expected to be centres of excellence in their localities, able to compete at the highest levels of academic attainment and producing outstanding results. Quality gains are to be spread among existing pupils and are proposed as a means for Academies to attract new pupils (Adonis, 2008).

The responsibility of Academies to both turn around circumstances of failure and pursue academic excellence presents something of a dichotomy for these schools. Eradication of failure requires them to target underachievement among pupils from deprived backgrounds. On the other hand, in order to satisfy their drive for excellence, a more favourable intake that draws in pupils with a historically high level of attainment and associated social characteristics may be sought, so that the task of raising performance in the Academy school is made easier, as was discussed previously. If they are to achieve these opposing outcomes, then Academies must necessarily aim to attract new pupils to the school who are of higher academic quality, whilst at the same time reserving enough places for pupils from deprived backgrounds with lower historical educational performance. If access for the latter group is to be fair, then the Academy school needs to retain places in comparable proportions to the share these pupils would have accounted for in the predecessor school(s).

In recent times Academy schools have become increasingly popular, with their admissions demand exceeding available places at the school. The DCSF notes 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."[93] Oversubscription has brought with it interest in Academy admission by a different class of pupils, a new direction that has been openly welcomed by the former Minister responsible for the programme: "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 it would seem that Academy schools are broadening their appeal to a wider mix of pupils while at the same time facing capacity pressures as a direct consequence of their heightened status.

Conflicts of interest in Academy school objectives and responsibilities, combined with the expanding popularity of these schools, raise the issue of the effectiveness of institutional change in the form of school renewal in delivering equality of educational opportunity, as a general intention of government education policy of this type. The reporting that Academies are vastly oversubscribed suggests that some pupils miss out on the opportunity to attend them and also implies that rejuvenation of a failing school may result in that school no longer serving the education needs of particular types of pupils with which it has traditionally been associated. In this context it appears important to understand the extent to which Academy schools 'refresh' their pupil intake and composition as a result of the freedoms afforded to them by their renewed status.

To date no empirical evaluation of the changing pupil profile of Academy schools relative to both their predecessor counterparts and to schools in similar circumstances who do not undergo any form of school renewal has been conducted. This would seem to be a valuable exercise, given the growing prominence of the Academies scheme as one kind of catalytic system of school renewal that aims to generate education reform and promote education equality as a means for raising the chances

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

for pupils in underprivileged areas to succeed. Hence this forms the purpose of Chapters Four and Five that follow.

Chapter Four: Evaluating the Changing Pupil Profile of Academy Schools: Initial Steps in the Empirical Process

4.1 Introduction

The ultimate question that the empirical work undertaken here and in Chapter Five aims to address is whether school renewal in the shape of the Academies scheme serves to reinforce social selection, extending it to certain schools within deprived areas, or whether this policy might provide an effective means for tackling underachievement among hard to reach pupils who often only ever have access to poor quality schooling. Data on Academies and comparable schools is extracted from a national administrative data source in order to assess whether Academy schools are more 'exclusive' following their change in status, catering for disadvantaged pupils less than previously.

Section 4.2 introduces and explores the data to be analysed in this Chapter. Sub-section 4.2.1 presents details on Academy schools that opened between the academic years 2002/03 and 2006/07, which form the five cohorts to be assessed. Information is included on the area in which these schools are located, their subject specialism(s) and their predecessor history. Sub-section 4.2.2 briefly describes the principal data source that is used for the empirical evaluation undertaken here and in Chapter Five, this being the National Pupil Database, from which annual pupil-level observations on year 7 intake into state secondary schools are derived. School-level data files also provide supplementary details on composition and attainment in the whole school and the indicators taken from these files are described here. In sub-section 4.2.3 the process of dataset construction is set out. This includes the formation of a balanced panel of observations that can be 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.

Section 4.3 describes the methodological approach of difference-in-differences estimation that is used here. This is combined with propensity score evaluation and the subsequent estimation of an 'Academy effect' relative to a set of control schools contained within an identified region of common support. All of these processes lay the foundations for empirical analysis, the results from which are presented in follow-up Chapter Five.

4.2 Describing and Exploring the Data

In this section, the construction and evaluation of an empirical dataset is outlined. In the first instance details on open Academy schools for which data is available to date are presented. The main sources of pupil and school level data are then discussed, together with the procedures that are undertaken in order to arrive at a final reduced sample of Academy and non-Academy schools for whom all necessary variables required for evaluation exist in all years of data availability.

4.2.1 Academy schools sample

Prior to describing the data sources that are to be 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 noted earlier, the first cohort of Academy schools came into being since September 2002 and additional cohorts have arisen in each academic year following on from then. There are currently 133 open Academy schools dispersed across 65 LEAs (June 2009), of which a total of 46 (in 34 LEAs) can be traced in the available pupil-level and school-level datasets. Table 4.1 below 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 Academy school is situated, the amount of finance the sponsor(s) have committed to contributing to the school, and the subject area(s) in which each Academy specialises. The Table also includes other information relevant for the empirical work, as will be discussed in the results section, such as whether the Academy school represents a completely new school or simply a new building, the number of predecessor schools that the Academy replaces, and if such replacement involves a school that was formerly a CTC.

As can be seen from Table 4.1, 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 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. 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[94]. 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. This conforms with the notion that the scheme should target weak schools in areas of decline, and therefore the underprivileged pupils that frequently attend these schools and inhabit such areas[95].

Moving on to address Academy school sponsorship, both the United Learning Trust and the Harris Federation of South London Schools Trust are prevalent 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 the listed Academies average £1.69 million so far, 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 is an entirely new build or a refurbishment (column 5)[96]. The most frequently chosen subject of specialism is that of Business and Enterprise, either as a sole specialism or in conjunction with another field of study. Otherwise,

[94] 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).

[95] 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).

[96] See Chapter Three, Section 3.2.2, 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.

sponsors have tended to opt for sports as their Academy's area of expertise (column 6).

Table 4.1 additionally highlights specifics pertaining to each Academy school and reveals interesting patterns of change to the stock of schools in LADs resulting from the introduction of Academies (column 7). Looking again at Middlesbrough and Southwark, though these areas each contained three Academies by 2006/07, in Middlesbrough two of the Academies actually replaced four predecessor schools. Thus 2 pre-existing schools were amalgamated into each Academy, while the remainder Academy in Middlesbrough replaced just one school. This suggests a fall in the quantity of schools in this LAD based only on the stock changes brought on by the Academies programme. By contrast, in Southwark, two Academies each replaced a single predecessor school and one Academy provided a brand new institution for the area, such that the Academies programme in isolation increased the school supply (by one school) here. Overall the LAD of Hackney gained the greatest number of completely new schools as Academies, with its two new developments generating a rise in the school stock in this area due to the Academies scheme. Unique to the LAD of Westminster has been the replacement of one predecessor school by two Academy schools, resulting in a one unit growth in the number of schools in the LAD that can be attributed to the onset of Academies. To summarise the remaining facts contained in column 7, 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) and it is likely to be a more prominent feature of future Academy cohorts, as one recent extension of the model has been to encourage successful schools, such as CTCs, to become Academies[97].

[97] For further details see Curtis *et al.* (2008), section 4 (pp. 50-67). Government interest in converting all CTCs to Academies is expressed on the following website: http://www.standards.dfes.gov.uk/academies/ctcs/?version=1 (accessed 20 February 2009).

Table 4.1: 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

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 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
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

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)
Harefield Academy	2005: September 2nd	Hillingdon; Outer London	157	David Meller/Haig Oundjian/Jonathon Green (1.5)	Sports	2nd Academy to open in LEA
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

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)
Gateway Academy	2006: September 1st	Thurrock; East of England	124	The Ormiston Trust (unknown)	Arts and Engineering	-
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

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)
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
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.

Though the Academies listed in Table 4.1 are spread across several LEAs, and their magnitude and dispersion is on the rise, Academy schools are not expected to account for a significant fraction of state secondary education provision until around 2015, by which time 400 such schools should be in existence (around 15 per cent of the total). Table 4.2 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 are 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 relatively smaller pupil-teacher ratio (15.06) compared to that in all maintained secondary schools (16.47).

Table 4.2: 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.

4.2.2 Data description

Information on pupils who have been or currently are enrolled in the state-maintained English education system is contained within the National Pupil Database (NPD), a centrally collected longitudinal data source that consists of the Pupil-Level Annual School Census (PLASC) and Key Stage (KS) data files. Details on this dataset and its components were described in Chapter One, Section 1.5 and those descriptions also act as the point of reference here.

PLASC contains some indicators on the background characteristics of each pupil, such as whether the pupil is eligible for free school meals (FSME), whether the pupil has Special Educational Needs (SEN), the ethnicity of the pupil, their gender and their first language. These details are provided alongside more administrative 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. Annual collation of PLASC data in January of each academic year has more recently been replaced by a tri-annual system of information provision in both September and May, though for researchers the year-on-year January collection is the most available and consistent and therefore the most widely used version. At the time of writing (August 2008) six PLASC waves of data have been issued, covering the academic years 2001/02 to 2006/07 inclusive, all of which are used in this empirical work.

Analysis undertaken here utilises pupil test performance at KS1 (when pupils are aged 6/7) and KS2 (aged 10/11), 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 (aged 13/14) 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 be matched together using the distinct and anonymous pupil identifier contained in each of these data files.

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 DCSF. 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.

4.2.3 Dataset Construction

The empirical analysis made in this Chapter and Chapter Five looks at changes in the academic quality and composition of pupils entering year 7 of secondary school in each year and 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 school per year from the full PLASC population[98]. Of this year group, only those pupils entering secondary schools situated in the 34 LEAs in which the sample of 46 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 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 do 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

[98] As Table 4.1 showed, Academy schools generally open in September, and schools start their new school year in this month, while PLASC information on the pupil roll that is used here is 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.

an LEA in the vicinity of an 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 Key Stage 2 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 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. Given that pupil-level KS3 attainment data is available in the NPD from 1997/98 onwards, this allows for the potential expansion of the sample frame pertaining to the assessment of intake quality changes by a full 6 academic years at the front. However, as was said earlier, KS2 data is provided in the NPD from 1995/96. Pupil-level results from this year can be matched to the 1998/99 KS3 outcomes of the same pupils, so that 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 do not move schools between year 7 and year 9 of secondary school. If pupils who were in the school in year 7 have 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. Recent 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 in secondary school and are aged 11/12 to 13/14) (Machin *et al.,* 2006)[99]. 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 will be considered in Chapter Five (Section 5.3), and it can be stated here that 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 4.3 below 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 join 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.

[99] Non-compulsory school moves have been defined in Chapter One and 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.

Table 4.3: 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 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 aged 10/11.

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 enter 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 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[100]. 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 established, as will be outlined in 'Methodology' section 4.3. As for intake quality changes, whole school compositional changes can be assessed over the 11 year period of 1996/97 to 2006/07[101].

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 3A, Section 3A.A. Table 4.4 indicates the size of this

[100] 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.

[101] 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.

sample of schools before and after corrections and imputations have been made. Panel A shows that the sample of Academies drops 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") falls from 1,699 to 389 schools following the process of data cleaning[102]. 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 3A, Section 3A.A. It is worthy to note here a total of 5 Academies are dropped because they are new schools that have no historical pre-policy observations and 2 Academy schools fall 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.

Panel B of Table 4.4 shows when the switch to Academy status occurred for each of the 5 cohorts of Academies for which details are available to date, as well as how many schools are in each cohort. As per the original sample of Academy schools (shown in Table 4.1 above), in the final sample the largest cohort of Academies are those opening from September 2006, cohort 5. This is also the group from which the most Academies are lost in reaching the balanced panel – seven Academy schools drop out in this year, as compared with none from cohorts 1 and 4 and three each from cohorts 2 and 3 (see Appendix 3A, Section 3A.A).

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. For

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[102] 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 3A, Section 3A.A.

non-Academy schools their status remains unchanged (U) throughout the period[103]. Contained within this group is a subset of control schools whose attributes most closely resemble those of Academy predecessors and whose trends in pupil profile are to be compared with those of Academies and their predecessor(s), as set out in Section 4.3.

[103] In fact some schools in the non-Academy group do change their status over the period, but the percentage doing so is negligible. Therefore the categorisation of these schools as 'U' is valid (see Appendix 3A, Section 3A.D for further details).

Table 4.4: 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.

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 will therefore be 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.

4.3 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 switch 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. This method is known in the economics literature as a 'natural experiment approach' to the evaluation of policy interventions[104], in which the aim is to gauge the impact of an exogenously occurring policy shift in some time period on a sub-population that receives treatment as a result of the policy change and to set this against behaviour in the untreated population. 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:-

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

The term A in this equation refers to the 'Academy' dummy variable. This takes the value of 1 for schools that become 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

[104] The principles of experimental design are originally attributable to the fields of the natural sciences and psychology, and the term 'natural experiment' was coined in the early 1960s by the psychologists Julian C. Stanley Jr. and Donald T. Campbell.

effect in school s and 0 at all other times (so that k is the year that a school opens 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 occurs. Hence δ measures the average effect of the 'treatment' of changing to Academy school status on the set of Academy schools, 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. 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)[105]:-

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

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

[105] 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. In terms of time-varying unobservable effects, these could take the form of (i) an unexpected one-off event, such as a sudden change in the composition of a neighbourhood, which affects Academy schools simultaneously opening in that area at the time of its occurrence; or (ii) a change that occurs through time, for example 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 through 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 a robustness check of empirical findings on changes to intake ability in Academies, the results of which are presented in Chapter Five, Section 5.3.

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[106].

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 the policy of status change[107]. 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 there is at least one Academy (see Appendix 3A, Section 3A.A 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 be based.

Of course the heterogeneity that exists 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

[106] 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 a more aggregated levels.

[107] Construction of the counterfactual outcome on the basis of a well-defined comparison group of control schools is designed to tackle the 'missing data problem', in which a school is either subject to the Academy policy or is not, but that school cannot be observed in both states at the same time (Blundell and Costa Dias, 2008).

collected and freely available, the selection rules governing assignment to the Academy programme are not precisely stated, making the task of netting out heterogeneous differences less clear. In general Academy school 'treatment' has been shown to depend on the partially observable features of schools that concern their performance and their levels of disadvantage. As was pointed out in the 'Key Concepts' (part ii, point c) 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) has been used as one qualifying criteria for school replacement by an Academy since 2008. In terms of the data sources used here (discussed in section 4.2.2), the percentage of pupils not getting any GCSE passes can be used as 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 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 recent trends in these observable factors that likely influence assignment to treatment among schools can be put to use as a means for strengthening the analysis findings[108].

The procedure that is employed in order to determine a distinct control group of schools who share similarity in observables in the pre-policy years to Academy predecessors 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 that the school becomes an Academy given the available set of pre-policy observable factors relating to it. This conditional assignment probability can be

[108] 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.

estimated in a parametric non-linear logit or probit model or through a linear probability model, where the 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 determine 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 region of overlap in the distribution of the propensity scores of the treatment and control groups indicates those Academy and non-Academy schools who share similar treatment probabilities. This area of the distribution 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[109].

Restricting the estimation sample to schools within the CSR strengthens the alignment of the counterfactual situation to that which Academy schools may have experienced had they not converted to Academy status. Thus this procedure serves to produce more exact treatment effect estimates by generating a more stringent testing sample. The construction of a reduced sample of schools 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[110]. Empirical estimates presented in Chapter Five 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. In the section that follows the process leading up to the generation of the CSR sample is set out in detail, beginning with the presentation of descriptive statistics on the entire

[109] 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 4.6 (see also Figure 4.1 and Figure 4.2) 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.

[110] 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.

sample of schools prior to CSR formation and tracking how disparities in the characteristics of treated and control schools are narrowed down following restriction to the CSR.

In Panel A of Table 4.5 shown below, 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, 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 Academies to be set up in areas of decline, the Table shows that their predecessor versions are characterised by a far higher proportion of pupils eligible for Free School Meals (FSM) than is the case in non-Academy schools, where this measure is a proxy for family disadvantage. Over the 6 year period just above 40 per cent of pupils are 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 are 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 completes their compulsory schooling years achieving no GCSE qualifications (22.25 per cent), while about the same percentage acquire five or more GCSEs graded A*-C (25.45 per cent). Non-Academy schools fare 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 achieve 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 has been determined since 2008. Of course, this recent definition would in no way have influenced conversion to Academy status among the schools featuring in Table 4.5; also the qualifying criteria for conversion focuses 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.

Table 4.5: 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.

Panel B of Table 4.5 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 get their pupil intake[111]. Indeed pupils joining predecessor secondary schools over 1997 to 2002 tend 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 sample is 39.14 per cent, as compared with 26.83 per cent in the primary schools that non-Academies sample from, a statistically significant difference of 12.31 percentage points. Interestingly, pupils entering pre-Academy schools are apt to come from a larger number of lesser-performing primary schools. Predecessor schools spread their year 7 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 government target of attainment at Key Stage 2 is that 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 being admitted into Academy predecessor schools.

The pre-policy observable characteristics of Academy and non-Academy secondary schools shown in panel A of Table 4.5 are mapped into implied probabilities of each school becoming an Academy using the non-linear logit models as set out in Table 4.6. 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 4.4 that cohorts of Academy schools have been set up in different time periods so that

[111] The reader should note that the statistics in Panel A of Table 4.5 are at the whole school-level; they do not indicate school-level averages of pupils entering year 7 only.

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 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 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.

Table 4.6: Models of Academy School Probability: Pr(Academy) = 1, logit marginals and percentage effects, 1997-2002 averaged characteristics

Variable	Model 1 : Full Controls (1) Marginal effects	(2) % effect on Pr(Academy)=1	Model 2 : Selected Controls (3) Marginal effects	(4) % 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 4.4 (here) and Table 5.1 (Chapter Five) for the number of Academy schools in each cohort). The predicted probabilities of a school being 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.

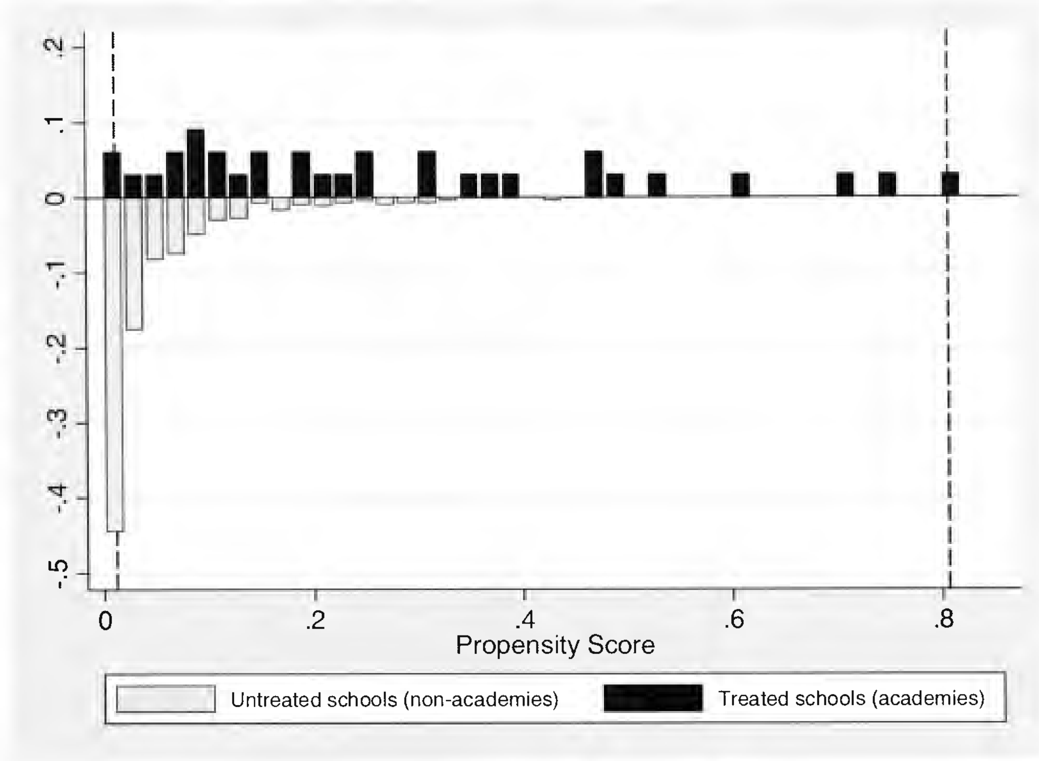
Columns (1) and (2) of Table 4.6 are based on estimation of a fully-specified logit model (model 1), in which all the observable pre-treatment factors in Panel A of Table 4.5 are used as regressors. The results from this model suggest that averaged school-level variables on the fraction of pupils in 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 4.6 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[112]. Once again the only statistically significant independent variable is the percentage of pupils with no GCSE passes at the age of 15/16[113].

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 4.1 below. 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.

[112] See Table 3A.2 in Appendix 3A, 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 the decision of a school to change to an Academy.

[113] 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 3A, Section 3A.B).

Figure 4.1: Propensity Scores for Academy and Non-Academy Schools: Logit Model with Full Controls (see Table 4.6, 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 4.6 (model 1; see also Table 5.1, column 3, Chapter Five). The common support region of (0.0115 0.8068) includes 33 Academy schools (out of 33) and 266 non-Academy schools (out of 389).

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 4.2. 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 becomes an Academy, the subsequent process of defining a CSR does generate more stringent testing by reducing heterogeneity in the characteristics of treatment and control groups[114]. It is the restricted sample of schools contained within the CSR linked to

[114] More specifically, the statistically significant differences in the pre-treatment attributes of Academy and control schools shown in Panel A of Table 4.5 are reduced in the formation of a

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 are to remain as non-Academies (93.11 per cent correctly predicted, as shown in column (3) of Table 4.6) 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[115].

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 determine 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.

Following on from the initial steps to evaluation that have been set out here, in Chapter Five the results deriving from the process of estimation are presented and their implications discussed.

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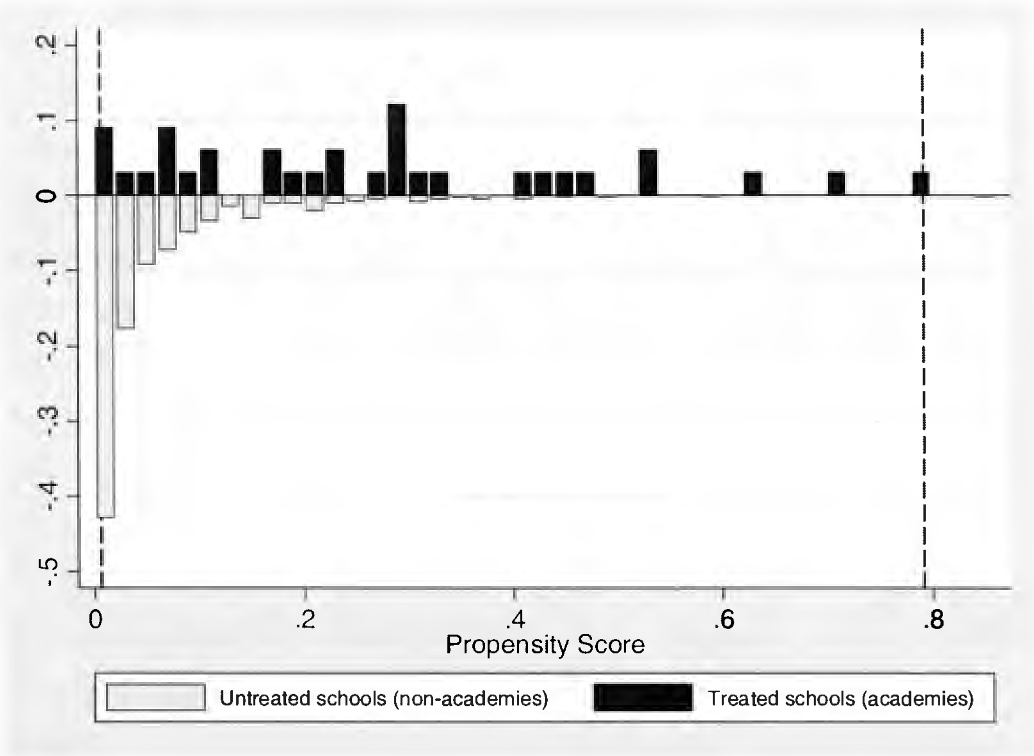
common support region under both logit model 1 and the logit specification with selected controls (see Appendix 3A, Section 3A.C (including Tables 3A.4 and 3A.5)).

[115] The empirical results section that follows (Chapter Five) includes as a robustness check of 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 5.3, column 3, Chapter Five).

Figure 4.2: Propensity Scores for Academy and Non-Academy Schools: Logit Model with Selected Controls (see Table 4.6, 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 4.6 (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).

Chapter Five: Are England's Academy Schools More Inclusive or More 'Exclusive'? Empirical Results from Evaluation

5.1 Introduction

In this part of the evaluation of the Academies Programme, results are presented on the intake ability and composition of pupils entering Academies, and how these profile dimensions of the schools compare with those of their predecessors and the control group of non-Academies. Analysis also addresses whole school compositional changes following conversion to Academy status.

Section 5.2 presents empirical findings on KS2 intake quality changes in Academy schools as compared to their predecessors. Section 5.3 explores whether the jump up in intake quality post-conversion that is revealed through difference-in-differences regression estimation captures the actual policy effect, by subjecting the results to a host of robustness checks. In Section 5.4 the notion of heterogeneous responses to the policy by the Academy cohort is examined through a series of dynamic effect model specifications. Section 5.5 looks at the possible mechanisms driving the change to intake quality, and introduces evidence on changes in the dispersion of intake that indicate the reduced admission of pupils of lower ability in the Academy years. This suggests that Academies are not delivering on one of their main aims of being more inclusive and mixed ability schools. With this in mind, Section 5.6 assesses other dimensions of compositional changes in Academies and finds that these schools also take in fewer pupils from underprivileged backgrounds. Finally, Section 5.7 includes a summary and discussion of the work presented across Chapters Three to Five and delivers some thoughts on the effectiveness of schemes of institutional change such as the Academies Programme in enhancing equality in educational opportunity through fair access.

5.2 Empirical Results: Main Findings

The outcome measure that most illustrates the extent to which schools switching to Academy status are more inclusive and mixed ability, and therefore have the potential to enhance 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 tend 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} in equations (1) and (2) of Section 4.3 (Chapter Four).

Table 5.1 below 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 common support region identified from logit model 2 in Table 4.6 (Chapter Four). 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 is available (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 (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 Academy schools frequently feature pupils with a relatively weaker background of educational achievement, Table 5.1 shows that the KS2 total points scores of pupils entering grouped Academies (which includes their predecessor counterparts) are *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 narrows over the period, by 2007 Academies still sit below non-Academies in their intake quality distribution. However, Academy schools as a whole experience a sharper rise in their pupil intake quality across 1997 to 2007 than do 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 5.1). Therefore the process of restricting the estimation sample to those Academy and non-Academy schools within the CSR results in 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, are based on a very small number of Academies (cohort 1 features only three Academy schools; cohort 3 contains 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 is high throughout the 11 year period and in most years (except 1999 and 2002) lies above that in non-Academy schools. As was noted in Section 4.2.1 (see also Table 4.1) 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 out-perform other schools within their areas in terms of the number of pupils getting GCSE passes in the A*-C range (Astle and Ryan, 2008)[116]. 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 Academies, the results of Table 5.1 suggest that these schools admit a different quality of year 7 pupil once they switch status relative to both their predecessor school(s) and the non-Academies. It would appear that in general students of a higher academic ability are more likely to enter into the renewed school.

[116] 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).

Table 5.1: 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. Sample includes pupils in Academy and non-Academy schools belonging to the common support region determined by the logit regression as defined in Table 4.6, model 2 (see also Figure 4.2), Chapter Four. 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.

In Table 5.2 below, the findings established so far from simple difference-in-differences regression estimation that uses 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 5.2 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) and affect all schools (s) within the respective LEA in the same way over time[117]. 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.

[117] 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 5.2). This represents a higher level of aggregation than when school fixed effects are added (columns (3) and (4) of Table 5.2), in which case the regression models deviations from school-specific means.

Table 5.2: 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 4.6, model 2 (see also Figure 4.2), Chapter Four, so that regressions are based on 3,949 observations covering 359 schools, of which 33 are Academies and 326 are non-Academies (see Table 5.1 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.

As can be seen from columns (1) and (2) of Table 5.2, Academy schools and their predecessors tend 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 sits above that of all other non-Academy schools in the sampled LEAs (though this difference is not significant). Estimation of how intake quality changes in schools once the Academy policy comes 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 switch to Academy status their KS2 total points score is 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 increases from 73.577 to 76.037 when schools re-open as Academies, a rise of some 3.34 per cent[118].

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 5.2. In this case the more detailed specification of equation (2) in Section 4.3 (Chapter Four) is followed. Column 3 of Table 5.2 excludes the vector of observable school-level characteristics that are present in equation (2) from regression estimation, while column 4 takes these into account. 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 become Academies do 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 is 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 can attract more teachers to the school, the substantial increase in the prior attainment of year 7 entrants holds[119]. With the coefficient

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[118] This is an approximate effect since schools convert 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.

[119] The notion that Academy schools may be able to accommodate a larger pupil capacity than their predecessor version(s) is suggested in Section 3.3 ("Aims and Objectives") of Chapter Three and the

(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[120].

Overall these regression findings tally with those from the descriptive analysis of Table 5.1, and reaffirm that Academy schools sit below non-Academies in their intake quality distribution throughout the 11 year period (except for the fourth Academy cohort) but there is 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 5.2 has now shown.

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flexibility that Academy schools have 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 3.2.2 ("Key Features", in particular see point (vi) on staffing) of Chapter Three.

[120] These coefficient estimates are not reported in Table 5.2. 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.

5.3 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 5.3[121]. The specific equation on which robustness tests are conducted is that which delivers the most conservative estimate of the Academy effect, namely equation (2), where the regression results relating to this model are given in column 4 of Table 5.2. If rigorous testing leaves these results unaffected, then this gives assurance that the analytical procedure utilised here identifies the effect of the policy.

[121] 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 4.6, model 2 (see also Figure 4.2), Chapter Four.

Table 5.3: Robustness checks

	(1) Excluding former CTCs	(2) No logit common support	(3) Logit common support, full controls	(4) Probit common support, selected controls	(5) School-specific trends	(6) Years 2002-2007	(7) Fake policy on (years 1997-2002)
Academy on effect (all academies) (academy*policyon)	3.046*	2.547*	2.400*	2.358*	2.136*	2.388*	0.148
	(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 4.6, model 2 (see also Figure 4.2), Chapter Four. Column (1) excludes from this common support region former CTCs that become 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 4.6 (see also Figure 4.1), Chapter Four. The probit regression on which column (4) is based uses the same selected controls as the logit regression shown in Table 4.6, model 2 (Chapter Four). The regression shown in column (5) is the same as that in Table 5.2, 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).

To begin with, column 1 of Table 5.3 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 now constitutes the Academies programme, the Conservative government's CTC scheme and the schools that it established have increasingly become an integral part of the New 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 Academies during 2005/06 (cohort 4). The discussion surrounding Table 5.1 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 the outcome measure between predecessor and Academy school years appears lower than that among other Academy schools[122].

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 and when they are dropped all other non-Academy schools also featuring in these LEAs and forming part of the control group 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

[122] 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 convert into Academy schools relative to once other predecessor schools have made the change.

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 5.3 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 'Methodology' Section 4.3 (Chapter Four).

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[123]. 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-

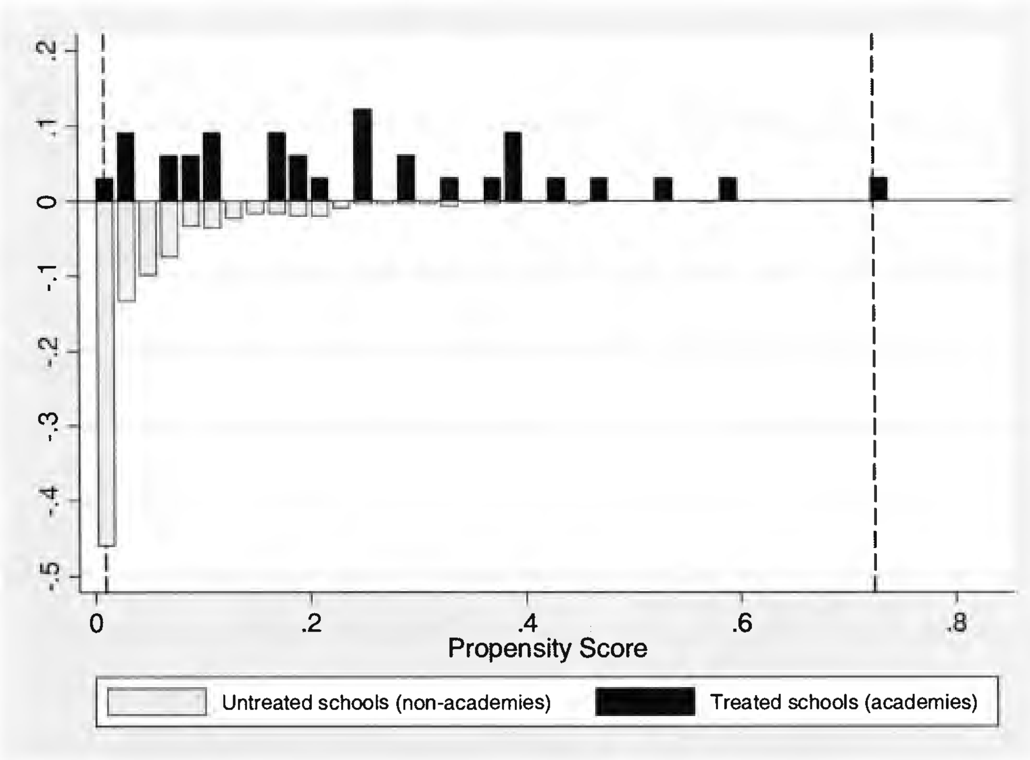
[123] This percentage increase is determined as follows: (2.409/73.577)*100 = 3.274%; (2.547/73.577)*100 = 3.462%; and ((3.462-3.274/3.274)*100) = 5.74%. Here the value 73.577 is the average KS2 total points score in 2002, the common pre-policy year for all Academy cohorts (see the notes to Table 5.2); 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.

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 5.3. Column 3 uses the propensity scores and CSR pertaining to the logit model with full controls, shown as model 1 in Table 4.6 (see also Figure 4.1) of Chapter Four. 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 4.6 (Chapter Four)[124]. 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 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 5.1 below:-

[124] 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 that a school becomes 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 are to remain as non-Academies (93.11% are correctly predicted under both models), but the probit model is marginally better at predicting which schools are to become Academies (98.35% versus 97.80% under logit model 2 – see also Table 4.6, Chapter Four). 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.

Figure 5.1: Propensity Scores for Academy and Non-Academy Schools: Probit Model with Selected Controls (see Table 5.3, 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 5.3, column 4 (for the list of selected controls used in the probit model see Table 4.6, model 2, Chapter Four). The common support region of (0.00917 0.7243) includes 33 Academy schools (out of 33) and 269 non-Academy schools (out of 389).

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 4.3 (Chapter Four) 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 identifies more non-Academy schools in the CSR than does the probit, even if modelling uses 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 5.3 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 5.3 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 ($\delta A_s * PolicyOn_{t \geq k}$) 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)[125]. 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[126]) 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 5.3, 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 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 numbers 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

[125] 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).

[126] 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.

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 Academy cohorts to which the experimental setting can be applied. Table 5.4 below indicates the practicalities behind this testing process and how the 'fake' trial situation compares with that which actually exists for each wave of Academy schools:-

Table 5.4: The Structure of the Falsification Exercise as a Robustness Check (see columns 6 and 7 of Table 5.3)

	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. The actual predecessor years and Academy years for each Academy cohort shown here are the same as those in Table 4.4 (Chapter Four). 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 5.3). 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 5.3).

As can be seen from the Table the fake policy experiment does not use data from any of 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 5.4 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 5.3 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 (δ = 2.388). This means that the outcomes from the falsification experiment and the actual result are comparable. Column 7 of Table 5.3 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 5.3 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 5.2. The outcome of re-estimating this effect using only 6 years of data (as discussed above and shown in Table 5.3, column 6) also provides assurance about one particular aspect of the evaluation process. It was noted in 'Dataset Construction' section 4.2.3 of Chapter Four 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 is 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 and discussed in Section 4.2.3 (Chapter Four). 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 are 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 5.3, 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 affect 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 affect 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 compete with non-Academies for pupil intake from the same supply pool, then the increased entry of more academically able pupils into Academies may 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 results 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 do not become Academies as a comparison group, given that they may not be 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[127]. Given these statistics, it is unlikely that intake behaviour changes in one post-conversion Academy school can have 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 5.1, where it was shown that the comparison group still experience intake quality growth

[127] 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 3A, Section 3A.A, including Table 3A.1). Thus all figures discussed here understate the actual number of control schools within the LEA of an Academy.

between 1997 and 2007 but to a lesser degree than do 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 are of an increasingly stronger academic quality throughout the 11 year window implies that intake into these schools has not been 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 be no significant indications of policy spillovers occurring from Academy to non-Academy schools that might be affecting pupil admissions for both parties.

5.4 Dynamic Effects

School conversion to Academy status has thus far been shown to be *generally* characterised by these schools admitting year 7 pupils with a higher record of prior attainment. The stringent model estimated in column 4 of Table 5.2 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 indicates the *average instantaneous response* of all 33 Academy schools to treatment. In Table 5.5 that follows tests are carried out that look for evidence of dynamic reactions to the Academy schools policy, such that the outcome measure continues to change among Academies as the length of exposure to the scheme increases 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.

Table 5.5: 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 4.6, model 2 (see also Figure 4.2) of Chapter Four, so that regressions are based on 3,949 observations covering 359 schools, of which 33 are Academies and 326 are non-Academies (see Table 5.1 for the number of Academy schools in each cohort). * indicates statistical significance at the 5% level, or better.

In the first column of Table 5.5 all schools that become Academies are assumed to have the same initial change in their KS2 intake quality on average (as per column 4 of Table 5.2), 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 there are gradual year-on-year changes in intake quality that add 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:-

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

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 continue 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 carries on cannot be rejected. Thus it would appear that there is only a one-off augmentation in pupil quality that happens as soon as schools re-open 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 5.5, where this average initial policy response is allowed to differ by the cohort. In this case some Academy waves may change the intake quality of their new entrants by more than others once they become Academies, so that they drive 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 respond 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 ($\delta_c = 0$ 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 is 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 are generating the average response over and above others (see the rows in italics in Table 5.5, 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 5.5 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:-

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

$$\Psi Z_{st} + \xi_s + \lambda_t + \varepsilon_{st} \qquad (8)$$

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 5.5 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:-

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

$$\Psi Z_{st} + \xi_s + \lambda_t + \varepsilon_{st} \qquad (9)$$

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 is a homogenous cohort response to the Academy policy and no changes to the outcome measure after the average positive change which happens initially when schools convert 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 5.5).

Overall, the dynamic equation models (6) to (9) estimated in Table 5.5 give weight to the persistent regression finding that there is an immediate increase in KS2 intake quality once schools become Academies. Beyond this initial rise there are no more changes in this outcome measure, though the jump up is a constant impact that is neither reversed nor reduced over time in the effective policy years. Moreover this pattern of behaviour is not witnessed among non-Academy schools nor is it evident at some earlier point in time, as the pre-policy robustness test highlighted in column 7 of Table 5.3 showed. Thus the estimated Academy conversion effect shown in column 4 of Table 5.2 and derived using regression equation (2), which excludes cohort-specific controls, binds in all tested circumstances. All Academy schools intake pupils with an average 2.409 higher KS2 total points score as soon as they open 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. As the Academies Programme expands, a useful future research exercise would be to determine whether heterogeneous cohort responses to the policy can be found in a larger sample.

5.5 Possible Mechanisms behind Changing Intake Ability

In the final part of the evaluation process to be concerned with KS2 intake quality changes, Table 5.6 presents findings from analysis that looks into the mechanisms behind the positive jump in this dependent variable among schools that become Academies as compared to other schools in the sample. To start with, in the first four columns of Table 5.6 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 are entering Academy schools from their KS1 records combined with their KS2 outcomes. It may be, for example, that Academy schools admit pupils showing signs of improved learning over time, so that their value-added test score increase between KS1 and KS2 is high. Or pupil intake into Academy schools may comprise of pupils showing consistently strong levels of attainment, in which case their KS1 and KS2 total points scores may be high but remain 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 prefer to admit pupils who have attended primary schools that are more likely to be 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 are 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 taking place among Academy schools.

Table 5.6: 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 column (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 come; 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 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 4.6, model 2 (see also Figure 4.2) of Chapter Four. * indicates statistical significance at the 5% level, or better. § indicates significance at the 10% level.

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 entering these schools[128]. 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 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.

Columns 1 and 2 of Table 5.6 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 may 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

[128] Table 3A.3 in Appendix 3A 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.

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 drop out of each school in the sample because they lack 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 changes to an extent where the estimated policy impact falls 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[129]. 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 5.6 use the matched KS1 and KS2 sample to consider if schools admit more of a particular pupil type once they become Academies: either pupils with a stronger innate ability background or improved

[129] 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 5.6, which is greater than that under column (1), of 73.69 points.

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 schools admissions steer 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 it is not clear how well informed state secondary schools are about the prior attainment of pupils applying for (year 7) entry to the school. Nevertheless, this finding has raised the issue of a potential change to the types of pupils that comprise 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 5.6, consideration is made for whether the number of primary schools from which secondary schools get their pupil admissions differs among schools that convert to Academy status versus non-Academies. Then column 6 asks if schools that receive Academy 'treatment' subsequently intake their pupils from relatively higher performing primary schools than did their predecessors or the comparison group of schools. These issues are examined by re-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 increase their primary school supply pool following their status switch relative to control schools[130]. 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 get their intake in the common pre-policy year of 2002 is 33 schools and

[130] The number of primary schools from which secondary schools get 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 is assigned the value 1 and values are 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 is averaged again at the secondary school-level in order to establish the mean quality of intake primary schools.

after conversion this rises 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)[131], 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 pupils entering Academies also come 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 get 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 come once these schools are Academies is about 1.2 per cent higher, at 76.49 total points.

In columns 7 and 8 of Table 5.6 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 5.6, these extra regressors do help in explaining which factors shape the rise in pupil intake quality among schools that convert into Academies. About 34.70 per cent of the measured boost in KS2 intake ability can be accounted for by the fact that post conversion, and with school capacity changes controlled for, Academy schools tend to admit pupils from a larger number of primary schools and from primary schools that perform 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 5.2 and column 7 in Table 5.6 respectively). With the

[131] 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}.

characteristics of primary schools added, the estimated δ coefficient is marginally reduced again, to 1.567 KS2 total points scores[132]. 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 admit more academically able pupils once they switch status, but some of these pupils attain KS2 standards of achievement which are 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 Academies that appears to reflect more pupil entry by higher ability pupils, including those with above primary-school average 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 are happening which are then allowing their intake to include more pupils with a relatively stronger average prior ability. In the final column of Table 5.6 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 looks at whether the year-on-year KS2 attainment range of pupils entering Academy schools is narrower or wider than it was for their pre-Academy counterparts and non-Academies. Given that Academies raise their admissions of pupils with higher prior attainment without this effect being fully absorbed by school size growth, then mean intake quality can be pushed up in one of two ways. Either Academy schools might *intake pupils of a wider ability range* once they switch status and raise 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,

[132] 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.

Academies may instead *lower the spread of their pupil intake ability*, cutting the proportion of pupils that they intake from the bottom end of the attainment distribution in particular, so that average intake ability into the school rises. 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 take shape. More specifically, one of three situations could occur that would allow for a reduced dispersion and higher mean ability among pupil admissions in post-conversion Academy schools. These are: (i) Academies could 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 reduce intake ability proportions at both ends of the performance spread, but cut off relatively more pupils from the bottom than the top end; or (iii) Academies could lower admission shares at the bottom end and raise the pupil entry proportion at the upper end of the attainment distribution, but with an increase at the top end that is relatively smaller than the cut at the bottom end. In all cases a rise in mean intake quality *and* a reduction in intake ability dispersion occurs, an outcome that is achieved through 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 convert into Academies they reduce 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 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 happens 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 are 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 is a reduction in the admission of pupils with a weaker KS2 performance record in Academies relative to in their pre-Academy versions. Empirical evaluation has also revealed that Academy schools cater for pupils of above average ability in the primary school from which they came and there is some indication that innate ability features more among admitted pupils than does learning progression. Thus it seems that school conversion into an Academy is 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 on the constitution of schools to which it is applied in contrast to other 'untreated' schools.

5.6 Assessing Other Dimensions of Intake Quality and Examining Changes in Whole-School Composition

Panel A of Table 5.7 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 writing, 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 DCSF-provided school-level files (as described in Chapter Four, Section 4.2.2), 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 5.7.

Column 1 begins by looking at changes in the fraction of pupil intake that is eligible for Free School Meals (FSM) in schools that turn 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 1A, Section 1A.G for further details; for a discussion of the drawbacks of this variable see Chapter Two, Section 2.7). As can be seen from the findings of this regression, intake into Academy schools consists 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 falls 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 has 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.

Table 5.7: 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) (academy*policyon)	-5.563* (1.436)	-0.417 (0.326)	0.389 (2.609)	0.302 (1.125)	0.269 (2.347)	0.680 (1.005)	-4.197* (1.324)	2.049* (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) (academy*policyon)	-1.697 (1.200)	0.283 (0.396)	1.090 (1.603)	0.171 (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 years for which year 7 pupil-level data is available (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 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 4.6, model 2 (see also Figure 4.2), Chapter Four. * indicates statistical significance at the 5% level, or better.

In columns 2 to 6 of Table 5.7 (Panel A) consideration is made for whether other aspects of pupil characteristics differ in the Academy school years for pupils starting their secondary school phase of education. 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 change to a discernable or statistically valuable degree in the years in which the policy period applies. The same general finding stems from the analysis of changes in whole school features. Panel B of Table 5.7 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 are 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 does change in a significant and substantial way in the Academy school years is FSM eligibility. Columns 7 and 8 in Panel A of Table 5.7 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 enter a school that has converted into an Academy. Column 8 goes back to the estimated regression shown in column 4 of Table 5.2 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 enter a school that has 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 not only intake academically stronger pupils and reduce their admission of weaker-attaining students, but they also tend to feature fewer pupils from deprived backgrounds. These findings are in direct contrast to their stated objective of having a more inclusive and mixed ability pupil profile (see Section 3.3, Chapter Three).

5.7 Summary and Discussion

Education policy in the UK has increasingly sought to raise school standards and the performance of individual pupils through the introduction of school renewal programmes that target institutions at the lower end of the attainment distribution. Under these schemes schools deemed to be failing in their delivery of education experience 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 increasingly applied to state secondary schools since the early 2000s is that of the Academies Programme, where underachieving schools are 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 at the time of writing (June 2009) there are 133 Academy schools in existence. Plans to extend the scheme to 15 per cent coverage of the secondary education phase in the future will make 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 reflects an understanding of the lack of confinement of this scenario to urban areas. Though they are becoming 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 are meant to cater in the areas in which they are set up. Chapters Three to Five have sought to examine the issue of the inclusiveness of the Academies scheme using information on schools that underwent conversion to the new 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 share a similar historical evolution in their characteristic make-up but differ 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 this particular programme of school reform. The dimensions of intake that appear to change the most in Academy schools are the prior attainment distribution of pupils joining these schools and the percentage of new entrants who are eligible for free school meals. There is a distinct and robustly estimated rise in intake ability among Academies as soon as they re-open under their new 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 are not shown in non-Academy control schools. Growth in the pupil capacity of these schools does not explain away these measured effects, implying that composition changes are achieved through re-drawing the fractions of pupils that are admitted to the school from within the ability and social background ranges. Evidence presented here suggests that Academy schools raise 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 likely lower 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)) is occurring 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 Chapter Three, Section 3.3).

As the Academies programme expands, further analysis of the scheme will determine the extent to which these findings are a consequence of a small sample size. If the well-publicised popularity of Academy schools persists, physical capacity constraints may prevent the ability of these schools to admit an ever growing number of pupils. This may increase the degree and types of compositional change occurring in these schools over time. The difficult issue to *empirically* pinpoint is whether the driver of exclusivity through compositional change is 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.

Given the unique circumstances surrounding Academy schools, including their political and media attention, there is a limit to the general applicability of the findings presented here. However, as an initial detailed study into the effectiveness of this kind of school reconstitution in delivering its objective of raised inclusion, this work flags up concerns about the benefits of expanding a policy that does not appear to reap any improvement in circumstances among underprivileged pupils attending schools at the bottom end of the performance distribution.

Conclusion

Equality of educational opportunity requires that all pupils have fair access to standards of education which maximise their future life chances. School choice policies and strategies of institutional reform have each sought to achieve the intertwined goals of raising attainment and providing a fairer education system through better alignment of the pupil-school match, attempting to deliver this by widening the network of schools that pupils *can* and *do* want to access from their current home location.

The choice system was introduced in England in the late 1980s in response to the perceived failings of the education system that had historically allocated pupils to their nearest local school. From its inception the scheme pursued the creation of a quasi-market for schools, which was to be developed by two means. Parents were allowed for the first time to express a preference for the school to be attended by their child. This was combined with school competition generated through the pupil-led funding of schools, in which those institutions that attracted a higher number of students, particularly disadvantaged pupils, received greater revenue. Choice policies were designed to improve the pupil-school match by *offering all pupils the chance to access good-quality schools without moving home.*

As it stood, the choice structure was imposed on an uneven playing field, in which some schools had an historical reputation of poor standards of education delivery and performance, whilst others were consistently popular due to their high records of academic attainment. This divide in quality persisted following the introduction of choice policies and school competition, and, by the early 2000s, resulted in the formation of school reform strategies that targeted a revival in the reputation of underperforming and therefore under-demanded schools. As the largest scheme of this kind to date, the Academies Programme began in 2002 and offered school renewal at the secondary phase of education in particular, since attainment standards in some secondary schools within deprived areas were falling well below government-established National Curriculum school performance targets. Institutional reform methods sought to raise the potential for a better pupil-school match by *increasing the supply of schools pupils would want to attend, given their current residential setting.*

Whilst they are two initiatives that are distinct in terms of their timing of introduction and their approach to tackling failures in state-provided education, choice policies and school reform strategies are united by their overall focus on reducing educational inequalities. This thesis has employed the substantial evidence contained in England's National Pupil Database to demonstrate shortfalls in the functioning of these schemes and hence the persistence of disparities in educational opportunities. Deficiencies in the operation of policy have resulted in exclusivity in access to oversubscribed or potentially improving schools by pupils from more economically advantaged backgrounds with relatively higher academic ability. Key findings are:-

- The process of transferring between schools at non-standard time points during the primary phase of education involves combined school and home moves more often than it does school only change. If isolated school shifts do take place, these are far more likely among pupils who are *not* entitled to free school meals;

- There is limited evidence of the existence of a quasi-market for schooling, measured here as the amount of pure school moves into oversubscribed Community schools by pupils coming from under-capacity institutions. Preliminary indications of a choice system were found to be dominated by the London region and were not present elsewhere in England, implying that the connection between the school and the home still matters for admission into popular schools throughout much of the country. However, a breakdown of the regional analysis by FSME status revealed that both eligible and ineligible-FSM pupils in London were making choice-type school changes, with stronger indications among those eligible. Further investigation is necessary in order to determine whether such moves do actually reflect the choice scheme in operation;

- Restrictions on the choice system appear to stem from oversubscription admissions rules applied to LEA-governed Community schools which reinstate the school-home proximity link. Among more autonomously-governed Voluntary-aided (VA) schools, it is likely that oversubscription criteria use non-distance related factors to rank pupil entry (such as an expression of religious faith). In these institutions there are signs of choice-type school change taking place for FSME pupils, and these moves are not confined to the London region. This relative difference in the presence of a quasi-market between the Community and VA school types suggests the potential for proximity rules to be imposing inhibiting effects on the choice process.

- School improvement applied to state secondary schools in the form of the Academies Programme is failing some disadvantaged pupils inhabiting areas of deprivation, precisely the group the scheme aims to cater for. Academy conversion is associated with a school performance-favouring change in the pupil profile of these schools. Intake into year 7 of an Academy features a reduced proportion of pupils of a weaker KS2 attainment background, and a lower proportion of students on free school meals relative to the fractions of these groups in both predecessor schools and comparable non-Academies. This evidence of the development of stratification in Academies along the lines of pupil characteristics and prior ability suggests a worsening of education inequality.

The most positive finding to come out of this study, in terms of equality in educational opportunity, is that deriving from the regional and FSME status breakdown of moves from under-filled to full-to-capacity Community schools. This analysis signalled a likelihood of some less-advantaged pupils gaining access to popular, well-performing LEA-governed schools in the London area by making pure school changes, and therefore the possibility that choice is exploited by this group despite the continued emphasis on school and home proximity in oversubscription rules. However, this is only true insofar as these moves do reflect the exercise of choice, and are not driven by factors specific to conurbations that allow for a greater likelihood of entry into popular schools through isolated school change.

At present the education system appears to be organised into two distinct tiers. Current school choice provisions are mainly conferring advantages on pupils of above-average academic attainment who come from higher income households, allowing them to engage in *"aspirational mobility"* to better-performing institutions that are expected to increase their future education outcomes[133]. School renewal targets the lower end of the achievement and income distribution, aiming to increase the supply of schools improving in their quality in regions typically inhabited by disadvantaged pupils. Reform of this kind can essentially be viewed as promoting *aspirational immobility*, in that it encourages higher service provision and better standards of education in the schools pupils from low-income households would usually attend, a strategy that, if effective, should reduce the need to search for alternative school quality.

To the extent that school reform in the shape of schemes such as the Academies Programme is allowing at least some underprivileged pupils access to potentially improving school quality, it can be argued that this two-tier outcome of education policy is *efficient*. If better-off families face lower search costs in the process of choice participation, associated with the costs of acquiring, interpreting and utilising information on the quality of different schools, and if their gains from choice-related school change are larger, then their relatively greater exploitation of this policy is resource-saving (Adnett and Davies, 2002). Pupils from worse-off families, however, may well be confronted by higher costs of searching due to low family wealth and may anticipate lower returns to be derived from school change that takes place in the quest for a better pupil-school match. Unless the costs of engaging in choice can be reduced among financially disadvantaged households in particular, then a strategy of effectively discouraging mobility among pupils in deprived areas and instead attempting to boost the quality of their local schools might also be deemed to be more economically viable.

However, where failures in the correct targeting of school improvement lead to some pupils being made worse-off in terms of their fair access to education, these point towards *inefficiencies* in the policy and therefore in the education system as it presently stands. More importantly, these suggest the existence of *inequalities* that may lead to a deterioration in the life chances of underprivileged pupils. Findings from the research undertaken here into the intake and compositional changes of

[133] Ewens (2005) describes aspirational mobility as that "where parents of children with higher levels of attainment seek to better their child's educational prospects by seeking out 'better' schools, regardless of where those schools may be" (pp. 5). Aspirational mobility relating to schooling may confer additional advantages on pupils where the move also entails increases in the quality of the home, the area, and/or employment opportunities (see Verropoulou *et al.*, 2002).

Academy schools have highlighted the validity of these concerns: the displacement of pupils with low attainment at KS2 suggests an involuntary change in the choice of school attended among weaker-performing pupils who might otherwise have gone to the Academy. At the same time disadvantaged pupils, who likely underestimate the expected returns to taking part in choice compared to the associated costs, may stand to gain the most from a choice system. If this boosts the quality of education they receive and reduces the gap between their attainment and that of other pupils from higher social classes, then their benefits from participation in the choice process will far exceed the costs. For pupils from better-off families, learning achievements are likely being raised all the more by their greater use of choice, while it can be claimed that even in the absence of this scheme such pupils may have acquired strong academic performance because of the higher motivation for academic success that is associated with their relatively more advantageous socio-economic family background (Mortimore and Whitty, 2000). With these points in mind, policy implementations that allow poorer families to benefit *to a greater extent* from the initiatives of choice and school reform would appear to be useful in raising standards and educational equality.

i. New Policy Developments and Their Effectiveness

Recent developments in education policy have aimed to bolster the school choice system on the demand-side, targeting participation in choice by low-income households in particular, with introduced initiatives also likely impacting on school improvement programmes through their potential to increase competition between schools for pupils. The 2006 Education and Inspections Act enforces the promotion of fairness in access to educational opportunities by placing a duty on LEAs to reduce the costs of exercising choice among poorer families (Burgess and Briggs, 2006; Tough and Brooks, 2007). Two key methods of access promotion concern home-to-school transportation and the provision of support to parents when making schooling choices, as outlined below[134]:-

[134] Other important components of the Act include a ban on the use of interviews in any school's admissions process (Part 3, Section 44) and a strengthening of "the legal status of the School Admissions Code so that admission authorities will have to 'act in accordance' with it, rather than simply 'have regard to' it" (Part 3, Section 40; see DCSF, 2006b, pp. 6).

- School travel – Part 6, Section 77 of the Act places "a new duty on local authorities to provide free transport for some of the most disadvantaged pupils (those eligible for free school meals or whose parents are in receipt of the maximum level of Working Tax Credit) to attend any of three suitable secondary schools closest to their home, where these schools are more than two (and less than six) miles away. Alternatively, pupils may choose a school up to 15 miles away where this is the nearest suitable school preferred on grounds of religion or belief" (DCSF, 2006b, pp. 9);[135]

- Parental support in the choice process – Part 3, Section 42 of the Act requires local authorities "to provide advice and assistance to parents in expressing a preference for a school for their child"..... "In this way it helps a broader range of parents to exercise their right to choose the most suitable school for their child and take advantage of the diversity of local provision" (DCSF, 2006b, pp. 2 and pp. 7).

The extent to which the provision of free transport to secondary school-age pupils from low-income households will lead to greater school choice take-up among this group depends in part on whether this scheme changes the quality of schools they can access. Burgess *et al.*, (2006a) study the journey-to-learn travelling distances made by one cohort of pupils who enter state secondary schools during the academic year 2001/02. The authors consider the "feasibility of choice", that is "how far pupils would have to travel to reach at least three schools" (*ibid*, pp. 2), and they assess the likelihood of at least one of these schools being "good", where this is defined as a school that ranks in the top third of the national school performance tables in terms of the percentage of its pupils getting five A*-C GCSE grades in the pre-entry year for the cohort (2000/01)[136]. Pupils who are eligible for free school meals are found to

[135] In terms of primary school-age children, "[r]egardless of the level of family income, children of compulsory school age, but under the age of eight are entitled to free travel arrangements to their nearest qualifying school more than two miles from their home (paras.102-105). In addition, from September 2007, children aged eight, but under age 11 from low income families must have travel arrangements made where they live more than two miles from their nearest qualifying school. This two mile limit should be measured in the same way as the 'statutory walking distance', i.e. along the 'nearest available route'. This might include footpaths, bridleways and other tracks which are not passable by motorised transport" (DfES, 2007a, pp. 21, paragraphs 93 and 94).

[136] The authors measure straight line distances between the home and the school to identify the nearest three schools and they do not take into account whether there are spare places at each school or if each school adheres to the religious denomination of the pupil. Only gender mis-matches are taken into account, in that each nearest school must not be a single sex school catering for the opposite gender to the pupil.

have considerable choice feasibility, with their median commuting distance to three schools being 2.0km, compared to 2.5km among non-FSM entitled students. Furthermore, 91 per cent of FSME pupils live within 5km of three schools, relative to 78 per cent of pupils from better-off families. However, the chances that any one of the three accessible schools is a "good" school is much lower for a FSME pupil than it is for a student who is ineligible for FSM, standing at 44 per cent versus 61 per cent respectively. This evidence focuses on journey patterns of a single cohort and as such is unlikely to be representative of all secondary school year groups. It also pre-dates the 2006 Act by five years, during which time the performance of the schools surrounding FSME pupils may well have improved. Nevertheless, with these statistics in mind, it is plausible to suggest that the successfulness of the transport policy in boosting choice feasibility is undermined by the notion that the scheme may not go far enough to change the quality-set of schools accessible to pupils from poorer backgrounds. The areas of relative deprivation that these pupils frequently inhabit may be characterised by no "good" schools as defined by Burgess *et al.*(2006a), even within the maximum free transport allowance of less than six miles. Then, if increased schooling access simply provides FSM-entitled students with a greater number of reachable schools of the same (or possibly worse) quality, these pupils would have little logical incentive to engage in longer journeys to school if doing so leaves their learning experiences unchanged.

The underlying assumption behind a policy of offering support to parents involved in the process of choosing schools for their child(ren) to attend is that all parents value education and will benefit from guidance that aims to increase the match of the school to the pedagogic needs of their child(ren) because they each seek to maximise the education potential of their offspring. In fact, qualitative research into the decision-making procedure behind choosing schools indicates variation in the values and priorities parents place on learning and aspects of its provision according to their own income and education levels. Croft (2003, pp. 17) summarises literature evidence on this provided by Ball *et al.* (1995), who find that "[t]here are two distinct discourses of choice in evidence. A working class discourse dominated by the practical and the immediate and a middle class discourse dominated by the ideal and advantageous." A study into the school choice process carried out by the DfES in 2001 also highlighted that "parents from lower socio-economic backgrounds are more likely to consider their child's friendship groups and proximity to the school as more important than its performance table position. On the other hand, academic factors are more likely to be relevant in establishing which schools to apply to for mothers in a non-manual social class" (Tough and Brooks, 2007, pp. 17). That worse-off families place strong emphasis on practical considerations such as proximity to the school is corroborated by the work on home-to-school travelling distances by Burgess *et al.* (2006a), who estimate that FSM-eligible students travel about one third of a kilometre less further to school than non-FSME pupils, even after conditioning for the higher tendency for pupils who are entitled to FSM to inhabit urban areas. Disparities in the aspects of schooling that families give precedence to are likely to be related to variations in aspiration levels along the income and social class spectrum. Croft (2003, pp. 17) notes that "[t]here are some data which suggest that children reject schools which they think they can not have (Reay and Lucey, 2000); this mirrors findings in studies of low income families, where children's aspirations were found to be quickly limited (see Middleton *et al.*, 1994). In the case of school choice, rejection involves stating that they do not want to go to the 'unattainable' school, or that they prefer others."[137]

It should be noted that while the provisions of the 2006 Education and Inspections Act target the costs of school choice, with transport and knowledge of the system being two particularly high costs for low-income households, guidance services are open to all parents, regardless of their financial situation. Taken together, all of the points raised above suggest that the offer of support in the school-choosing process may be less than fully utilised among economically disadvantaged parents and stands a greater likelihood of benefitting pupils from better-off families. Then choice exploitation among higher-income households could be raised by this provision, while that of worse-off families could remain largely unaltered if the service does little to change their perceptions of the long-term education benefits to be derived from more informed choice. The counterargument to this is that raising the supply of information on the choice process to low-income parents may encourage positive changes in the values they attach to education and the aspirations they have for their children, if the low weight placed on these issues stems directly from a lack of understanding of how the system works.

[137] See Croft (2003) for full references to the work of Ball *et al.* (2005); Reay and Lucey (2000); and Middleton *et al.* (1994). See Tough and Brooks (2007) for a full reference to the work of the DfES (2001).

The travel provisions offered by the 2006 Act could be made more effective and equitable by increasing the home-to-school distance over which *all* secondary school pupils from economically-disadvantaged households are guaranteed to receive free transport. The Act stipulates that pupils from low-income families may travel up to 15 miles to reach a school that satisfies religious affiliations or beliefs. If this journey distance is considered feasible for pupils to undertake in order to maximise their schooling preferences on the basis of religious grounds, then it would appear fair to augment the travel service for all students covered by the scheme, irrespective of faith-based factors. This may widen the scope for underprivileged pupils to access schools differing in their quality, especially helping to ensure the possibility of entry to "good" schools with a stronger league table performance than that achieved by the institutions these pupils typically attend, an outcome which in turn may achieve a more substantial reduction in cost-related non-participation in choice by poorer households. A broader impact of transport extension may be to boost standards in all schools, including Academies, if the field of competitive pressure surrounding each individual school were enlarged as a result. In respect of the supply of guidance to parents on the school choosing process, this initiative could be strengthened by close monitoring of usage among households in which children are entitled to FSM. If take-up were low within this group, the equity and efficiency of the provision may be raised if awareness of the educational benefits to be derived from making better-informed schooling choices were specifically targeted towards low-income families. Successful service usage targeting would stand to further reduce the connection between family socio-economic background and the capacity to exercise school choice (Tough and Brooks, 2007).

While policy initiatives on the demand-side of the choice equation may serve to redress some of the overall imbalance in the use of choice by households differing in their income levels, the fundamental flaw in the 2006 Act lies in its failure to rectify problems on the supply-side of the schooling system, which cause it to continue to operate in a way that is not fair to all pupils (Tough and Brooks, 2007). Croft (2003, pp. 16) neatly summarises these problems in her discussion of the work by Taylor (2002), who "found parents raising the issue of constrained choice; sometimes they saw this as connected with where they lived, with the problem either being affordability of transport, or the restrictions of catchments and prioritisation mechanisms."[138] The provision of free transport for secondary school pupils from low-income households coupled with more informed schooling preferences may on their own have a measured degree of impact on reducing the costs of exercising choice among these families. However, assignment rules governing entry to schools – particularly those applied when popular, well-performing schools become filled-to-capacity – currently revert access back to the community-based model of schooling, because of the emphasis they place on admissions determination according to a well-defined school-home distance. The success of recent policy reforms in raising choice uptake rests on the adjustment of admissions criteria to allow pupils living within two to six miles of the school to be classified as satisfying proximity-focused entry rules, a situation which the latest School Admissions Code does not appear to have taken into account[139]. For as long as geographically-related schooling allocation mechanisms persist along their current lines, parents who are financially better-off will continue to benefit from strategic housing moves into the catchment areas of preferred popular schools in order to ensure access based on adherence to proximity clauses, with the result that house prices in such areas will be sufficiently high to crowd out economically worse-off families (Gibbons and Machin, 2006)[140]. In the long-run the pursuit of location advantages can only serve to create or perpetuate a situation of "selection by mortgage" and a segregated schooling system, with composition that reflects the homogeneity of pupil-types in the vicinity surrounding the school (Croft, 2003, pp. 18; Silva, 2009)[141]. Without corrections to supply-side proximity allocation rules, demand-side policies deal with only half of the restrictions on the use of choice among poorer households and consequently impose

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[138] See Croft (2003) for a full reference to the work of Taylor (2002).

[139] The most recent School Admissions Code (2009) came into effect on 10 February 2009. Inspection of the Code did not reveal any explicit statement that admissions criteria relating to distance must accommodate the extended provision of free transport between the school and home of between two and six miles. At best the Code states that "Local authorities **must** consider, for example, whether their admission or transport policies....are in line with the principle of fair access to educational opportunity (DCSF, 2009, pp. 23, paragraph 1.70; original emphasis). In terms of oversubscription rules and transport, the Code notes that "[i]t is good practice to give priority to children who could reach one school (but not others) by public transport, or to children who would have a disproportionately long journey to another school if denied admission to their nearest school (*ibid*, pp. 35, paragraph 2.38).

[140] The 2009 Code acknowledges the connection between proximity rules and the housing market, but does not fully prevent their having an unfair admissions effect, as the use of *should* rather than *must* in paragraph 2.39 of the Code indicates: "If using distance as an oversubscription criterion, admission authorities **should** ensure in their admission arrangements as a whole that families who are less able to afford property nearest the school are not excluded as a result" (*ibid*, pp. 35, original emphasis).

[141] Tough and Brooks (2007, pp. 8) define segregation in schools as "the degree to which pupils from different backgrounds, or with different characteristics such as their level of prior attainment, are likely to be concentrated in particular schools."

limitations on the government aims of raised standards of attainment and equality of educational opportunity.

ii. Avenues for Future Research

Empirical analysis of school change at the primary school stage presented in this thesis has shown there to still be a significant association between entry to above-capacity schools and combined school-home moves, a result which suggests that the choice system has not gone far enough to disentangle this historical and geographical link. Interestingly, the government's approach to tackling school underperformance through improvement schemes does not appear to be immune to admissions restrictions, with reports indicating that Academy schools are becoming increasingly oversubscribed (see Chapter Three, Section 3.5). These findings propose directions that future research into the mobility and school choice relationship could take. Two key pieces of information that matter for the assessment of primary school mobility are missing from the evaluation undertaken here. The first is details on pre-school-entry moves, that is, those taking place from birth up to the age at which a child first starts their compulsory education. As was noted in Chapter One, relocation activity is more likely before children join the school system and any mobility that takes place during this stage needs to be accounted for if the definition and measurement of stable and mobile pupil populations during later schooling years, such as in the primary phase, is to be accurately determined. The second is qualitative evidence on the reasons for moving school only or school and home. The use of comprehensive survey data is paramount to gleaning some knowledge on these areas, one main source being the Millennium Cohort Study (MCS), a UK-based longitudinal dataset that tracks children from birth and contains information on schooling-related factors, such as the grounds for choosing a particular school. The study includes disproportional representation of families in England that inhabit regions of child poverty and areas containing high ethnic minority populations. A significant advantage of this study concerns its capacity to be linked to the NPD, which would then allow details on school choice to be correlated with move activity using the mobility measurement techniques that have been applied in this thesis. This could open up more substantial evidence on whether strategic moves of home take place among parents in order to secure entry to a particular popular school or whether the choice system can be exploited by school change only, and how these outcomes vary by household financial circumstances. Preliminary research by Burgess *et al.* (2009) has considered the amount of school choice that is present in the MCS sample by assessing how stated parental preferences of schooling differ from the actual school attended by their child(ren). It could well be that the deviations of stated from revealed preferences found in the data are differentially associated with school change and school-home moves as defined here, suggesting that the analysis of mobility using the MCS linked to PLASC represents a valuable avenue for future research to take.

In terms of the secondary schooling phase, this thesis has considered fairness in access to potentially improving Academy schools among disadvantaged pupils and therefore whether these students are able to benefit from this *aspirational immobility* dimension of school choice. One area of analysis that has not been explored is whether the relatively increased intake proportions of higher ability and non-FSME pupils in schools that convert into Academies are driven by the circumstance of oversubscription, which allows Academy schools, as their own admissions authority, more discretion to set their own rules of entry (whilst adhering to the statutory requirements of the School Admissions Code). If a higher quality pupil profile can be mostly attributed to Academies that are oversubscribed, this might hint at an increasing role of choice within the schools themselves and therefore exclusivity that is mainly a consequence of the potential that popularity creates for schools to influence their intake (Burgess and Briggs, 2006). This research exercise is likely to produce more fruitful results as the number of Academies rises and the areas in which they locate shift away from regions of deprivation and towards wealthier neighbourhoods. It may then be found that oversubscription restores the school-home connection and allows Academies to reap the performance-enhancing benefits of access to a more homogeneous, higher ability, neighbourhood composition. Preliminary investigation into the availability of data on the capacity of Academy schools from the DCSF-provided Edubase data source has revealed there to be a lack of consistent annual observations. However, as the scheme still accounts for a low share of the secondary school market and as media interest in the successfulness or otherwise of the Academies Programme remains high, web-based sources and newspaper stories could prove to be useful outlets for determining those Academies that are popular and apply admissions restrictions, so that this future research avenue may still be feasible.

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Appendices

Appendix 1A

Section 1A.A: Patterns of child migration in the UK

Descriptive details on patterns of child migration in the UK and how they have changed over time are given here. Table 1A.1 illustrates the levels and percentages of migrant children aged 1 to 15 within the UK according to the 1990/91 and 2000/01 Population Census statistics. In this context the term *child* refers to all dependent children living in the household, either aged under 16 or aged 16-18 and in full-time education, and the term *migrant* follows the 2001 Census definition of "a person with a different address one year before the Census to that on Census day"[142]. Migration activity then reflects moves that involve a change of home.

The Table shows that in the year prior to both the 1991 and 2001 Census days, the most migrant children were those in the pre-school ages of 1 to 4 (42.03 per cent and 36.37 per cent of all ages 1 to 15 within each Census year respectively), with migration tailing off as children reached a more non-dependent, close to compulsory school-leaving age (at 3.83 per cent and 4.15 per cent respectively by age 15). Approximation to the years of primary schooling is given by the aged 5-9 category and for secondary schooling by the aged 15 category, with some overlap of 2 years appearing for both school stages in the 10-14 age group. Along these lines, the Table suggests that children of primary school age moved more than those in secondary school.

Across the Census years migration was highest in 2001, apart from for children in the 1 to 4 age group, where it was slightly greater in 1991 (at 20.00 per cent of the total number of migrants, compared with 19.07 per cent in 2001). The largest increase in migration occurred for those in the 10-14 age category, with a 3.06 percentage point rise in the percentage of migrants of this age range, from 15.12 per cent of the total (1991) to 17.48 per cent (2001). This was followed closely by children aged 5 to 9 (a 2.36 percentage point increase between the Census years). This suggests that in the 10-year period between Census records, child migration activity rose.

[142] Office for National Statistics (ONS) (2004). 'Census 2001 Definitions', p. 37. Available to download from:-http://www.statistics.gov.uk/downloads/census2001/definitions_chapters_1_5.pdf Note that persons under the age of 12 months are treated as migrants if their next of kin was one.

Table 1A.1: Migrant Children in the UK by Age Group, 1990/91 and 2000/01

(levels and percentages)

	All ages 1 to 4	All ages 5 to 9	All ages 10 to 14	All aged 15	All ages 1 to 15
1990/91	360,958	272,988	191,970	32,852	858,768
% of all ages 1-15	42.03	31.79	22.35	3.83	100.00
% of total	20.00	15.12	10.63	1.82	47.58
2000/01	344,189	315,574	247,288	39,261	946,312
% of all ages 1-15	36.37	33.35	26.13	4.15	100.00
% of total	19.07	17.48	13.70	2.18	52.42
Total	-	-	-	-	**1,805,080**

Sources: 1991 Census; Local Base Statistics (LBS 15) and 2001 Census; Standard Tables (ST008).
Notes for 1991 Census figures: 1991 figures are based on the sum total of 8 migration categories: (1) Within wards (2) Between wards but within districts (3) Between districts but within county (4) Between counties but within region (5) Between regions or from Scotland (6) From outside Great Britain (7) Between neighbouring districts and (8) Between neighbouring counties. The migration period covers one year before the Census day of 21 April 1991.
Notes for 2001 Census figures: 2001 figures are based on the sum total of 3 migration categories: (1) Lived elsewhere one year ago within the same area (2) Inflows - the number of persons moving into the area from elsewhere within the UK and (3) Outflows - the number of persons moving out of the area to elsewhere within the UK. Inflows exclude persons with no usual address one year ago who did not live within the area. Outflows exclude persons moving outside the UK. Area refers to the counties of England. The migration period covers one year before the Census day of 29 April 2001.

Section 1A.B: Initial steps in developing a KS1-2 cohort

Prior to merging together the Key Stage 1 and Key Stage 2 files, some observations are dropped from the dataset as follows:-

(i) If the pupil does not sit for their English, Maths or Science KS2 examinations in the academic year 2005/2006 (where the exams are taken in the summer of 2006). The following numbers of pupils are dropped from the KS2 dataset: 13 (English), 20 (Maths) and 6 (Science) pupil observations respectively.

(ii) There are a few duplicate observations (more than one row of observations for the same KS2 pupil). 10 pupils are dropped from the KS2 file here.

(iii) The KS1 file does not have the above issues (no pupils are dropped from the dataset because they do not sit for their KS1 exams in 2001/2002 and there are no duplicate pupil observations).

Merging the Key Stage 1 and Key Stage 2 data together gives the following results:-

Table 1A.2: Developing a Key Stage 1 to Key Stage 2 Cohort

Status	**Number of pupils** (1)	**Of which independent school pupils** (2)	**Number of pupils *less* independent school pupils** (3)
In Key Stage 1 only (1)	27,427	3,375	24,052
In Key Stage 2 only (2)	32,849	7,681	25,168
In both KS1 and KS2 (3)	562,400	9,091	553,309
Total (4)	**622,676**	**20,147**	**602,529**

There are 20,147 independent school pupils in the sample. PLASC does not sample *all* pupils attending independent schools. Only pupils attending private schools that follow the National Curriculum and register to be included in PLASC will feature, therefore the independent school pupils who are in the dataset are unlikely to be fully representative of the population of this school type.

Section 1A.C: Merging in PLASC data to the KS1-2 cohort

Prior to merging in the PLASC data for 2001/2002-2005/2006, the following observations are dropped from each of the five PLASC waves:-

(i) duplicate observations on the same pupil

(ii) Pupils recorded as attending the school on a part-time basis

(iii) Pupils recorded as being in a nursery class

(iv) Boarding school pupils

(v) Pupils in special schools whose registration type indicates that they are currently registered at more than one school

Table 1A.3: Dropping Invalid PLASC 2001/2002-2005/2006 Observations

PLASC academic year	**2001/2002**	**2002/2003**	**2003/2004**	**2004/2005**	**2005/2006**
Original no. of pupil observations (1)	7,739,335	7,740,153	7,733,278	7,164,816	7,351,518
Duplicates (2)	122	20	2	66	0
Part-time basis (3)	299,712	290,720	296,232	45,400	19,615
Nursery class pupils (4)	34,248	34,780	34,250	6,534	1,121
Boarding school pupils (5)	3,198	2,994	3,613	3,780	4,107
Enrolled in more than one school (6)	996	2,130	5,012	3,951	6,385
Total no. of remaining pupil observations (7)	7,401,059	7,409,509	7,394,169	7,105,085	7,320,290

Note that the total number of remaining pupil observations (row 7) includes *all* state school pupils (across the primary and secondary school stages). Not all of these observations are valid in merging the PLASC waves to the KS1 to KS2 dataset, as the Table below shows.

Table 1A.4: Linking PLASC 2001/2002-2005/2006 to the Key Stage 1-2 Cohort

	PLASC waves merged to KS1-KS2 cohort dataset				
Status	**PLASC 2001/2002**	**and PLASC 2002/2003**	**and PLASC 2003/2004**	**and PLASC 2004/2005**	**and PLASC 2005/2006**
In KS1 or KS2 or both only (1)	41,212	41,878	42,431	42,944	41,810
In PLASC wave only (2)	6,819,595	6,828,711	6,813,924	6,525,353	6,739,424
In KS1 or KS2 or both and in PLASC wave (3)	581,464	580,798	580,245	579,732	580,866

Note that in the above merges of the PLASC data to the merged KS1-KS2 dataset, the PLASC waves have been merged to the whole set of KS1 to KS2 observations, and not just those pupils in the KS1 file who have a matching KS2 observation (i.e. rows (1) and (3) of Table 1A.4 add up to 622,676 in each PLASC year, where this figure is equivalent to the maximum number of pupils who can be in KS1-KS2 and in any PLASC wave, as shown in Table 1A.2, row (4), column (1)).

Section 1A.D: Creating a sample with non-missing mobility indicators and valid key stage results

Looking at the merge of the Key Stage 1 and Key Stage 2 datasets the sample size of the cohort should be at most 562,400 pupil observations (Table 1A.2, row (3), column (1)), or 553,309 observations if independent schools are excluded from the analysis (Table 1A.2, row (3), column (3)).

However, there are other factors to take into account in assessing the workable sample size, and these are:-

- Some pupils in the sample have no observations on the mobility variables of interest in any of the 5 PLASC waves, namely home postcode, school code, and the date of school entry.
- Not all pupils in the Key Stage files have valid Key Stage test outcomes. A recorded entry in a Key Stage test is considered to be valid where either the pupil has achieved a recognised level of attainment in that test or otherwise records indicate that the pupil was eligible to take the test, but failed to do so.

Removing pupils from the sample with no mobility indicators affects the sample of pupils featured in Table 1A.2 as shown below:-

Table 1A.5: Developing a Key Stage 1 to Key Stage 2 Cohort With Data on Mobility

Status	Number of pupils (1)	**Of which independent school pupils** (2)	**Number of pupils *less* independent school pupils** (3)
In Key Stage 1 only (1)	23,499	3,273	23,397
In Key Stage 2 only (2)	24,414	7,401	24,135
In both KS1 and KS2 (3)	557,876	4,465	553,264
Total (4)	605,789	15,139	600,796

Valid Key Stage 1 test outcomes in English reading, English writing and Mathematics are considered to hold where the level achieved in each test can be categorised as shown in the Table below. This Table also indicates how levels achieved in Key Stage 1 are converted into points scores (according to the scoring system set by the government Department for Children, School and Families, or DCSF) making them comparable across Key Stages 1 and 2:-

Table 1A.6: Valid Key Stage 1 Test Outcomes (levels and points score equivalents)

KS1 National Curriculum Level	Points Score Equivalent
Level 4+	27
Level 3	21
Level 2A	17
Level 2B	15
Level 2C	13
Level 1	9
W – Working towards Level 1	3
X – Not required to take the test*	Disregard
M – Missing	Disregard
D – Disapplied from National Curriculum	Disregard
A – Absent	Disregard

Source: DCSF http://www.dcsf.gov.uk/performancetables/16to18_08/testandexam_pointscores08.doc (accessed 14 August 2008). Pupils undertake National Curriculum Key Stage 1 exams in England's state primary schools in the subjects of English reading, English writing and mathematics at the age of 6/7. * X applies to the reading test outcome only. In the calculation of the Average Points Score (APS) 'disregard' is coded as missing, so that the APS for a pupil ranges between 3 and 27. In the calculation of a pupil's Total Points Score (TPS) 'disregard' is coded as zero, so that the range of the TPS is 0 to 81.

At Key Stage 2 English, Mathematics and Science test outcomes are considered to be valid if the level achieved in each test can be categorised as shown in the Table below. Points score equivalents are also given here:-

Table 1A.7: Valid Key Stage 2 Test Outcomes (levels and points score equivalents)

KS2 National Curriculum Level	Points Score Equivalent
Level 5	33
Level 4	27
Level 3	21
Level 2	15
N – Not awarded a test level	15
B – Working below the level of the tests	15
T – Working at the level of the tests but unable to access them	Disregard
L – Pupil has left the school	Disregard
Pupil will take the test in the future	Disregard
Not eligible for the tests (not at the end of KS2)	Disregard
Annulled	Disregard
Absent	Disregard
Lost scripts	Disregard
Missing	0
S – Pending maladministration	0

Source: DCSF http://www.dcsf.gov.uk/performancetables/16to18_08/testandexam_pointscores08.doc (accessed 14 August 2008). Pupils undertake National Curriculum Key Stage 2 exams in England's state primary schools in the subjects of English, mathematics and science at the age of 10/11. In the calculation of the Average Points Score (APS) 'disregard' and '0' are coded as missing, so that the APS for a pupil ranges between 15 and 33. In the calculation of a pupil's Total Points Score (TPS) 'disregard' and '0' are coded as zero, so that the range of the TPS is 0 to 99.

The condition that only those pupils with valid entries in Key Stage tests 1 and 2 are retained in the sample is set so as to reduce the likelihood of the sample picking up observations on pupils from other cohorts, thereby aiming to boost sample accuracy. The following Table indicates pupil-level observations taking into account the validity of their test outcomes:-

Table 1A.8: Developing a Key Stage 1 to Key Stage 2 Cohort With a Valid KS Outcome in Each Test

Status	Number of pupils (1)	Of which independent school pupils (2)	Number of pupils *less* independent school pupils (3)
Valid test outcome in Key Stage 1 (1)	581,597	4,728	576,869
Valid test outcome in Key Stage 2 (2)	581,462	4,660	576,802
Valid test outcomes in both KS1 and KS2 (3)	557,296	4,404	552,892

Comparing column (2) in Tables 1A.5 and 1A.8 with that in Table 1A.2, it is evident that a large number of independent school pupils are missing mobility information as contained in PLASC and, furthermore, others do not have valid KS1 and KS2 test outcomes. Therefore this sample of pupils is dropped from the analysis at this point. Thus a total of 552,892 pupils have data on mobility and a valid test outcome in every test taken at Key Stages 1 and 2, a sample loss of just 417 pupils (compared with 553,309 non-independent school pupils attained previously (see Table 1A.2, column and row (3)).

Section 1A.E: Defining a 'full' sample

A sample of **full** observations required for the purpose of accurately estimating mobility is characterised as having:-

(a) Valid Key Stage 1 and Key Stage 2 test outcomes in all of the Key Stage tests associated with these stages

(b) A home postcode observation in all of the 5 PLASC waves (covering the academic years 2001/2002 to 2005/2006 inclusive)

(c) A date-of-school-entry observation in all of the 5 PLASC waves

(d) A school code observation in all of the 5 PLASC waves.

(e) No missing data on pupil characteristics in each of the 5 PLASC waves and no inconsistencies on pupil attributes that should remain unchanged over time.

For the purposes of measuring school and residential mobility, it is possible to impute some of the missing school code, date of school entry, and home postcode observations to increase the size of the full sample. Imputations that were made to both the school and home mobility indicators involved replacing a missing observation with that from the following PLASC year when observations on an individual pupil in adjacent PLASC years to the missing year were the same (except for in tail-end sample cases, where imputation used either the previous (if missing in 2005/06) or the following (if missing in 2001/02) year observation instead). In terms of the actual measurements of home mobility, there are some errors in the home postcode observations across the PLASC waves and these have been corrected for. The details on these corrections are discussed after Table 1A.9, which indicates the extent of imputations and corrections made.

Table 1A.9: Imputations and Corrections to Mobility Indicators in Each Wave of the PLASC and Key Stage Data (pupils have a valid KS outcome in each test)

	PLASC 2001/2002	KS1 2002	PLASC 2002/2003	PLASC 2003/2004	PLASC 2004/2005	PLASC 2005/2006	KS2 2006
Home Postcode							
Original number of pupil-level observations	547,112	-	550,432	549,876	550,071	551,251	-
Imputes	3,017	-	223	113	29	85	-
New number of pupil-level observations	**550,129**	-	**550,655**	**549,989**	**550,100**	**551,336**	-
% increase in no. of pupils	0.55		0.04	0.02	0.01	0.02	
Number of type (1) corrections*	17,235 (3.13%)	-	11,409 (2.07%)	6,535 (1.19%)	916 (0.17%)	5,820 (1.06%)	-
Number of type (2) corrections*	500 (0.09%)	-	237 (0.04%)	134 (0.02%)	26 (0.00%)	102 (0.02%)	-
Number of type (3) corrections*	1,885 (0.34%)	-	2,318 (0.42%)	2,154 (0.39%)	1,529 (0.28%)	1,190 (0.22%)	-
Date of School Entry							
Original number of pupil-level observations	550,515	-	550,799	550,216	550,210	551,377	-
Imputes	0	-	0	0	0	0	-
School code							
Original number of pupil-level observations	549,415	552,277	550,600	550,165	550,210	550,751	552,861
Imputes	790	148	115	50	0	368	30
New number of pupil-level observations	**550,205**	**552,425**	**550,715**	**550,215**	**550,210**	**551,119**	**552,891**
% increase in no. of pupils	0.14	0.03	0.02	0.01	0.00	0.07	0.01

Notes: * Percentages (in brackets) are calculated on the new number of pupil-level observations, following imputations to the home postcode in each PLASC wave.

Note that in all cases in Table 1A.9 pupils have valid KS1 and valid KS2 test outcomes. Imputations to the date of school entry leave the annual number of observations unchanged. Information on the home postcode and date of school entry are held in the PLASC waves only. Information on the school code is held in each PLASC wave and in the Key Stage 1 and Key Stage 2 waves.

Error corrections that were made to the pupil home postcode data are as follows:-

- Type (1) corrections on the home postcode are for those where only the first or the last letter of the pupil's home postcode changes between the PLASC waves, and otherwise the home postcodes are identical.
- Type (2) corrections are for those where the length of the pupil's home postcode changes by one character (so that the postcode length increases or decreases) between the PLASC waves, and otherwise the postcodes are identical.
- Type (3) corrections are for Royal Mail Changes to the home postcode.

Note that there are no corrections made to the date of school entry or the school code where use is made of information across all PLASC waves since with these codes it is less easy to identify inaccuracies in collected records.

Taking into account these imputations and adjustments to the mobility indicators of interest, our sample is given by:-

Table 1A.10: Sample sizes of the Key Stage 1 to Key Stage 2 Cohort With all Mobility Variables

	Number of pupils	**Sample change (number of pupils)**
KS12 cohort	552,892	
Original sample size (1)	539,387	-13,505
Imputations on mobility indicators (2)	4,515	+4,515
New sample size (3)	543,902	-8,990

The original sample size is that sample size attained using the original home postcode, date of school entry and school code indicators, prior to any imputations. The new sample size indicates the number of additional pupil observations that are obtained following imputations (the error corrections made to the pupil home postcode affect estimated home mobility, not the overall sample size). So the process of cleaning increases the sample size for analysis by 4,415 pupil observations at this point.

The sample is additionally amended for missing observations or inconsistencies on pupil characteristics across the 5 PLASC waves as detailed in Table 1A.11 below:-

Table 1A.11: Sample sizes of the Key Stage 1 to Key Stage 2 Cohort With all Mobility Variables and Pupil Characteristics

	Number of pupils
Sample size (all mobility indicators) (1)	543,902
Missing pupil characteristics in all 5 PLASC waves (2)	138
Dropping pupils with inconsistencies on gender (3)	2,049
Dropping pupils with inconsistencies on ethnicity (4)	13,586
Dropping pupils with inconsistencies on EFL (5)	5,689
FULL sample size (6)	**522,440**

Pupils dropped from the sample in row (2) are those with no ethnicity, Free School Meal eligibility, or Special Educational Needs data in any of the 5 years of PLASC. Row (3) drops pupils with miscoded or incorrectly recorded gender observations, a variable that should be consistent throughout. Likewise inconsistencies in recorded ethnicity lead to a further 13,586 pupils being dropped from the sample (row (4)). In row (5) pupils with changing English as a First Language (EFL) status are also eliminated from the sample, to give a final full sample size of 522,440 pupil-level observations, as shown in row (6).

In the process of checking the availability of data on ethnicity and EFL, it was noticed that there were inconsistencies in records for the former variable in particular in 2001/02 and 2002/03 and for the latter variable in 2001/02 that could be corrected for. Where records on ethnicity or EFL in all other years were the same, the inconsistent year observations were replaced with observations from the next most adjacent year (2002/03 for inconsistent ethnicity or EFL in 2001/02; 2003/04 for inconsistent ethnicity in 2002/03). Actual imputations made were small in number, being 1,295 and 778 pupil-level imputations on ethnicity in 2001/02 and 2002/03 respectively; and 1,476 imputations on EFL in 2001/02. Note that these corrections were made prior to dropping any remaining pupils with inconsistencies in their ethnicity and/or their EFL as detailed in rows (4) and (5) of Table 1A.11.

Section 1A.F: Changes to the number of moving pupils due to missing observations on KS1 APS

If a pupil does not achieve a recognised level of attainment across all three KS1 tests, but they were eligible to sit for these tests, their KS1 Average Points Score (APS) is coded as missing in the data. Pupils without an entry on KS1 APS are not excluded from the descriptive content of Chapter One, though they drop out in regression estimation in Chapter Two. The following Table indicates how the number of pupils in each move category shown in Tables 1.9 to 1.12 of Chapter One change when pupils with missing KS1 test scores are excluded. As can be seen from this Table, sample size losses are small and not sufficient enough to affect the weighted average percentages shown in the Chapter One Tables.

Table 1A.12: Sample Size Changes in Mobility when Pupils without KS1 APS are Excluded

Panel A: Pupils moving once						
Year group transitions	**Pure pupil mobility***	**Excluding pupils with missing KS1 APS**	**Difference**	**School-home moves***	**Excluding pupils with missing KS1 APS**	**Difference**
2-3	10,615	10,516	99	14,444	14,322	122
3-4	8,812	8,738	74	13,371	13,306	65
4-5	8,241	8,183	58	11,082	11,041	41
5-6	6,057	6,002	55	8,093	8,067	26
Panel B: Pupils moving twice						
2-3; 3-4	471	464	7	1,454	1,430	24
2-3; 4-5	466	460	6	988	978	10
2-3; 5-6	198	194	4	715	700	15
3-4; 4-5	267	266	1	1,284	1,279	5
3-4; 5-6	202	201	1	934	928	6
4-5; 5-6	180	178	2	1,030	1,027	3

*Figures shown here are the same as those in Tables 1.9 to 1.12 of Chapter One.

Section 1A.G: 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)).

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Appendix 2A

Table 2A.1: Logit Model Estimates of the Relationship Between Mobility and Pupil Characteristics: One Move

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Gender = Male	0.020***	0.013***	0.013***	0.013***	0.013***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Ethnicity =	-0.052***	-0.047***	-0.003	0.010	0.010	0.009
Other White	(0.016)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)
Asian	-0.036***	-0.032**	-0.020	0.002	0.000	0.000
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Black	-0.013	-0.006	0.045***	0.068***	0.069***	0.069***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Other	0.008	0.014	0.040***	0.048***	0.051***	0.051***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Unknown	0.068*	0.062*	0.071**	0.068**	0.069**	0.071**
	(0.037)	(0.036)	(0.036)	(0.032)	(0.033)	(0.033)
FSME		-0.040***	-0.042***	-0.039***	-0.042***	-0.042***
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
SEN		0.047***	0.049***	0.047***	0.034***	0.033***
		(0.005)	(0.005)	(0.004)	(0.006)	(0.006)
Age = 7		-0.026***	-0.017*	-0.015*	-0.016*	0.062***
(transition yrs 3 - 4)		(0.010)	(0.010)	(0.009)	(0.009)	(0.020)
Age = 8		0.002	0.012	0.011	0.011	0.043**
(transition yrs 4 - 5)		(0.010)	(0.010)	(0.009)	(0.009)	(0.021)
Age = 9		0.002	0.012	0.009	0.008	0.114***
(transition yrs 5 - 6)		(0.012)	(0.012)	(0.011)	(0.011)	(0.024)
KS1 Average					-0.002***	0.001
Points Score (APS)					(0.001)	(0.001)
Age = 7 x KS1 APS						-0.005***
						(0.001)
Age = 8 x KS1 APS						-0.002
						(0.001)
Age = 9 x KS1 APS						-0.007***
						(0.002)
GOR dummies	No	No	Yes	No	No	No
LEA dummies	No	No	No	Yes	Yes	Yes
Predicted probability of a pure school move	0.418	0.417	0.414	0.416	0.415	0.415
Number of obs.	80,715	80,715	80,343	80,713	80,173	80,173

Notes: See the notes to Table 2.1, Chapter Two.

Table 2A.2: Logit Model Estimates of the Relationship Between Mobility and Pupil Characteristics: Two Moves

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Gender = Male	0.023***	0.016**	0.016**	0.018***	0.017***	0.017***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Ethnicity = Other White	-0.121***	-0.117***	-0.104***	-0.103***	-0.097***	-0.097***
	(0.025)	(0.025)	(0.027)	(0.022)	(0.024)	(0.024)
Asian	0.082**	0.088**	0.088**	0.062***	0.069***	0.069***
	(0.038)	(0.038)	(0.036)	(0.023)	(0.023)	(0.023)
Black	-0.027	-0.021	-0.002	-0.027	-0.019	-0.018
	(0.019)	(0.020)	(0.019)	(0.017)	(0.018)	(0.018)
Other	-0.003	0.006	0.015	0.004	0.006	0.006
	(0.022)	(0.023)	(0.023)	(0.019)	(0.019)	(0.019)
Unknown	0.453***	0.445***	0.451***	0.449***	0.506***	0.506***
	(0.096)	(0.099)	(0.094)	(0.109)	(0.117)	(0.117)
FSME		-0.064***	-0.072***	-0.057***	-0.055***	-0.055***
		(0.011)	(0.011)	(0.009)	(0.009)	(0.008)
SEN		0.048***	0.048***	0.059***	0.066***	0.066***
		(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
Age = 7 (transition yrs 3 - 4)		-0.054**	-0.048*	-0.034*	-0.033*	-0.046
		(0.026)	(0.025)	(0.018)	(0.018)	(0.034)
Age = 8 (transition yrs 4 - 5)		-0.043	-0.037	-0.035**	-0.035**	-0.012
		(0.027)	(0.026)	(0.016)	(0.016)	(0.034)
Age = 9 (transition yrs 5 - 6)		-0.079***	-0.071***	-0.044***	-0.043***	0.027
		(0.020)	(0.019)	(0.014)	(0.014)	(0.040)
KS1 Average Points Score (APS)					0.002	0.003
					(0.001)	(0.002)
Age = 7 x KS1 APS						0.001
						(0.003)
Age = 8 x KS1 APS						-0.002
						(0.003)
Age = 9 x KS1 APS						-0.005*
						(0.003)
GOR dummies	No	No	Yes	No	No	No
LEA dummies	No	No	No	Yes	Yes	Yes
Predicted probability of a pure school move	0.217	0.213	0.209	0.188	0.187	0.187
Number of obs.	16,378	16,378	16,348	16,365	16,197	16,197

Notes: See the notes to Table 2.2, Chapter Two.

Table 2A.3: Probit Model Estimates of the Relationship Between Mobility and Pupil Characteristics: One Move

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Gender = Male	0.020***	0.013***	0.013***	0.013***	0.013***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Ethnicity = Other White	-0.052***	-0.047***	-0.003	0.010	0.010	0.010
	(0.016)	(0.016)	(0.017)	(0.016)	(0.016)	(0.016)
Asian	-0.036***	-0.032**	-0.020	0.002	0.000	0.000
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Black	-0.013	-0.006	0.045***	0.068***	0.069***	0.069***
	(0.011)	(0.011)	(0.012)	(0.011)	(0.012)	(0.012)
Other	0.008	0.014	0.040***	0.048***	0.050***	0.050***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Unknown	0.068*	0.062*	0.071**	0.067**	0.068**	0.070**
	(0.037)	(0.036)	(0.036)	(0.032)	(0.032)	(0.032)
FSME		-0.040***	-0.042***	-0.039***	-0.042***	-0.041***
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
SEN		0.047***	0.049***	0.047***	0.034***	0.033***
		(0.005)	(0.005)*	(0.004)	(0.006)	(0.006)
Age = 7 (transition yrs 3 - 4)		-0.026***	-0.017	-0.015*	-0.016*	0.062***
		(0.010)	(0.010)	(0.009)	(0.009)	(0.020)
Age = 8 (transition yrs 4 - 5)		0.002	0.011	0.011	0.011	0.043**
		(0.010)	(0.010)	(0.009)	(0.009)	(0.021)
Age = 9 (transition yrs 5 - 6)		0.002	0.011	0.009	0.008	0.113***
		(0.012)	(0.012)	(0.011)	(0.011)	(0.024)
KS1 Average Points Score (APS)					-0.002***	0.001
					(0.001)	(0.001)
Age = 7 x KS1 APS						-0.005***
						(0.001)
Age = 8 x KS1 APS						-0.002
						(0.001)
Age = 9 x KS1 APS						-0.007***
						(0.002)
GOR dummies	No	No	Yes	No	No	No
LEA dummies	No	No	No	Yes	Yes	Yes
Predicted probability of a pure school move	0.418	0.418	0.415	0.416	0.415	0.415
Number of obs.	80,715	80,715	80,343	80,713	80,173	80,173

Notes: See the notes to Table 2.1, Chapter Two.

Table 2A.4: Probit Model Estimates of the Relationship Between Mobility and Pupil Characteristics: Two Moves

Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Gender = Male	0.023***	0.015**	0.015**	0.019***	0.018***	0.018***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Ethnicity = Other White	-0.121***	-0.118***	-0.105***	-0.106***	-0.100***	-0.100***
	(0.025)	(0.025)	(0.026)	(0.023)	(0.024)	(0.024)
Asian	0.082**	0.088**	0.087**	0.062***	0.069***	0.069***
	(0.038)	(0.038)	(0.036)	(0.023)	(0.023)	(0.023)
Black	-0.027	-0.021	-0.001	-0.029*	-0.021	-0.020
	(0.020)	(0.020)	(0.019)	(0.018)	(0.018)	(0.018)
Other	-0.003	0.006	0.016	0.005	0.005	0.006
	(0.022)	(0.023)	(0.022)	(0.020)	(0.020)	(0.020)
Unknown	0.453***	0.443***	0.451***	0.441***	0.494***	0.494***
	(0.096)	(0.098)	(0.094)	(0.100)	(0.106)	(0.106)
FSME		-0.064***	-0.071***	-0.057***	-0.055***	-0.054***
		(0.011)	(0.011)	(0.009)	(0.008)	(0.008)
SEN		0.048***	0.049***	0.061***	0.068***	0.068***
		(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
Age = 7 (transition yrs 3 - 4)		-0.055**	-0.049**	-0.034*	-0.033*	-0.045
		(0.026)	(0.025)	(0.018)	(0.018)	(0.035)
Age = 8 (transition yrs 4 - 5)		-0.044	-0.037	-0.035**	-0.035**	-0.011
		(0.028)	(0.026)	(0.016)	(0.016)	(0.034)
Age = 9 (transition yrs 5 - 6)		-0.081***	-0.072***	-0.041***	-0.040***	0.028
		(0.020)	(0.019)	(0.014)	(0.014)	(0.039)
KS1 Average Points Score (APS)					0.002	0.003
					(0.001)	(0.002)
Age = 7 x KS1 APS						0.001
						(0.003)
Age = 8 x KS1 APS						-0.002
						(0.003)
Age = 9 x KS1 APS						-0.005*
						(0.003)
GOR dummies	No	No	Yes	No	No	No
LEA dummies	No	No	No	Yes	Yes	Yes
Predicted probability of a pure school move	0.217	0.214	0.211	0.195	0.194	0.194
Number of obs.	16,378	16,378	16,348	16,365	16,197	16,197

Notes: See the notes to Table 2.2, Chapter Two.

Table 2A.5: Logit Model Estimates of the Relationship Between Mobility and Entry to Oversubscribed Schools: One Move

Independent Variable	(1)	(2)	(3)	(4)	(5)
Choice dummy=pupil moves to oversubscribed school	0.041***	0.018**	0.018**	0.017**	0.017**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Choice dummy x VA school	0.006	0.012	0.013	0.013	0.014
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Pupil moves to VA school	(0.077)***	0.087***	0.087***	0.085***	0.085***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Pupil moves from VA school	0.011	-0.007	-0.008	-0.011	-0.008
	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
% FSME (old school)		0.000	0.000	0.000	0.001**
		(0.000)	(0.000)	(0.000)	(0.000)
% FSME (new school)		0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Pupil-teacher ratio (old school)		-0.007***	-0.007***	-0.007***	-0.006***
		(0.001)	(0.001)	(0.001)	(0.001)
Pupil-teacher ratio (new school)		-0.002**	-0.002**	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)
School size (old school)*100		-0.028***	-0.027***	-0.027***	-0.027***
		(0.002)	(0.002)	(0.002)	(0.002)
School size (new school)*100		0.014***	0.013***	0.013***	0.011***
		(0.002)	(0.002)	(0.002)	(0.002)
% non-white (old school)		-0.002***	-0.002***	-0.002***	-0.001***
		(0.000)	(0.000)	(0.000)	(0.000)
% non-white (new school)		0.003***	0.003***	0.003***	0.003***
		(0.000)	(0.000)	(0.000)	(0.000)
Pupil characteristics	No	No	Yes	Yes	Yes
GOR dummies	No	No	No	Yes	No
LEA dummies	No	No	No	No	Yes
Predicted probability of a pure school move	0.377	0.374	0.373	0.372	0.371
Number of observations	72,123	70,707	70,422	70,405	70,421

Notes: See the notes to Table 2.3, Chapter Two.

Table 2A.6: Probit Model Estimates of the Relationship Between Mobility and Entry to Oversubscribed Schools: One Move

Independent Variable	(1)	(2)	(3)	(4)	(5)
Choice dummy=pupil moves to oversubscribed school	0.041***	0.018**	0.018**	0.018**	0.017**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Choice dummy x VA school	0.006	0.013	0.013	0.013	0.015
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Pupil moves to VA school	0.076***	0.087***	0.087***	0.084***	0.085***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Pupil moves from VA school	0.012*	-0.007	-0.008	-0.011	-0.007
	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
% FSME (old school)		0.000	0.000	0.000	0.001**
		(0.000)	(0.000)	(0.000)	(0.000)
% FSME (new school)		0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Pupil-teacher ratio (old school)		-0.006***	-0.007***	-0.007***	-0.006***
		(0.001)	(0.001)	(0.001)	(0.001)
Pupil-teacher ratio (new school)		-0.002**	-0.002**	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)
School size (old school)*100		-0.028***	-0.026***	-0.026***	-0.027***
		(0.002)	(0.002)	(0.002)	(0.002)
School size (new school)*100		0.014***	0.013***	0.013***	0.011***
		(0.002)	(0.002)	(0.002)	(0.002)
% non-white (old school)		-0.002***	-0.002***	-0.002***	-0.001***
		(0.000)	(0.000)	(0.000)	(0.000)
% non-white (new school)		0.003***	0.003***	0.003***	0.003***
		(0.000)	(0.000)	(0.000)	(0.000)
Pupil characteristics	No	No	Yes	Yes	Yes
GOR dummies	No	No	No	Yes	No
LEA dummies	No	No	No	No	Yes
Predicted probability of a pure school move	0.377	0.374	0.373	0.373	0.372
Number of observations	72,123	70,707	70,422	70,405	70,421

Notes: See the notes to Table 2.3, Chapter Two.

Table 2.A.7: Mobility and Entry to Oversubscribed Schools: Examining Variations by Region and Pupil FSME Status, Logit Model

Independent Variable	London (1)	Other regions (2)	FSME (3)	Non-FSME (4)	FSME: London (5)	Non-FSME: London (6)	FSME: Other regions (7)	Non-FSME: Other regions (8)
Choice dummy=pupil	0.055***	0.010	0.018	0.017**	0.062**	0.052***	0.007	0.012
moves to oversub. school	(0.015)	(0.009)	(0.012)	(0.009)	(0.024)	(0.020)	(0.013)	(0.010)
Choice dummy	0.020	0.011	0.039	0.005	0.041	0.007	0.035	0.005
x VA school	(0.029)	(0.015)	(0.026)	(0.016)	(0.054)	(0.036)	(0.029)	(0.017)
Pupil moves to VA school	0.167***	0.071***	0.107***	0.079***	0.199***	0.151***	0.084***	0.067***
	(0.018)	(0.009)	(0.015)	(0.009)	(0.033)	(0.021)	(0.017)	(0.010)
Pupil moves from	-0.007	-0.004	-0.023*	-0.001	-0.010	-0.005	-0.020	0.001
VA school	(0.018)	(0.008)	(0.013)	(0.009)	(0.034)	(0.020)	(0.014)	(0.009)
Predicted probability	0.300	0.383	0.343	0.380	0.326	0.282	0.345	0.395
Number of observations	11,342	59,063	18,671	51,750	3,820	7,522	14,845	44,218

Notes: See the notes to Table 2.4, Chapter Two

Table 2.A.8: Mobility and Entry to Oversubscribed Schools: Examining Variations by Region and Pupil FSME Status, Probit Model

Independent Variable	London (1)	Other regions (2)	FSME (3)	Non-FSME (4)	FSME: London (5)	Non-FSME: London (6)	FSME: Other regions (7)	Non-FSME: Other regions (8)
Choice dummy=pupil moves to oversub. school	0.055***	0.010	0.018	0.017**	0.061**	0.053***	0.007	0.012
	(0.015)	(0.009)	(0.011)	(0.009)	(0.023)	(0.019)	(0.013)	(0.010)
Choice dummy x VA school	0.022	0.011	0.040	0.006	0.041	0.009	0.036	0.005
	(0.029)	(0.015)	(0.026)	(0.015)	(0.053)	(0.036)	(0.029)	(0.017)
Pupil moves to VA school	0.164***	0.071***	0.107***	0.079***	0.195***	0.148***	0.084***	0.067***
	(0.018)	(0.009)	(0.014)	(0.009)	(0.032)	(0.021)	(0.016)	(0.010)
Pupil moves from VA school	-0.007	-0.004	-0.022*	-0.001	-0.008	-0.005	-0.020	0.001
	(0.018)	(0.008)	(0.013)	(0.009)	(0.033)	(0.020)	(0.014)	(0.009)
Predicted probability	0.302	0.383	0.344	0.381	0.328	0.284	0.346	0.395
Number of observations	11,342	59,063	18,671	51,750	3,820	7,522	14,845	44,218

Notes: See the notes to Table 2.4, Chapter Two

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Appendix 3A

Section 3A.A: Schools sample construction

Below the details of 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 3A.1: Procedures for Creating a Balanced Panel of Academy and Non-Academy Schools.

Academy schools			Non-Academy schools		
Procedure (1)	**Number of schools** (2)	**Sample loss** (3)	**Procedure** (4)	**Number of schools** (5)	**Sample loss** (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 replaces 2 predecessors); Academy cohort 2 (Academies opening from September 2003, where 2 Academy schools each replace 2 predecessors); and Academy cohort 5 (Academies opening from September 2006, where 2 Academy schools each replace 2 predecessors, and also where 1 predecessor is 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 3A.1) 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.

Table 3A.2: 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.

Section 3A.B: 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 4.6 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 4.6 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 4.6.

Table 3A.3: 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 in Chapter Four as Table 4.3, 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 aged 10/11. KS1 tests are taken earlier on in Primary school at the age of 6/7.

Section 3A.C: Restricting the sample of schools to the Common support regions – impact on the t-statistics of Table 4.5 (Chapter Four)

Tables 3A.4 and 3A.5 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 4.6 in Chapter Four.

Table 3A.4: Descriptive Statistics of School-Level Characteristics for Schools Belonging to the CSR Determined by the Logit Regression with Full Controls (see Table 4.6, Model 1 and Figure 4.1, Chapter Four)

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)	29.70 (15.31)	11.61	4.09*
% Special Educational Needs, with statement	3.21 (1.78)	3.09 (2.95)	0.12	0.22
% Special Educational Needs, no statement	24.40 (9.00)	20.69 (8.44)	3.71	2.36*
% white	69.18 (27.19)	72.38 (27.45)	-3.20	-0.63
School size (number of pupils)	910 (345)	996 (312)	-86	-1.48
Pupil-teacher ratio	15.13 (1.59)	15.37 (1.32)	-0.24	-0.94
% 5+ GCSEs, A*-C	25.45 (19.61)	36.05 (16.77)	-10.60	-3.36*
% no passes at GCSE	22.25 (11.98)	14.47 (8.24)	7.78	4.84*
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 3A.5: Descriptive Statistics of School-Level Characteristics for Schools Belonging to the CSR Determined by the Logit Regression with Selected Controls (see Table 4.6, Model 2 and Figure 4.2, Chapter Four)

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)	27.90 (14.84)	13.41	4.92*
% Special Educational Needs, with statement	3.21 (1.78)	3.48 (3.86)	-0.27	-0.40
% Special Educational Needs, no statement	24.40 (9.00)	20.04 (8.41)	4.36	2.82*
% white	69.18 (27.19)	74.32 (27.61)	-5.14	-1.02
School size (number of pupils)	910 (345)	1007 (315)	-97	-1.68
Pupil-teacher ratio	15.13 (1.59)	15.54 (1.37)	-0.41	-1.59
% 5+ GCSEs, A*-C	25.45 (19.61)	36.27 (15.82)	-10.82	-3.66*
% no passes at GCSE	22.25 (11.98)	13.68 (7.78)	8.57	5.69*
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.

Section 3A.D: Discussion of school type changes among non-Academy schools and the types of schools that become Academies

It could be that non-Academy secondary schools also change 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 change 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 change 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 change 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 do 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.

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