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Faith Primary Schools: Better Schools or Better Pupils?

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Executive Summary

Research on the impact of resource-based educational intervention has found little evidence for the general effectiveness of this type of policy. As a result, governments in many countries, including the UK, now favour school-improvement schemes based on choice, incentives and governance. In England, this idea has become linked to the expansion of the Faith-school sector. This is because Faith schools are not just religiously affiliated, but also often embody the kind of admission and governance practices that policy makers wish to promote. An expansion of this combination of institutional arrangement and school ethos will, it is argued, lead to higher educational standards – including higher levels of attainment both at the Primary and Secondary level.

However, the fact that we observe higher attainment in the Faith sector *now* is no indication of the advantages offered by transferring a typical secular state school pupil into the Faith sector, because pupils currently attending Faith schools are not 'typical'. Pupils studying at religiously affiliated schools differ from secular students along several dimensions, many of which – such as family background – are correlated with their academic achievement. These differences arise in part because of parents and pupils who choose Faith schools may have different preferences and attitudes towards education; in part, they may also arise because many Faith schools operate some forms of 'covert' selection in their admissions procedures.

In this paper, we investigate whether Faith schools *really* raise pupil attainments more than other schools, or whether they simply enrol pupils with characteristics conducive to faster educational progress. Additionally, we try to understand whether any beneficial impact of attending a Faith school comes from its religious affiliation, or from specific governance and admission arrangements.

To answer these questions, we consider pupils at the end of their primary schooling in England (age-11). We make use of a large census that includes information on pupils' past and current achievements, school type and characteristics, place of residence (postcode) and schools attended. Using this information, we can compare the age-11 attainment of students who attend Faith primary schools with the age-11 attainment of pupils in secular primary schools who had similar abilities, and seem to have similar preferences and family background – in particular because they live in the same street or block of housing and because they go on to attend the same secondary school. We are also able to compare age-11 attainments for secular and Faith primary school pupils who exhibit similar levels of commitment to religious schooling through their choice

of Secondary school. Although this exercise does not allow us to nail down a single answer to the magnitude of the 'causal' impact of Faith schools on pupil attainment, it does allow us to show the likely range of effects and the relative role of selection and institutional differences.

Our results suggest that:

- Faith primary schools could offer a very small advantage over secular schools in terms of age-11 test scores in Maths and English. Attending the average Faith school rather than the average secular school could move a pupil around 1 percentile further up the test-based pupil rankings.

- Any benefit of attending a primary Faith school is linked to the more autonomous admission and governance arrangements that characterised 'Voluntary Aided' schools during the period covered by our data. Pupils in religiously affiliated schools where admissions were under the control of the Local Education Authority ('Voluntary Controlled' schools) do not progress faster than pupils in Secular primary schools.

- All of the apparent advantage of Faith school education – particularly for Church of England schools - could be explained by unobserved differences between pupils who apply and are admitted to Faith schools and those who do not: Pupils who *do not* attend a Faith primary school up to age-11 but attend a Faith secondary school thereafter perform just as well at age 11 as students who attended a Faith primary school but then attend a secular secondary school.

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Acknowledgments

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1. Introduction

Quality of childhood schooling is increasingly seen as important for life chances, because adults' success in the labour market is closely linked to early educational attainments (Heckman, 2000). However, economic and educational research has had little success in finding resource-based interventions that are effective in raising school standards (Hanushek, 2003). Government policy in many countries now favours policies based on incentives, governance, increased choice and competition[1]. In England, this idea has become linked with the expansion of the Faith-school sector because it symbolises choice and diversity in the education system, it embodies the kind of practice in admissions and governance that policy makers wish to promote, and – crucially – because it is claimed it offers higher educational standards. This claim is, however, a difficult one to assess, because pupils that choose and get chosen by Faith schools differ from the population of pupils in ways that are correlated with their educational achievement. In this paper we present some new evidence on the effectiveness of Faith schools in the English context, using a national census of pupils which allows us to carefully match students who attended Faith schools in the Primary phase with similar pupils in the Secular (non-Faith) Primary sector. This matching is based on prior attainments, family characteristics, place of residence, and commitment to Faith-education that is revealed in their subsequent choice of Secondary school.

Schooling and religion have had a long alliance. Traditionally, churches have run schools in part as a way to disseminate their religious message and in part because of their wider charitable

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[1] See LeGrand (1991) and (1993), and Machin and Vignoles (2005) for a review of the English experience, and Hoxby (2004) for an analysis of US based evidence.

and community responsibilities. These days, Faith schools are formally integrated into the fabric of many educations systems, and in Britain provide some education to around one-third of all pupils in the state-sector. These Faith schools continue to be popular, and, as with Catholic schools in the US, their average pupil outcomes appear favourable when compared to other types of school. Also, the heterogeneity offered by Faith schools in terms of religious character, pupil admissions and governance is seen by some as encouraging diversity and reinforcing school choice; yet, others argue this may be culturally, socially and economically divisive.

Whatever one's view here, the fundamental question that has taxed researchers in recent decades, particularly in the US, is whether or not pupils really benefit from attending a Faith school rather than a Secular school, or whether Faith schools simply attract and admit high-ability children with better family backgrounds. This is a question of pressing policy relevance, especially in Britain where government policy has taken on-board the idea that Faith schools perform well and is trying to replicate their institutional arrangements more widely (DfES White Paper 2005, DfES Education Bill 2006). Surprisingly perhaps, there is almost no evidence on the issue for Britain that makes any serious attempts to separate out the causal effect of Faith schools from pure selection, and there are serious doubts about the credibility of the strategies used in much of the US empirical work (see Altonji et al. 2002, 2005).

Bearing this in mind, our paper provides estimates of the impact of various types of English Primary school on pupil attainment at age-11 using a census of pupils matched to current and historical records of attainment. Research that has tried to measure the 'Catholic school' effect in the US has, typically, made use of instruments for Faith school attendance, such as family religion, neighbours' religion and place of residence. We agree with arguments that these instruments are not credible when the point of the exercise is to purge estimates of family background and ability-

related effects (see Altonji et al. 2002, 2005); this is because family religion is correlated with other background characteristics (explicitly so if it is claimed that Faith-school attendance affects pupil outcomes) and because families choose where to live on the basis of which school they wish to attend. Indeed, it is likely to be impossible to find instruments that induce random assignment to Faith schools, because school and residential choice is always subject to personal preference and any random assignment without compulsion could be undone by individual action. Therefore, while we believe one cannot be completely conclusive in terms of a single parameter that characterises the 'causal' influence of Faith schools, we can present estimates under different specifications that provide a good indication of the likely range of effects and the relative role that selection and institutional differences make.

Our empirical strategies are, in outline, as follows. Contrary to previous literature, we argue that consideration of the process of residential choice means that it is better to *control* for precise residential location, rather than use it as an instrument. To this end, we exploit the geographical detail in our data set to compare outcomes for Primary school pupils who live in the same postcode (10 or so contiguous housing units) but attend different schools. Our methods also take advantage of the fact that we can observe pupils at two phases of their education. Some never attend a Faith school, some attend a Faith Primary school but not a Faith Secondary school or vice-versa, and some attend Faith schools in both phases. We argue that these patterns of choice are revealing about unobserved family preferences and characteristics, and comparison of the association between Faith school attendance and attainment amongst these different groups is informative about the relative role of selection vis-à-vis institutional arrangements. Our results suggest that most of the observed educational advantage of Faith schools is due to non-random selection into the Faith sector, while the 'causal' impact of attending a Faith school between ages 7 and 11 is at

most equivalent to one percentile in the distribution of pupil test scores at age 11 (conditional on scores at age 7).

The paper has the following structure. The next section critically reviews some of the literature and its methods. In Section 3 we explain the different types of school that exist in the English school system and the data that we will be using. Section 4 sets out our empirical approach in more detail and Section 5 presents and discusses the results that arise from these approaches. Section 6 concludes.

2. Methods Used in Previous Studies

By far the bulk of existing academic work on the impact of Faith schools on education originates in the US, and has focussed on Catholic schools – largely springing from the influential work of Coleman (1982). Most of the subsequent research there finds that attendance at a Catholic school raises graduation rates and sometimes test scores, though there is variation across different demographic and geographical groups and across subject areas. Our discussion will focus on whether there is anything we can learn from the methodological approaches used in the US and international literature rather than the results per-se. For Britain, evidence on the performance benefits of Faith schools is fairly limited: Schagen et al. (2002) show that pupils in Faith Secondary schools progress slightly faster in English (but not in Maths and Science), and also seem to pass more subjects overall in their age-16 exams. Benton et al. (2003) report that Faith Secondary schools are associated with faster grade progression between age 11 and 13, and age 13 and 16; yet, this is confined to schools affiliated with Jewish and Other Christian denominations

(i.e. non-Catholic or Church of England). Finally, in a study limited to two London boroughs with only 7 religious schools, Prais (2005) finds quite strong Faith school advantages in Maths, particularly amongst weakest pupils. Yet, neither of these studies takes any steps to control for pupil background or otherwise deal with selection on unobservable characteristics that influence educational progress.

In the US, Catholic schools are the dominant type of Faith school, though the context is very different from that in England: in the US, Catholic schools are private-sector schools whereas many English Faith schools are part of the state school system. Nevertheless, the key issue that has taxed US researchers investigating the effects of Catholic schooling on achievement is the same issue that we will need to confront: there is clearly non-random selection of pupils into Faith schools, such that Faith school attendance is correlated with unobserved pupil-family characteristics that are educationally advantageous. Almost all approaches try to find an explicit source of random variation in the probability of Catholic school attendance that is otherwise uncorrelated with educational attainment and can be used as an instrument. Disappointingly, many of the instrument choices do not seem credible on deeper reflection, and the evidence in Altonji et al. (2002) and (2005) is not supportive of any of those that are commonly used.

The first typical instrument is family religion, on the basis that being Catholic is a strong determinant of attendance at a Catholic school. This approach is used, for example, by Noel (1982), Evans and Schwab (1995) and in part of Neal (1997). However, opinion seems divided on whether family religion is related to educational outcomes other than through Catholic school attendance, and most recent studies seem to disregard it as a plausible instrument. On a priori grounds, it seems most likely that religious beliefs influence all sorts of family attitudes and economic outcomes; this is especially true if attendance at a Catholic school *does* raise

attainments, the probability of graduation, future earnings and hence family resources in future generations – which is what most of these schooling studies imply. In fact, the range of family outcomes that are correlated with religiosity may be much wider: Gruber (2005) finds evidence that religious participation is correlated with education, income, lower rates of disability, and, perhaps unsurprisingly, with more marriage and less divorce. Moreover there is another strand of literature that links religious beliefs to economic growth, ranging from sociological work such as Weber (1905) to macroeconomic studies such as Barro and McCleary (2003). In a similar vein, Guiso et al. (2003) use international micro data to show a link between religion and social attitudes that are conducive to positive economic outcomes. On balance, we are not convinced that family religion is a useful instrument for Faith school attendance.

Another approach has been to use instruments that try measure the local 'supply' of Faith schooling. Neal (1997) uses both the geographic density of Catholic schools, on the basis that this lowers costs of access, and the number of Catholics as proportion of the local population as an instrument, with the justification that Catholic schools charge lower fees in predominantly Catholic areas. The same ideas are applied in Grogger and Neal (2000), and in Figlio and Stone (1999), who go further and include all sorts of geographical and area-demographic variables in their instrument set. None of these ideas are convincing theoretically. Observational evidence on the proximity of place of residence to Faith schools is clearly related to family's preferences over schooling because the decision to live near a Faith school is based on the intention to attend that school. This role of schools in housing choices is evident in the voluminous empirical literature on the influence of schools on housing demand (Black, 1999; Gibbons and Machin, 2006; Kain, Staiger and Reigg, 2005). Similarly, demographic characteristics such as the local proportion of Catholics must be related to pupil's family background because his or her family has made choices to live in this type

of community. In particular, one reason why a locality may have high concentrations of, say, Catholic families is because these families want their children to attend a local Catholic school. In this case it is spatial correlation in family preferences over schooling that incidentally generates an association between Catholic school attendance and local Catholic density. Other approaches have tried to use interactions of these instruments, whilst controlling for their levels (e.g. Sander, 1996) though the theoretical basis for this is uncertain, and the testing in Altonji et al. (2002) suggests it is not satisfactory.

Given the weaknesses in the IV approach, some have tried other methods: Jepsen (2003) simply controls for pupil background characteristics and for the school-median test scores of pupils soon after they enter school. Unfortunately he only has data on prior attainments for a different cohort of pupils, not for the pupils whose outcomes are being measured, but still he finds no impact of Catholic schools on test scores. In a different approach, Altonji et al. (2005) infer the degree of selection bias in the Catholic school effect from the extent of selection on observable pupil characteristics, and conclude that whilst there is an impact on high school and college graduation rates, there is no influence on test scores.

The approach we will follow is closer to those in these more recent US studies, but we have the advantage of a large dataset on the population of pupils in England, containing information on pupil's prior attainments, demographics and details on precise geographical location. Before discussing our methods, we outline the institutional context for Faith schools in England, and the details of the dataset we use to investigate them.

3. Institutional Context and Data

School types and governance

Primary schools in the state-sector in England fall into a number of different categories, and differ in terms of the way they are governed, the ownership of the school buildings, and who controls pupil admissions. The key differences between these school types – Community, Foundation, Voluntary Aided and Voluntary Controlled – are set out in Table 1. In addition there is a small private, fee-paying sector, which we do not consider here[2]. All state schools are funded largely by central government, through Local Education Authorities that are responsible for schools in their geographical domain. Schools, other than Community schools and some Foundation schools, are usually linked in some way to a faith or other charitable organisation (a 'Foundation'). Confusingly, most Foundation schools are not linked to a Foundation, but have *partnerships* with one or more local organisations.

All schools are run by a Governing Body composed of members elected from amongst parents and staff (Parent Governors and Staff Governors), appointed by the Local Education Authority (LEA Governors), appointed by the faith or charitable foundation that owns the school premises (where relevant – Foundation/Partnership Governors), and appointed from the community (e.g. local businesses) by the Governing Body. The Governing Body sets the strategic direction of the school, draws up school policies, sets targets and monitors performance, although day-to-day running is down to the head-teacher and his or her leadership team. The constitution of the Governing Body is important because it determines how much influence various 'stakeholders'

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[2] Private schools educate around 6-7% of pupils in England as a whole.

have in the way the school is run – in particular, the balance between influence by the Local Education Authority (LEA) and influence by the faith or charitable foundation/partnership. Moreover, in Voluntary Aided and Foundation schools the Governing body of the school is responsible for admissions and has some flexibility in deciding which pupils will be admitted when the school is oversubscribed; in other cases the LEA is the admissions authority. Over the period relevant to our empirical work, applications for admission to Voluntary Aided and Foundation schools were made directly to the school, though this has now changed and the Local Authority coordinates all admissions[3]. Schools are further differentiated according to who is classed as the employer – either the LEA or the Governing Body, which includes representatives of the organisation that is linked to a school's Foundation or Voluntary Aided status. It is the Governing body which is responsible for making staff appointments at all schools – including the appointment of the head-teacher. However, in Voluntary Aided schools (and to a lesser extent in Foundation and Voluntary Controlled schools) charitable organizations/partnerships have a strong say *via* their representatives in the Governing body. These distinctions are important when we consider the role of Faith schools, because Faith schools are often different in other ways than just religious affiliation – as shown in Table 1.

Because of our emphasis on Faith schools, we re-arrange schools into four types that we feel best characterise their religious affiliation and governance/admissions arrangements. The breakdown is as follows

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[3] Although according to the national Code of Practice on Admissions, Primary schools should not use explicit selection by aptitude at Primary school level. Recent changes in legislation (subsequent to the years we study here) will mean applications for admission to all schools will be handled by the LEA, and pre-admission interviews will be prohibited.

- *Secular, non-autonomous*: includes schools that have no religious affiliation and are Community or Voluntary Controlled.

- *Secular, autonomous*: includes schools that have no religious affiliation but are Foundation or Voluntary Aided.

- *Faith, non-autonomous*: includes schools that have a religious affiliation and are Voluntary Controlled.

- *Faith, autonomous*: includes schools that have a religious affiliation and which are Foundation or Voluntary Aided.

The goal of our empirical work will be to explore differences in attainment of pupils in these schools in the Primary phase, and to consider to what extent any differences can be attributed to their Faith-affiliation[4]. First, however, we need to briefly explain the way attainment is assessed in English Primary schools, and describe the data we will bring to bear on this question.

National curriculum and assessment

Compulsory education in England is organised into five stages referred to as Key Stages. In the Primary phase, pupils enter school at age 4-5 in the Foundation Stage (not to be confused with Foundation *schools*) and then move on to Key Stage 1, spanning ages 5-6 and 6-7. At age 7-8 pupils move to Key Stage 2, sometimes – but not usually – with a change of school[5]. At the end of

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[4] We are here considering state schools only; this makes our estimates of a Faith-school effect less 'confounded', because religious education does not overlap with the private sector education.

[5] In few cases there are separate Infants and Junior schools (covering Key Stage 1 and 2 respectively) and a few LEAs still operate a Middle School system (bridging the Primary and Secondary phases); we do not consider these schools in our analysis.

Key Stage 2, when they are 10-11, children leave the Primary phase and go on to Secondary school where they progress through Key Stage 3 and 4. At the end of each Key Stage, pupils are assessed on the basis of standard national tests and progress through the phases is measured in terms of Key Stage Levels, ranging between W (working towards Level 1) and Level 5+ in the Primary phase. A point system can also be applied to convert these levels into scores that are intended to represent about one term's (10-12 weeks) progress.

The data

The UK's Department for Education and Skills (DfES) collects various data on school and pupils centrally, because the pupil assessment system is used to publish school performance tables and because information on pupil numbers and characteristics are necessary for administrative purposes – in particular to determine funding. A National Pupil Database (NPD) holds information on each pupil's assessment record in the Key Stage tests throughout their school career. Since 2002, the DfES has also collected information on pupil's school, gender, age, ethnicity, language skills any special educational needs or disabilities, entitlement to free school meals and various other pieces of information via the Pupil Level Annual Schools Census (PLASC), which is incorporated into the test-score information in the NPD. Importantly, PLASC has information on postcode of residence: a postcode is typically 10 contiguous housing units, which allows us to control very carefully for residential location.

The NPD thus provides a large and detailed dataset on pupils and their test histories. The test histories contain details on the Levels reached in the core subject areas – Maths, English, Science (Science is only tested beyond Key Stage 1) – and, for Key Stage 2 and beyond, the raw scores in the component tests. We use information on two cohorts: those aged 10-11 and sitting their Key

Stage 2 tests in 2002 and 2003, who took their Key Stage 1 tests in 1998 and 1999 respectively. We can also deduce to which school these pupils are assigned when they move on to Secondary school in 2003 and 2004. Various other data sources can be merged in at school level – in particular each school's religious affiliation and the institutional types described above in Section 0 – which are available from the DfES 'Edubase' system.

We will use this large and complex combined data set – which gives us information on around 1 million pupils in over 14000 Primary schools in England – to estimate the influence of Faith schools on pupil progress through Key Stage 2 (between ages 7 and 11). In the next section we set out the empirical model more precisely.

4. Empirical Model

As can be seen above in our consideration of previous efforts (Section 2), measurement of the effectiveness of Faith schools presents a difficult challenge. Families with a preference for religiously-affiliated schools or schools with a religious tradition and ethos may, on average, have characteristics that influence academic progress in their children. In addition, in the English context, many Faith schools at both Primary and Secondary level had until recently (and for the period under analysis) much greater control over their own pupil admissions than do most Secular schools. The reason for this is that Faith schools (and other schools classed as *Voluntary Aided* or *Foundation*; see Section 0) were allowed to interview families – ostensibly to determine their religious or other ethical convictions; however, it has long been suspected that this leads to some form of covert selection based on parental and pupil characteristics that are correlated with pupil

ability. West (2005) and West and Hind (2003) provide detailed qualitative analysis of this issue, and Allen (2006) provides some statistical analysis. Clearly, both these factors can lead to differences between Faith and non-Faith schools in terms of the distribution of pupil and family background characteristics at time of school entry. These forms of school-side and family-side selection together mean that pupils are sorted into schools along lines of ability, with higher strata over-represented in Faith schools. As discussed above (Section 2) we do not believe there are any credible instruments for Faith school attendance – at least not in the English setting and current policy environment. But we do have a wealth of information on the residential location and school attendance history of our pupils which, we argue, we can turn to our advantage.

The basic model we will estimate is a standard pupil-level 'value-added' model of educational attainment, which measures the statistical association of school attendance and other characteristics with progress at school between the ages of 7 and 11. In our two-period empirical setup, attainment of pupil i in school j at stage two (h_{ij2}) builds on prior attainment at stage one (h_{ij1}), and is modified by school-type factors (β_j) and observable personal and family characteristics x'_{ij2}:

$$h_{ij2} = \beta_j + x'_{ij2}\gamma + f(h_{ij1}) + \eta_{i2} + \varepsilon_{ij2} \tag{1}$$

The key empirical problem is that family-side selection of schools and school-side selection of pupils before stage two means that unobserved pupil-family characteristics η_{i2} that influence the rate of progress between stage 1 and stage 2 are correlated with school choice, so $E[\eta_{i2} \mid h_{ij1}, x_{ij2}, j = k] \neq E[\eta_{i2} \mid h_{ij1}, x_{ij2}, j \neq l]$. Estimates of β_j that do not control for η_{i2} are biased estimates of the expected impact of Faith school attendance. Since we regard selection on prior

ability or attainment as particularly important, we allow these to enter our model in a very general way as indicated by $f(h_{ij1})$.

Most of the previous literature on faith school effects has had to make-do without information on prior attainments and has used instruments – typically geographical – to deal with selection on unobservables (including unobservables which influence the level of attainment at stage 1). But basic theories of urban economics tell us that choice of place of residence is revealing of the benefits of different locations to different types of people, and that similar people sort into communities according to these benefits and the income that they have available to pay for housing (see Tiebout, 1956). Given this, it seems to us that one of the most fundamental things to do when looking for evidence of performance advantages in Faith schools is to *control* for place of residence, rather than use it to predict Faith school attendance as is common in instrumental variable approaches. The geographical detail and density of pupils in our data means we are able to do this quite effectively, by comparing outcomes for pupils who live in the same postcode, but attend different schools. At least then we are comparing pupils with families who exhibit similar preferences over choice of housing, neighbourhood and local amenities.

There is, however, an obvious difference between two families attending different types of school, even if they are close geographical neighbours: the type of school they attend may reveal preferences over school type or attributes of the pupil that schools are able to observe when making admissions decisions; these preferences and attributes may be correlated with pupil progress[6]. Indeed, as Manning and Pischke (2006) demonstrate, simply conditioning on prior

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[6] In the US private Catholic school setting, these factors are theoretically related to the benefits of choosing a Faith school, since attendance at a private school rather than a pubic school imposes financial costs. In England, conditional on place of residence, admission to a state Faith school

attainment, observable pupil characteristics and family characteristics is an inadequate way to control for pupil selection into secondary schooling. However, we can use our data to work out where pupils attend school when they leave the Primary phase and go on to a new Secondary school at age 12; one thing this allows us to do is control for family differences that are expressed in Secondary school choice by allowing for Secondary school fixed effects when we estimate (1). Moreover, the range of school types in Primary school is replicated at the Secondary phase, and so, we argue, school assignment at age-12 is revealing both about the preferences of families regarding Faith schooling and their 'suitability' in the eyes of Faith school admissions authorities. Families that commit to religious schooling over both educational phases are not likely to be suitable 'control group' members for the kind of pupils who attend non-Faith schools in both phases. Conversely, families who only attend Faith schools in the Secondary phase are potentially good controls for families who attend Faith schools only in the Primary phase; both types of family show no distaste for Faith schools and are clearly of acceptable social calibre. The underlying assumption behind this approach is that selection into Faith schools occurs along similar lines of family background in the Primary and Secondary phases[7]. We assume, in line with the evidence in West (2005) and West and Hind (2003), that any school-side selection is on the basis of pupil and family characteristics (such as local church attendance) and not explicitly on past academic

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does not incur high additional costs relative to a non-Faith school. The only likely cost is the effort of demonstrating some religious commitment through church attendance.

[7] Additionally, we need that the required 'religious commitment' to gain access to Faith-schools is similar for parents applying to Primary and Secondary schools; this seems to be the case, as it boils down to local church attendance for a relatively limited amount of time.

progress, because neither Primary or Secondary schools have any measure of a pupil's prior academic progress at the time they admit them[8].

Our different sample comparisons are likely to generate a range of estimates of the Faith-School effect on attainment; which one to trust depends entirely on assumptions about which groups we believe are better matched in terms of unobservable characteristics – something which we are unable to test. However, even bearing this in mind, we claim that a lot can be learnt about the relative role of selection and institutional differences by comparison of the relationship between Faith-Primary attendance and attainment in these different groups. In our view, this is the best approach when school selection occurs on the basis of unobservable pupil-family characteristics and no instrument is available.

5. Results and Discussion

Descriptive statistics

The basic facts about the association of pupil age-11 attainments and the type of Primary school attended are summarised in Table 2. The school categories were explained in Section 3 above. The Table shows the means and standard deviations of pupil test scores in standard age-11 tests, where the raw test scores are converted into percentiles. Notice that in all the empirical analysis that follows we will work with an average of the pupil's percentile in the Maths and English

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[8] Primary schools admit pupils before any testing has taken place, and pupils apply and receive admission offers to Secondary schools before they have taken their Key Stage 2 tests.

distribution because we found no interesting differences between these two subjects[9]. The summary statistics for this average are shown in Row 1 for the whole sample, and then split by broad school type. These figures show the key feature that we wish to analyse: pupils emerging from Primary schools that are classified as Faith schools under our definitions (see Section 3) have higher levels of attainment than those emerging from Secular schools. The difference is about 4.75 percentiles in the pupil test score distribution.

Splitting this up into the finer school classifications defined in Section 3, we can see that the apparent 'Faith school' effect in Row 2 is more specifically associated with Faith schools that we class as autonomous[10] – which means, amongst other things, that they operate admissions policies that are potentially covertly selective. At the time covered by this research, many of these schools required parents to apply directly to the school, which then reviewed the applications and was allowed to interview families prior to admission[11]. The question we want to address is to what extent this Faith school advantage is simply a product of differences in background characteristics between those who enter these schools and those who do not.

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[9] Results for Maths and English separately are not reported for space reasons; they are available from the authors.

[10] Another usual headline indicator for Primary school performance is the proportion reaching Level 4 in their age-11 tests; on this metric, in English 83.3% of age-11 Faith, autonomous pupils reach the target, whereas only 76.5% of Secular, non-autonomous pupils do; in Maths 80.7% of Faith, autonomous pupils reach the target, compared 74.6% in Secular, non-autonomous schools.

[11] However, relatively few are thought to have done so. West and Hind (2003) provide some evidence on this at secondary level only about 10% of Voluntary Aided schools were interviewing applicants or their parents.

Differences in pupil background and initial attainment

Firstly, we demonstrate that there are indeed important and significant differences between school types in terms of the observable characteristics of pupils at the beginning of the age 7-11 phase. Table 3 reports the overall means and standard deviations of age-7 attainment and background characteristics in Row 1, and the results from regressions of these characteristics on school-type dummies (with Secular, non-autonomous schools as the baseline) in Rows 2-5.

It is evident from this table that pupils in all types of Faith schools and in Secular schools that run their own admissions, are at an advantage over pupils in standard non-autonomous and Secular Primary schools, both in terms of initial attainment and background characteristics that are usually associated with educational disadvantage. Pupils start off in these schools with attainments that are, on average, 1.2 to 1.7 points (1 point is equivalent to one term) ahead of their counterparts in non-selective secular schools. This is around 15% of one standard deviation – about the same as that advantage in terms of final attainment at age-11 reported in Table 2. For sure, this may be because these pupils have already spent some time in Faith schools prior to age-7 and may have reaped some educational benefits. However, pupils in Faith and autonomous schools are also much less likely to be on a low income that entitles them to free school meals, more likely to be White and more likely to have English as their first language. The advantage of these schools in terms of lower free school meal entitlement also amounts to 15-20% of one standard deviation, and it is hard to see that how these differences can be a *consequence* of Faith school attendance.

Some of these differences may be explained by differences in geographical setting, but not all: Columns 6-10 report the same regressions once we include postcode-level fixed effects and show that many differences persist even across pupils who live in the same street but attend different types of school. These are less marked in terms of ethnicity and languages, but still strong

in terms of free school meal entitlement and prior attainment. In Faith schools, pupils still start at the beginning of our period some 0.7 to 1.2 terms ahead of Secular, non-autonomous pupils who live in the same street and are about 4 percentage points less likely to be eligible for free meals (on a base of 20 percent).

Regression estimates of progress between ages 7 and 11

Next we turn to our regression estimates of the model in Equation (1), in which we try first to control for observable differences between pupils. Later we will try to restrict our sample in such a way as to minimise the difference in unobservable attributes between the Faith and Secular school groups. The results of the first exercise are shown in Table 4.

The dependent variable here is the pupil-mean of the Maths and English percentiles that we described in Table 2. Column (1) provides information on the raw differences between schools, similar to that in Table 2, by regressing this measure of age-11 attainment on school-type dummies. In Column (2) we control for initial attainment groups at age 7. Note that we have a lot of observations – up to 1 million – in our data set, which means we can be quite flexible in the way we control for prior attainment at age 7. Although we do not have the age-7 test score percentiles, we categorise age-7 attainment by the combination of Levels reached in each of the three subject areas – Maths, Reading and Writing. After taking account of empty cells and aggregating cells with low counts, this gives us 183 dummy variables that classify initial attainment groups. Controlling for age-7 attainment in this way more than halves the differences between mean age-11 attainment of pupils attending different types of school[12], although pupils in Faith schools and

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[12] In part this is because the age-7 attainment may in turn be affected by school type since pupils may spend up to three years in the same school before their age-7 tests.

autonomous schools still appear to do better, even when starting from the same age-7 base. In Faith, autonomous schools, pupil attainments are nearly 2.5 percentiles above pupils in the same age-7 attainment group in non-selective Secular schools[13].

Column (3) introduces the school and pupil level controls detailed in Appendix Table 9 alongside postcode-of-residence fixed effects. This gives us a much smaller sample (since we need multiple school types per postcode)[14]. In this case, we are comparing neighbouring pupils (i.e. pupils from the same postcode) with similar characteristics, but attending different Primary school types; this attenuates the gap between Secular, non-autonomous schools and other school types still further – in fact we find no evidence of an advantage for pupils in Faith schools over Secular schools when these schools do not have autonomy over their own admissions. However, pupils emerge with a slightly average higher level of attainment from autonomous schools – both Faith and Secular – than they do from schools that are more closely controlled by the Local Education Authority. One must suspect that this advantage is at least in part to do with selection on pupil characteristics that are correlated with progress between ages 7 and 11, but which we are not able to observe. However, we cannot rule out the possibility that there are real advantages in the more autonomous governance structures of Voluntary Aided and Foundation schools that fall in this school category.

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[13] We have tried other specifications of the value-added model. A common alternative assumption is that $h_{ijt} = \left(\alpha + \beta_j + x'_{ij}\gamma + \varepsilon_{ij} \right)t$, so that $\left(h_{ij2} - h_{ij1} \right) = \alpha + \beta_j + x'_{ij}\gamma + \varepsilon_{ij}$, in which case we can just regress the difference between pupil's age-11 and age-7 point scores on school type dummies and other background characteristics. The results from this exercise convey a similar message to that in Table 4. They are available upon request from the authors.

[14] We checked that our results are not driven by changes in the sample size.

We argued in Section 4 that unobservable characteristics and preferences that are correlated with choice of Primary school are likely to be closely correlated with choice of Secondary school. Because of this, pupils who go on to the same Secondary school are likely to be better matched in terms of unobservable characteristics than are pupils who attend different Secondary schools. Bearing this in mind, Column (4) includes Secondary-school-residence fixed effects in the regression; identification relies on comparing two pupils, with similar observed characteristics living in the same postcode and attending the same Secondary school, but coming from a different Primary school type[15]. The results reveal that there is still a gap between pupils emerging from autonomous Primary schools and those from baseline schools. It has to emphasised that this gap in mean attainments is small – around at around 0.7-0.8 percentiles of the pupil distribution. One thing that does seem to be clear here is that a Faith school is not, in itself, an indicator of higher educational standards: Faith, autonomous schools have mean attainments that are only 0.15 percentiles higher than Secular, autonomous schools, and not significantly so (the F-test for equality of the two parameters has a p-value of 0.7223). Moreover, pupils from Faith schools seem to do slightly worse than pupils from Secular schools when admissions are not under their control.

Regression estimates on samples restricted by future school-sector choice

As we have noted above, autonomous schools had some opportunity (during the period we study) to covertly pick pupils based on what they could observe about pupils and their family background. Hence, any Faith, autonomous school advantage could be equally well ascribed to

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[15] To check the robustness of our results, we also experimented with a propensity-score based matching approach (Rosenbaum and Rubin 1983, 1984) to control for observable characteristics in a more flexible way. There were no substantive differences from the results reported in Table 4.

differences in admissions procedure as to any impact of religious affiliation or ethos. Similarly, it may be families of the most motivated and able pupils that pick this type of school. But as described in Section 4, these differences in school type also apply at Secondary level, and we have information on each pupil's assignment to Secondary school after age 11. We argue that this is informative about pupil or family preferences over school type, and other personal attributes that may be observed by schools but cannot be observed by us.

The pattern of transitions between Primary and Secondary phases is shown in Table 5. About 77% of pupils in non-Faith, non-autonomous Primary schools transit to non-Faith, non-autonomous Secondary schools; similarly, 54% of those attending a Secular, autonomous Primary schools transits to a Secular, autonomous school for Secondary education. This implies that 54% of our sample stays in the Secular sector in both phases, with just over half (52%) in Community schools controlled by the Local Education Authority. On the other hand, more than 50% of pupils in Faith, autonomous Primary schools (about 10% of our sample) move to a Faith, autonomous school during the Secondary education phase. Our claim in what follows is that pupils in this last category are unlikely to be good matches for pupils in the first category in terms of their unobservable characteristics; we may then improve our estimates by focussing on pupils who, whilst not showing total commitment to religious schooling, do at some stage in their school careers seem willing and eligible to attend Faith schools. So, in Table 6, we show what happens to our estimates of the Faith school performance gap when we cut the sample in ways that try to make our 'control' group students more similar to our 'treatment' group pupils in terms of their attachment to Faith-based schools and their likelihood of admission to these schools.

Firstly, however, in Column (1) of Table 6 we use the same specification as in Table 4, Column (3), on the sub-sample of individuals who stay in the same school type during both

Primary and Secondary education. We would expect these two groups to differ widely in terms of unobservable education-related family characteristics because they exhibit very different schooling preferences or because the Secular school 'stayers' have been excluded from Faith schooling by school-side selection; so, we expect this comparison to provide an *upward* biased estimate of the Faith school effect. Indeed, we find that the benefit of attending a Faith, autonomous Primary school is about 2.7 percentiles whilst pupils attending a Secular, autonomous Primary school score around 2.2 percentiles higher than similar pupils in Secular, non-autonomous primaries.

In Column (2) we repeat the exercise of Column (1), but on a restricted sample from which we eliminate pupils who exhibit a persistent attachment to Faith schools or schools that we classify as autonomous – i.e. excluding pupils in the first three diagonal cells of the transition matrix of Table 5; this sample cut should make 'treated' and 'comparison' groups more similar. In Column (3), we further extend this to include postcode-Secondary school fixed effects (comparable with Table 4, Column (4)). Estimates from both these specifications are similar to what we had before, except that we now find no significant impact from Secular, autonomous schools[16]. Only Faith, autonomous schools seem to offer any performance advantage in this specification, and again it is under one-percentile in terms of pupil test scores.

It might now reasonably be argued that if the response of pupils to 'treatment' in one of these school categories is heterogeneous, then these are downward biased estimates of the mean impact of these school types on pupil performance relative to the baseline Secular, non-autonomous schools. This is because we may have dropped from the sample those pupils who benefited the most from Faith and autonomous styles of schooling and so decided to stay in these types of school

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[16] This is probably because we are left with too few pupils in this category to allow comparison with other pupils living in the same postcode sector.

at Secondary level; at the same time we have retained those who may have benefited the most from Secular, non-autonomous Primary schooling and stayed in this sector. However, when we go on in Column (4) to exclude these pupils too (i.e. dropping pupils in the fourth diagonal cell in Table 5) we drive the estimated performance gap of Faith and autonomous schools below zero, and none of the differences are significant. In other words, all the Faith Primary school effect is driven by comparison of Faith school pupils with students who never attend a Faith school at any educational phase.

We have so far brushed aside consideration of any denominational differences between schools, because we are interested in the effect of attending a school of religious character regardless of its particular affiliations; we return to this issue in Section 0. For the moment, we draw attention to the fact that there are differences in terms of access to Catholic and Church of England Secondary schooling, the denominations which comprise nearly the entire Faith sector. This can be seen from Appendix Table 12 and Table 13, which show the numbers of pupils switching between the various denominational and secular sectors, and some measures of the accessibility of Faith schools from pupil homes. There is clearly much less persistence in terms of Church of England school attendance than there is in terms of Catholic school attendance; in fact only 11% of autonomous Church of England Primary school pupils stay in this sector, compared to 81.6% for Catholics. In part, this will be because of preferences, but in part also because of the limited availability of Church of England Secondary schools in certain parts of the country: As Appendix Table 13 shows, Church of England Secondary schools are considerably less accessible than Catholic schools (in terms of geographical distance), especially in comparison to the situation at Primary phase. The implication of this is that, when we employ our sample-splitting strategy,

the sample of those exiting the Faith sector is predominantly Church of England, and the reasons for exit may be related to the limited availability of suitable Faith schools.

To check whether these geographical differences affect our results we repeat, in Table 6 Column 5, the estimates using a sample of pupils who have both a Catholic *and* a Church of England Secondary school within 5km of their home. This restriction implies that pupils who prefer Church of England schooling have at least one Church of England school that is geographically accessible. Although this sample restriction changes the point estimates – with slightly stronger evidence of a positive impact from Faith, autonomous schools – these are still statistically insignificant; our results do not seem to be affected by differential access to Catholic and Church of England schools. We also note that there could be differences in the impact of Catholic and Church of England schools, and that pupils of different denominations may be of inherently different abilities; this is an issue we return to in Section 0.

Robustness checks

There are however, a number of explanations for our findings other than there being little or no impact from Faith Primary schools. Firstly, if Secondary schools covertly select pupils on ability, then Faith Secondary schools may pick pupils from Secular Primaries who are expected to make the best progress; conversely, Faith-school pupils who are expected to make the least progress are excluded from Faith Secondary schooling and pushed out to the Secular sector. This is difficult to assess, but we can at least provide suggestive evidence by looking at the differences in *observable* characteristics in these groups. Suppose 'cream-skimming' occurs as described, then we expect the patterns of selection presented in Table 3 to be attenuated or reversed in sign in our restricted sample: pupils from Faith Primaries who do not attend Faith Secondaries will have more

educationally disadvantageous characteristics on average than their counterparts in Faith Secondaries who did not attend Faith Primary schools.

Evidence on this is provided in Table 7. On the one hand, we still find that pupils 'moving out' of the Faith sector at the end of Primary school seem to be at an advantage with respect to pupils 'moving into' the Faith sector from Secular Primaries on the basis of background characteristics, such as Free School Meal entitlement. On the other hand, there is some evidence that pupils with educational difficulties move out of the Faith sector end of the Primary phase. This is evident in Column (2), and particularly evident when looking at Column (3) where we report on the fraction of individuals classed as having 'Special Educational Needs' (SEN).[17] To directly evaluate the relevance of this issue for our estimates, we have re-estimated our regressions separately for pupils with and without SEN status (the results are reported in Appendix Table 10). As it turns out, even amongst no-SEN pupils, the effect of attending a Faith, autonomous Primary school is only 0.121 and not statistically significant (using the sample of 'movers' across educational phases)[18].

As a further step to reduce selection biases, we fully exploit the large size of our sample to obtain 'discrete-cell-based' matching estimates in which pupils in Faith schools are compared to

[17] This is consistent with West and Hind (2005), who show that Secondary autonomous (both Faith and Secular) schools did not at this time usually fix minimum admission quotas for pupils with SEN.

[18] Incidentally, our evidence does not point to any large beneficial impact of attending a Faith Primary school for more disadvantaged pupils, like those with SEN status. We also experimented breaking down the sample by free school meal eligibility (usually associated with economically disadvantaged family background), but still failed to find any differential impact. This is at odds with most of the US based evidence.

pupils with identical observable characteristics in Secular schools. We implement this by estimating within-group regressions, where groups are defined by KS1 level, gender, English as first language, free meal eligibility, SEN status, ethnicity, academic year and postcode of residence; in some of our specifications, we also match on type of Secondary school attended. The results of this exercise (reported in Appendix Table 11) are broadly in line with Table 6 and suggest that selection on observable characteristics cannot account for the patterns we observed there.

Different religious affiliation

In Section 0 we discussed the implications of differential geographical access to Catholic and Church of England schools, but we have said little about denominational differences in the impact of Faith schools or abilities of pupils. However, denominational differences may be an important consideration and there are various possible reasons why we might expect to see differences in educational outcomes between schools of different faiths: for example, the ethos of one faith may have more educational impact than another; or non-random selection of pupils into schools may be greater within one denomination than another – for example, Noden et al. (1998) found that Roman Catholic families express a very strong preference for Roman Catholic schools. Almost all Faith schools in England are either Church of England or Catholic, so we can say little about minority faiths (Jewish, Muslim etc.), but we briefly compare Catholic and Church of England schools. This is also interesting in reference to the US literature, which focuses on Catholic (private) schools.

We have carried out a broad range of checks to see if there are big differences between the impact of Catholic and Church of England schools, or whether our estimates of any Faith school impact are downward biased by the fact that most of our Faith-Secular and Secular-Faith movers

between Primary and Secondary school are Church of England-affiliated pupils. Some of our findings are reported in detail in the Appendix B and Appendix Table 14. Note, that Catholic schools account for about 53% of the Faith, autonomous sector in England, but only 3 Catholic schools in the non-autonomous sector, enrolling 65 pupils so we drop the latter from our analysis. In summary, we find some evidence that any attainment gap between the Faith and Secular sector schools is attributable to pupils in Catholic schools. However, even then it seems that most of this gap at the Primary stage can still be attributed to unobservable differences between Catholic and non-Catholic pupils because the difference occurs between pupils who choose to attend a Catholic school at *any* stage in their school careers, and those who never do so.

Furthermore, although our sample-splitting approach of Section 0 leads our estimated 'Faith' school impact to be heavily weighted towards Church of England schools, we find little evidence that Catholic schools provide a bigger lift to the achievement of the average pupil than these 'Faith' school estimates indicate. Overall, nothing from our analysis of the differential impacts of Catholic and Church of England schools leads us to conclude that our main Faith school estimates are misleading about the impact of attending Faith schools of different denominations.

Instrumental variable estimates

We began our paper casting doubts on the validity of the Instrumental Variable (IV) approaches that instrument using characteristics of residential neighbourhoods, such as availability of religious schools or fraction of individuals belonging to some religious group. We argued that this is a bad approach, because families *choose* where to live (often for reasons related to access to good schools) so neighbourhood characteristics are likely to be correlated with family characteristics, preferences and pupil achievements. In fact, instrumenting school choice with characteristics that

are the result of the sorting equilibrium arising from school choice is likely to inflate the bias rather than fix it (for reasons similar to those discussed in Altonji et al., 2005). To evaluate this IV approach, we (partly) replicate Neal (1997), and instrument religious school attendance using either the supply of religious schools (relative to secular schools) in the neighbourhood of residence, or the fraction of Christians in the neighbourhood population. Given the focus of our discussion so far, we present IV estimates that instrument attendance at Faith, autonomous schools. Results are reported in Table 8.

In Columns (1) to (3), we instrument Faith, autonomous school attendance using the ratio of number of Faith Primary schools to number of Secular Primary schools within 5kms of each pupil's home. At the same time, we control for total number of Primary schools within 5km and distances to closest Secular and Faith schools. Building from Column (1) to (3), we include KS1 level dummies, individual and school level controls and finally educational district dummies (LEA). In all specifications, we find that the instrument is powerful in the first stage equation. Second stage estimates of the impact of attending a Faith, autonomous Primary school are positive (and significant in Columns (1) and (2)), yet surely too large to be credible estimates of the causal impact of attending a Faith school. The coefficients indicate a conditional attainment gap of 5-6 percentiles, which is higher than the first OLS estimates we presented without any controls (Table 4). This suggests that the instrument is invalid and simply magnifies the effect of unobservable parental preferences and school-side selection. In fact, to believe these estimates, one would have to assume that there is strong negative selection into Faith schools based on unobservables, and that pupils with educational disadvantageous characteristics choose Faith schooling (in line with the claims about Catholic schools in the US literature, e.g. Neal (1997)). Yet this is very unlikely,

given our evidence on the way pupils are sorted into Faith schools on the basis of observable characteristics (Table 7).

In Columns (4) to (6), we further instrument Faith, autonomous Primary attendance using the fraction of Christians in the neighbourhood population constructed from Output Areas (OA) – units of around 250 people – from the 2001 UK Census. When we use this second instrument, we control for OA size and population density. Once again, estimates of the effect of attending Faith, autonomous schools are way too large to be plausible estimates of the treatment effect (up to 17 percentile points effect)[19].

6. Conclusions

We have provided a number of estimates of the impact of attending a Faith school in England between ages 7 and 11, on age-11 attainments. Our approach has deliberately avoided instrumental variable strategies adopted by previous work in the field, because we do not believe there are any credible instruments for Faith school attendance that are uncorrelated with family background, either directly or through residential sorting. Instead we have exploited the fact that we have around one million pupils in our database, which, in conjunction with precise details about place of

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[19] The specifications in Columns (5) and (6) of the Table are slightly different from those used in the discussion above; most notably, they do not include school level characteristics. For comparison reasons, we report OLS estimates from these specifications. Column (5): 2.485 (s.e.: 0.152); Column (6): 2.194 (s.e.: 0.156).

residence, academic record and future school choice allows us to control quite carefully for factors that influence the propensity to attend Faith schools.

We make no claim to have put a precise number on the causal impact of Faith school attendance, and have indeed demonstrated the magnitude of any difference between Faith school pupils and Secular school pupils depends on the way we cut the sample. What then are we to make of these results? One thing that seems clear is that there is no unambiguous performance advantage of Faith or autonomous schools that cannot be attributed purely to pupil-side selection into these schools, or to school-side selection of pupils likely to show the fastest progress. Pupils who attended Faith or autonomous schools at Primary phase, but not at the Secondary phase, do no better in Primary school than pupils who attend Faith or autonomous schools at the Secondary phase but not at the Primary phase. The Faith/autonomous school gap in attainments at Primary phase seems largely attributable to differences between those pupils who choose to attend a Faith school at *any* stage in their school careers, and those who choose never to do so or are excluded from doing so by school selection procedures.

There is clear positive selection of pupils into Faith schools (and into schools that have autonomous admissions and governance arrangements) on the basis of observable characteristics that are favourable to education – even when we compare pupils that originate in the same block of residential housing. This selection may arise because of family and pupil references, or because of autonomous school admission arrangements that existed until quite recently. Once we control for these types of selection, our lowest estimates suggest that there is no difference between expected attainment in Faith Primary schools and expected attainment in any other school type (and possibly even a negative impact from Church of England schools); this is based on comparing pupils who swap in and out of Faith schooling between the Primary and Secondary phases.

Because relatively few Catholic pupils swap out of Faith schooling in England, this lowest estimate is heavily weighted towards the impact of Church of England schools. A more generous reading of the results suggests that pupils in Faith Primary schools which have autonomous governance and admissions structures – especially Catholic schools – do progress marginally faster: A pupil starting in an autonomous Faith school at age 7 could expect to be one percentile higher in the distribution of pupil attainments by age-11 than a comparable pupil attending a standard Secular school, even when these two pupils live in the same postcode and go on to choose the same Secondary school. To put this in perspective, we draw on results in Machin and McNally (2004) that report labour market returns to age-10 reading tests, based on the British Cohort Survey[20]. Their figures (reported in their Table 7) indicate that the labour market return to a one percentile move up the attainment distribution at age 10 was around 0.0042%, conditional on family background. In other words, the labour market impact of Faith school attendance seems very slight.

Certainly, the cumulative impact of Faith school attendance over 12 years of compulsory schooling could be more substantial than this would suggest, and there may be other impacts, on staying on rates and child wellbeing for example, that are outside the scope of this study. However, pupils in Faith schools that are under close Local Education Authority control do not progress any faster than similar pupils in comparable Secular schools; any performance impact from 'Faith' schools in England seems to be closely linked to autonomous governance and admissions arrangements, and not to religious character.

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[20] The British Cohort Survey follows a cohort of children born in one week in 1980 through to adulthood. The reading tests were administered in 1990 when the children were aged 10.

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Table 1: Institutional characteristics of Primary schools in England

Type	Faith	Governors (approximately)	Admissions authority	Assets owned by	Employer
Community	Secular	Parents >30%, Staff <30%, LEA 20%, Community 20%	LEA	LEA	LEA
Foundation	Mostly secular, some C. of E.,	Parents >30%, Staff <30%, Foundation/Partnership <25%, LEA <20%, Community 10%	Governors	Foundation or Governors	Governors
Voluntary Aided	Mostly C. of E. or Catholic, some other faith, some secular	Foundation >50%, Parents >30%, LEA <10%, Staff <30%	Governors	Foundation	Governors
Voluntary Controlled	Mostly C. of E., some other faith, some secular	Parents >30%, Staff <30%, Foundation <25%, LEA <20%, Community 10%	LEA	LEA	LEA

Note: C. of E. means Church of England.

Table 2: Age-11 attainments by school type; descriptive statistics

Variable	Mean	Std.Dev.	Percentage of age-11 pupils
Average KS2 score, Mathematics and English (percentiles)	50.50	26.61	100%
Faith (non-autonomous or autonomous)	53.85	26.17	29.21%
Faith, non-autonomous	52.43	26.46	9.94%
Faith, autonomous	54.58	25.99	19.27%
Secular (non-autonomous or autonomous)	49.12	26.66	70.79%
Secular, non-autonomous	49.00	26.67	68.18%
Secular, autonomous	52.17	26.78	2.61%
autonomous (Faith or Secular)	54.30	26.03	21.88%

Note: the total number of observations is 929958. Pupils attending or moving to schools with other religious denominations are dropped from the sample; they amount to about 0.6% of the sample (6387) pupils. Autonomous schools include (Secular and Faith) Foundation and Voluntary Aided schools. Non-autonomous schools include Community and Voluntary Controlled schools.

Table 3: Prior attainment and pupil background by Primary school type

	No controls					Postcode fixed effects				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Age-7 KS1 points	Free meal eligible	SEN status	White	English first language	Age-7 KS1 points	Free Meal Eligible	SEN status	White	English first language
Mean	44.752	0.163	0.208	0.845	0.903	44.695	0.181	0.218	0.860	0.924
(Std.Dev.)	(10.212)	(0.369)	(0.406)	(0.362)	(0.296)	(10.198)	(0.385)	(0.413)	(0.346)	(0.265)
Faith, autonomous	1.657	-0.047	-0.014	0.033	0.037	1.283	-0.041	-0.013	0.024	0.034
	(0.075)	(0.003)	(0.002)	(0.005)	(0.004)	(0.053)	(0.001)	(0.002)	(0.002)	(0.002)
Faith, non-autonomous	1.289	-0.080	-0.014	0.074	0.061	0.132	-0.014	0.004	0.005	0.009
	(0.097)	(0.003)	(0.003)	(0.006)	(0.005)	(0.078)	(0.002)	(0.003)	(0.002)	(0.002)
Secular, autonomous	1.209	-0.067	-0.022	0.036	0.029	0.691	-0.025	-0.024	0.012	0.005
	(0.232)	(0.007)	(0.006)	(0.014)	(0.012)	(0.150)	(0.004)	(0.005)	(0.005)	(0.006)
Secular, non-autonomous	44.273	0.181	0.213	0.831	0.889	44.257	0.196	0.222	0.852	0.912
	(0.042)	(0.002)	(0.001)	(0.003)	(0.003)	(0.026)	(0.001)	(0.001)	(0.001)	(0.001)

Note: The top part of the table shows raw means and standard deviations for all schools. The bottom part shows means for Secular, non-autonomous schools, and mean differences for other school categories with respect to Secular, non-autonomous schools. Means and mean differences in the bottom part of the Table are obtained from regressions at the pupil level without controls or controlling for postcode fixed effects; standard errors clustered at the schools level. SEN means: Special Educational Needs (with and without statements). Sample size: no controls 929958; Postcode fixed effects: 281417.

Table 4: School type and mean age-11 attainment;

conditional on initial attainment, background and place of residence

	(1)	(2)	(3)	(4)
Faith, autonomous	5.582	2.337	1.686	0.818
	(0.212)	(0.158)	(0.126)	(0.161)
Secular, autonomous	3.168	0.925	1.119	0.671
	(0.606)	(0.453)	(0.337)	(0.397)
Faith, non-autonomous	3.425	0.918	0.023	-0.221
	(0.274)	(0.199)	(0.164)	(0.193)
Age-7 attainment	No	Yes	Yes	Yes
Individual and school level controls	No	No	Yes	Yes
Postcode fixed effects	No	No	Yes	No
Postcode-Secondary school fixed effects	No	No	No	Yes
Schools	14821	14821	14020	12089
Observations	929958	929958	281417	100203

Note: Regressions at the pupil level; standard errors clustered at the Primary school level. Baseline: Secular, non-autonomous schools. Controls with descriptive statistics are listed in Appendix Table 9.

Table 5: Transition matrix between Primary and Secondary phase, by school type

Current school (age 11)	Future school (age 12)			
	Faith, autonomous	Faith, non-autonomous	Secular, autonomous	Secular, non-autonomous
Faith, autonomous	51.2	0.8	10.8	37.2
	(91,774)	(1,526)	(19,408)	(66,497)
Faith, non-autonomous	6.9	2.2	18.5	72.4
	(6,343)	(2,044)	(17,147)	(66,948)
Secular, autonomous	5.4	0.5	54.8	39.3
	(1,310)	(122)	(13,295)	(9,531)
Secular, non-autonomous	5.2	0.8	16.5	77.5
	(32,714)	(4,785)	(104,897)	(491,617)

Note: The table presents cell percentages; total numbers in parentheses.

Table 6: School type and mean age-11 attainment; various pupil sub-samples

	(1)	(2)	(3)	(4)	(5)
	Including stayers across both phases only	Excluding Faith or autonomous stayers across both phases	Excluding Faith or autonomous stayers across both phases	Excluding stayers across both phases within all school types	Excluding stayers, High choice areas
Faith, autonomous	2.672	0.925	0.671	-0.106	0.387
	(0.183)	(0.154)	(0.181)	(0.225)	(0.348)
Secular, autonomous	2.176	0.084	0.061	-1.293	-1.323
	(0.594)	(0.430)	(0.487)	(0.513)	(0.469)
Faith, non-autonomous	2.036	-0.135	-0.229	-1.319	-0.693
	(2.050)	(0.169)	(0.196)	(0.248)	(0.943)
Age-7 attainment	Yes	Yes	Yes	Yes	Yes
Individual and school level controls	Yes	Yes	Yes	Yes	Yes
Postcode fixed effects	Yes	Yes	No	Yes	Yes
Postcode-Secondary school fixed effects	No	No	Yes	No	No
Schools	10535	13647	11660	9956	4276
Observations	170931	225249	93551	110481	36228

Note: Regressions at the pupil level; standard errors clustered at the Primary school level. Baseline: Secular, non-autonomous schools. Column 1 only includes pupils who attend the same type of schools in both periods. Column 2 and 3 exclude pupils who attend Faith schools or autonomous schools in both Primary and Secondary phases. Column 4 excludes all pupils who attend the same type of schools in both periods. Column 5 only includes pupils with both a Catholic affiliated Secondary school and a Church of England affiliated Secondary school within 5km from home (high choice areas). Controls with descriptive statistics are listed in Appendix Table 9.

Table 7: Prior attainment and pupil background by Primary school type for pupils who switch school types across Primary and Secondary phases

Primary school	(1) Age-7 KS1 points	(2) Free meal eligible	(3) SEN status	(4) White	(5) English first language
Faith, autonomous	-0.268	-0.019	0.014	0.008	0.017
	(0.111)	(0.003)	(0.004)	(0.004)	(0.008)
Faith, non-autonomous	-0.576	-0.011	0.015	0.011	0.016
	(0.131)	(0.004)	(0.005)	(0.004)	(0.003)
Secular, autonomous	0.171	-0.012	-0.000	0.006	0.017
	(0.264)	(0.008)	(0.011)	(0.009)	(0.009)
Secular, non-autonomous	45.07	0.166	0.213	0.856	0.917
	(0.069)	(0.002)	(0.003)	(0.003)	(0.002)

Note: Table shows means for Secular, non-autonomous schools, and mean differences for other school categories with respect to Secular, non-autonomous schools. Means and mean differences are obtained from regressions at the pupil level with postcode fixed effects; standard errors clustered at the schools level. SEN means: Special Educational Needs (with and without statements). Sample as in Table 6 Column 3.

Table 8: IV Estimates of the impact of attending a Faith, autonomous school;

using relative supply of Faith schools or fraction of Christians in the neighbourhood

	IV: Relative supply of Faith schools			IV: Fraction of Christians in neighbourhood		
	(1)	(2)	(3)	(4)	(5)	(6)
Faith,	5.092	6.384	4.454	5.958	15.77	17.73
autonomous	(1.471)	(2.034)	(5.959)	(2.001)	(2.719)	(2.714)
First Stage Coefficients						
Ratio, Num. of Faith school/ Secular schools	0.083	0.059	0.022			
	(0.001)	(0.001)	(0.001)			
Fraction of Christians in the neighbourhood				0.260	0.213	0.235
				(0.006)	(0.007)	(0.007)
T-Test on Coefficient	*59.58*	*46.55*	*17.19*	*40.78*	*29.82*	*33.82*
Age-7 attainment	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	Yes	No	Yes	No
LEA dummies	No	No	Yes	No	No	Yes
Schools	12271	12271	12271	12376	12376	12376
Observations	761475	761475	761475	774960	774960	774960

Note: Regressions at the pupil level. Standard errors clustered at the Primary school level, for second stages; standard errors clustered on postcodes of residence (Columns 1 to 3) or Census Output Areas of residence (Columns 4 to 6), for first stages. Baseline: Secular, non-autonomous schools. Religious school attendance in Columns 1 to 3 is instrumented using the ratio of number of religious schools to the number of secular schools available within 5kms from pupil postcode of residence, controlling for total number of schools within 5kms from postcode of residence and distances to the closest Catholic, Church of England and Secular school. Religious school attendance in Columns 4 to 6 is instrumented using the fraction of individuals in the neighbourhood who report being Christians, controlling for the size of the neighbourhood and its population density. This information is derived from UK Census 2001. Neighbourhoods are defined as the Census Output Areas (OA), meant to include about 250 individuals. First Stage coefficients report the estimated effect of the instrument on the probability of attending a religious school. The full set of controls is described in Appendix Table 9. Notice that school level controls are dropped from the specification in Column (5); and that individual level controls are also dropped in the specification in Column 6 (with LEA dummies).

Appendix A

Table 9: Control variables: descriptive statistics

Variable	Mean	Std.Dev.	Min,Max
Pupil Level			
Female	0.496	0.499	0,1
Native language English	0.902	0.296	0,1
Native language not available	0.022	0.148	0,1
Native language not English	0.075	0.263	0,1
Pupil eligible for free school meals (FSM)	0.163	0.369	0,1
FSM eligibility status missing	0.022	0.146	0,1
Pupil with special education needs (SEN)	0.208	0.406	0,1
SEN status missing	0.022	0.147	0,1
White ethnicity	0.845	0.361	0,1
Black Caribbean ethnicity	0.014	0.116	0,1
Black Other ethnicity	0.016	0.124	0,1
Indian ethnicity	0.019	0.136	0,1
Pakistani ethnicity	0.023	0.149	0,1
Other Asian ethnicity	0.011	0.103	0,1
Other and mixed ethnicities	0.027	0.161	0,1
Missing ethnicity	0.046	0.211	0,1
Academic Year 2001/2002	0.499	0.500	0,1
School Level			
Total number of pupils	315.8	132.5	13,1292
Pupil/teacher ratio	23.14	3.096	4.3,72.2
Fraction of pupils eligible for FSM	0.169	0.145	0,0.94
Fraction of pupils with SEN	0.197	0.095	0,0.79
Fraction of Whites in school	0.844	0.254	0,1
Fraction of Caribbean Blacks in school	0.013	0.047	0,0.79
Fraction of Other Blacks in school	0.016	0.053	0,1
Fraction of Indians in school	0.019	0.070	0,1
Fraction of Pakistani in school	0.023	0.095	0,1
Fraction of Other Asian in school	0.011	0.053	0,1
Fraction of other and mixed ethnicity in school	0.027	0.051	0,1
Fraction with missing ethnicity in school	0.047	0.167	0,1
Ratio of ethnically classified to total pupils in school	0.409	0.431	0,1

Table 10: School type and mean age-11 attainment; conditional on initial attainment, background and place of residence, and by Special Educational Needs (SEN) status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All Pupils	Including stayers across both phases only	Excl. Faith or autonomous stayers across both phases	Excl. stayers across both phases within all school types	All Pupils	Including stayers across both phases only	Excl. Faith or autonomous stayers across both phases	Excl. stayers across both phases within all school types
	With SEN status				*No SEN status*			
Faith, autonomous	1.554	3.097	0.529	-0.155	1.805	2.703	1.133	0.121
	(0.249)	(0.383)	(0.318)	(0.571)	(0.139)	(0.198)	(0.172)	(0.256)
Secular, autonomous	0.514	-0.611	-0.161	-0.293	1.163	2.156	0.178	-1.364
	(0.690)	(1.745)	(0.945)	(1.295)	(0.364)	(0.667)	(0.459)	(0.577)
Faith, non-autonomous	-0.173	-1.654	-0.397	-0.549	0.170	2.869	0.007	-1.356
	(0.323)	(3.511)	(0.339)	(0.579)	(0.183)	(2.387)	(0.187)	(0.285)
Age-7 attainment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual and school level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Postcode fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Postcode-Secondary school fixed effects	No	No	No	No	No	No	No	No
Schools	11783	8271	10985	6671	13830	10241	13358	9482
Observations	61266	36784	50574	24482	220123	134142	174654	85981

Note: Regressions at the pupil level; standard errors clustered at the Primary school level. Baseline: Secular, non-autonomous schools. SEN means: Special Educational Needs (with and without statements). Columns 2 and 5 include only pupils who attend the same type of schools in both periods. Column 3 and 7 exclude pupils who attend Faith schools or autonomous schools in both Primary and Secondary phases. Columns 4 and 8 exclude all pupils who attend the same type of schools in both periods. Controls with descriptive statistics are listed in Appendix Table 9.

Table 11: Faith, autonomous school treatment effects: discrete cells matching

	Not Including Future School Type Controls			*Including Future School Type Controls*		
	(1)	(2)	(3)	(4)	(5)	(6)
	All Pupils	Excl. Faith or autonomous stayers across both phases	Excl. stayers across both phases within all school types	All Pupils	Excl. Faith or autonomous stayers across both phases	Excl. stayers across both phases within all school types
Faith, autonomous	2.452	1.126	0.366	1.722	0.964	-0.212
	(0.416)	(0.634)	(1.179)	(0.615)	(0.674)	(1.399)
Secular, autonomous	1.290	3.410	-1.252	1.761	4.143	-1.944
	(1.131)	(1.860)	(2.778)	(1.416)	(2.387)	(4.388)
Faith, non-autonomous	1.084	0.945	-1.646	1.291	1.136	-1.661
	(0.600)	(0.657)	(1.211)	(0.680)	(0.703)	(1.427)
Schools	3293	2640	1496	1950	1811	1182
Observations	4460	3417	1945	2420	2238	1483

Note: Regressions at the pupil level; standard errors clustered at the Primary school level. Baseline: Secular, non-autonomous schools. Pupils matched in discrete cells based on the following variables: 24 KS1 level dummies, gender, dummies for native language, free meal eligibility status dummies, SEN status dummies, dummies for ethnicity, academic year (individual level) and postcodes of residence. Columns 4 to 6 also match on future school type (Faith, autonomous; Faith, non-autonomous; Secular, autonomous, Secular, non-autonomous). The set of matching variables is described in Appendix Table 9.

Table 12: Transition matrix between Primary and Secondary phase, by school type

	Future school (age 12)				
Current school (age 11)	Catholic, Autonomous	CofE, autonomous	CofE, non-autonomous	Secular, autonomous	Secular, non-autonomous
Full Sample					
Catholic, autonomous	81.6	1.3	0.2	4.0	12.8
	(77,675)	(1,275)	(186)	(3,815)	(12,195)
CofE, autonomous	4.3	11.0	2.5	18.5	64.3
	(3,591)	(9,233)	(1,333)	(15,593)	(54,302)
CofE, non-autonomous	2.4	4.4	2.1	18.5	72.5
	(2,232)	(4,111)	(1,968)	(17,123)	(66,907)
Secular, autonomous	2.3	3.1	0.5	54.8	37.7
	(561)	(749)	(120)	(13,295)	(9,531)
Secular, non-autonomous	2.3	2.8	0.7	16.5	77.5
	(14,596)	(18,118)	(4,693)	(104,897)	(491,617)

Note: The table presents cell percentages; total numbers in parentheses. The table excludes pupils in Catholic, non-autonomous Primary and Secondary schools (respectively 65 and 177 pupils). For this reason rows may not perfectly sum to 100.

Table 13:: Religious schools availability and distances

	Fraction with Catholic school within 5km	Distance to Catholic, within 5km	Fraction with CofE school within 5km	Distance to CofE, within 5km	Fractions with both Faith schools within 5km	Distance to Catholic, within 5km, both types available	Distance to CofE, within 5km, both types available
Primary schools	0.85	1.46	0.95	1.65	0.56	1.37	1.58
Secondary school	0.63	2.41	0.36	2.81	0.32	2.28	2.82

Note: Panels refer to Primary schools and Secondary school available to sampled Primary school pupils. Distances in kilometres.

Appendix B

Denominational differences

Section 0 discussed differences in attainment between Church of England and Catholic Schools. Here we discuss the results – presented in Table 14 below - in more detail.

Columns 1 and 2 include all pupils, while Columns 3 and 4 only include those who do not stay in Faith or autonomous schools over both educational phases. Column 5 present results for those who change their sector between Primary and Secondary school. Columns 1 to 4 suggest that autonomous Catholic schools have a larger impact on pupil educational progress during Primary education than schools affiliated to the Church of England (CofE). Whilst CofE institutions have a positive and significant effect on pupil achievement, at least in Columns 1, 2 and 3, their coefficient is around three times smaller than that on Catholic schools. However, when we move to the sample that only includes individuals who change sector between the Primary and Secondary phase, the Catholic effect shrinks dramatically, and pupils educated in CofE Primary schools now appear to be doing worse than pupils who switch in to Faith schooling at the Secondary phase; neither Catholic nor CofE autonomous schools have an effect on pupil attainment that can be statistically distinguished from zero. So, although there is some evidence here to suggest that the attainment gap between the Faith and Secular sector schools is attributable to pupils in Catholic schools, it still seems that most of this gap at the Primary stage can be attributed to unobservable differences between Catholic and non-Catholic pupils; the difference occurs between pupils who choose to attend a Catholic school at *any* stage in their school careers, and those who never do so. Once again, in Column 6, in

recognition of the fact that Church of England and Catholic pupils face different constraints in terms of geographical accessibility of their schools, we restrict the sample to 'high-choice' areas in which pupils have at least one school of both types within 5km; there is now more evidence of positive impacts from both Catholic and Church of England schools, but neither coefficient is significant or outside the range of estimates we have already obtained.

Note, that in all the estimates so far, we have treated Catholic pupils as appropriate 'controls' for CofE pupils and vice-versa. Thus, our Faith-autonomous coefficients estimated in Section 0 are based on comparison of pupils who switch out of Faith autonomous schools (a high proportion of CofE pupils) with pupils who switch in to Faith schooling (a mix of CofE and Catholic pupils); our Catholic-autonomous coefficients (for example) in Appendix Table 14 are based on comparison of pupils who move out of Catholic schooling between the Primary and Secondary phases with those who move in to Faith-autonomous schooling of any type. We have checked whether this could be misleading, be re-estimating the models comparing pupils who switch out of Catholic-autonomous Primary schooling with those who switch from Secular controlled to Catholic schooling (this is a relatively 'small' sample of 11374 pupils): in this case we find a Catholic effect of 0.743 (1.313), broadly similar to the final figures in Appendix Table 14. If instead we compare pupils who switch out of CofE autonomous Primary schooling with those who switch in from Secular schools at the Secondary phase we find a significant negative coefficient of -2.344 (0.685); in other words pupils educated in Church of England autonomous Primary schools are doing less well at age-11 than Secular pupils who choose Secondary education in Church of England autonomous schools.

Table 14: School type and mean age-11 attainment; different religious affiliations

	(1)	(2)	(3)	(4)	(5)	(6)
	All Pupils	All Pupils	Excluding Faith or autonomous stayers across both phases	Excluding Faith or autonomous stayers across both phases	Excluding stayers across both phases within all school types	Excluding stayers, High choice areas
Catholic, autonomous	2.140 (0.161)	1.633 (0.248)	1.695 (0.247)	1.620 (0.291)	0.572 (0.335)	0.772 (0.508)
CofE, autonomous	0.956 (0.172)	0.456 (0.200)	0.651 (0.180)	0.343 (0.210)	-0.345 (0.248)	0.301 (0.372)
Secular, autonomous	1.109 (0.338)	0.671 (0.397)	0.096 (0.429)	0.068 (0.488)	-1.281 (0.514)	-0.720 (0.939)
CofE, non-autonomous	0.018 (0.166)	-0.206 (0.193)	-0.123 (0.169)	-0.212 (0.196)	-1.368 (0.248)	-1.302 (0.467)
Age-7 attainment	Yes	Yes	Yes	Yes	Yes	Yes
Individual and school level controls	Yes	Yes	Yes	Yes	Yes	Yes
Postcode fixed effects	Yes	Yes	Yes	No	Yes	Yes
Postcode-Secondary school fixed effects	No	Yes	No	Yes	No	No
Schools	14019	12088	13642	11656	9949	4322
Observations	281405	100197	225208	93532	110443	37408

Note: Regressions at the pupil level; standard errors clustered at the Primary school level. Baseline: Secular, non-autonomous schools. CofE means Church of England. Catholic, non-autonomous schools are excluded from the sample; this is because they form a too small group (3 schools with 65 pupils). Columns 1 and 2 include all pupils. Columns 3 and 4 exclude pupils who attend Faith schools or autonomous schools in both Primary and Secondary phases. Column 5 excludes all pupils who attend the same type of schools in both periods. Column 6 only includes pupils with both a Catholic affiliated Secondary school and a Church of England affiliated Secondary school within 5km from home (high choice areas). Controls with descriptive statistics are listed in Appendix Table 9.