

Can school competition improve standards? The case of faith schools in England

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## Abstract

This paper measures the extent to which the presence of state-funded Catholic secondary schools in England alters the educational experiences of pupils who attend neighbouring schools, whether through school effort induced by competition or changes in peer groups induced by sorting. National administrative data are used to estimate pupil test score growth models between the ages of 11 and 16, with instrumental variable methods employed to avoid confounding the direct causal effect of Catholic schools. The historical Catholic population, holding constant the current Catholic population, is used to predict current Catholic school supply. We find little evidence that competition from Catholic schools raises area-wide pupil attainment.

## 1 Introduction

The introduction of a quasi-market for school places has been central to government aims to improve standards in English schools for the past twenty years. However, opinions remain polarised on whether reforms intended to facilitate parental choice of school and school competition have successfully induced schools to increase effort focused on pupil achievement. This paper adds to the literature on choice and competition using English Catholic schools as an empirical test of the potential impact of one particular source of school competition.

Religious schools, maintained by the State, are an important feature of the English schooling system, educating 15% of secondary-aged children. They are a legacy of the 1902 settlement between the Government and the Church of England (CoFE) and Roman Catholic (RC) churches, as the principal providers of nineteenth-century schooling. Despite a steep decline in church attendance across all denominations and limited support for the principle of state-funded religious schooling in attitude surveys, there continues to be relatively high demand for places at religious secondary schools, with institutional rigidities constraining the supply of places.

Religious secondary schools provide a potentially genuine and enhanced opportunity for some parents to choose between schools (without the cost of moving house) since they usually give priority in admissions based on religious affiliation of parents rather than solely proximity of home to school (although, as discussed later, proximity to faith school does play a role in admissions). Data show that faith schools do produce a large amount of sorting in local educational markets, thereby significantly reducing the proportion of pupils who attend their nearest secondary school (e.g. Allen 2007). This choice means that, in a system with spare capacity, religious schools do appear to present an enhanced competitive

threat to neighbouring schools, who may respond by exerting effort in some way to attract local families to their school. Under a number of assumptions discussed in the next section, this school effort may in turn increase pupil test scores.

Empirical studies of competition between schools in England have not consistently found it to be correlated with higher standards in schools. Several studies do identify a correlation between structural measures of competition/population density and pupil achievement (or even growth in pupil achievement), but it is not possible to attribute causality to these findings (Bradley and Taylor 2009; Bradley et al. 2001; Gibbons et al. 2008b). Gibbons et al. (2008a) study competition between primary schools, rather than secondary schools, and do find some positive effect of competition from religious primary schools that they use to suggest that schools such as faith schools that are autonomous to local authority control may have the means or motivation to respond to a competitive environment by improving standards.

In addition to this non-experimental literature, two quasi-experimental papers have attempted to estimate competition effects in England. Clark (2009) uses a regression discontinuity design to exploit votes of parents who decided whether schools gained autonomy from local authorities in the early 1990s, finding that these Grant-Maintained schools did not appear to exert a greater competitive pressure on their neighbours than schools who lost the vote and remained under local authority control. Burgess and Slater (2006) use the administrative boundary change of 1988 in Berkshire to estimate the impact of changes to school competition on pupil progress, but also find no competition effect.

This paper bears similarities to West and Woessman (2010) who use an instrument of historical Catholic populations to examine the effect of private school competition on student achievement, finding a positive impact across the 29 OECD countries participating in PISA 2003. There are also two papers estimating whole area effects of Catholic schools in the USA and Canada that are directly comparable to this analysis. Hoxby (1994) uses the National Longitudinal Survey of Youth to estimate the effect of the presence of Catholic schools (which constitute over 80% of the USA private schooling market) on area-wide achievement. The supply of Catholic schools is instrumented using the current size of the Catholic population in the area. She finds that a 10% point increase in Catholic school enrolment produces 0.9 additional years' worth of educational achievement, on average, and 6% higher wages for pupils graduating from high schools in the area. However, her choice of instrument is controversial, even though she is able to control for the religious affiliation of the family, because it requires us to assume that Catholic families who live in predominantly Catholic areas are no different from Catholic families who live in areas with few other Catholic families. Jepsen (2002), amongst others, contests this claim and through re-analysis of the same data concludes that competition effects are small.

Canada's dual system of schooling is similar to that of England because Catholic schools are entirely state-funded on the same terms as secular schools. Card et al. (2010) estimate the effect of Catholic school enrolment share on pupil test score gains using a school fixed effects specification of test score growth between grades 3 and 6. They find small positive effects from competition in the area of Ontario, but have no means to isolate an exogenous source of variation in the supply of Catholic school places. This means that their estimation strategy relies on comparisons

between areas with different fractions of Catholic families and different rates of growth of housing stock to identify cross-system effects. This again raises the concern expressed by Altonji et al. (2005) that the local religious composition of the population enters the education production function via some other mechanism. However, although Card et al. (2010) have no measure of the religion of the child's family, the identification assumptions would seem less onerous than Hoxby's because they use a (school) value added specification combined with school and cohort dummies.

This paper uses national administrative data on a cross-section of half a million pupils to measure the extent to which the presence of Catholic schools 'spills' over to the educational experiences of pupils who attend neighbouring schools, whether through school effort induced by competition or changes in peer groups induced by sorting. The estimation strategy is similar to West and Woessman (2010), Card et al. (2010) and Hoxby (1994) to identify these effects without the confounding influences of unmeasured pupil characteristics. Pupil growth in achievement from age 11 to age 16 is modelled as a function of share of pupils in the area who attend Catholic schools, using a wide range of pupil and area controls. In addition, instrumental variable methods are employed to avoid confounding the causal effect of Catholic schools on educational attainment with direct effects of Catholic families on educational success, or with growth in Catholic schools caused by ineffective local Community (state-maintained secular) schools. The historic characteristics of an area—early twentieth-century levels of religious affiliation—are used to predict the modern-day supply of Catholic school places (conditional on contemporary religious populations), thus isolating a source of variation that is exogenous to current demand for Catholic school places. This estimation approach, which controls for the current levels of Catholic populations, has also been proposed for the USA by Cohen-Zada (2009).

## 2 Institutional and conceptual framework

This section describes the nature of secondary school provision in England, including the institutional arrangements for school choice.

### 2.1 The supply of faith schools

There is wide variation in the levels of religious schooling provision in England, and the physical location of these schools was essentially fixed by the 1960s. This means that supply largely reflects the historical patterns of religious affiliation in particular areas. Overall, 17% of the 3108 secondary schools in England have a religious denomination with 11% that are Roman Catholic (RC) and 5% Church of England, but this figure is zero in some areas and as high as 31% in others. The involvement of churches in schooling predates the large-scale establishment of state-controlled board schools following the 1870 Education Act. However, the major expansion in religious schooling actually took place a little later and can best be described as a late nineteenth-century expansion, then a financially induced stagnation to 1950, followed by a final moderate growth (principally in RC schools) in the 1950s and 1960s. Financial difficulties for the churches in the first half of the twentieth century forced them to relinquish some control over their schools through a series of Education Acts whereby state financial support was exchanged for greater regulation and control [known as 'Voluntary Aided' (VA) status].

The final decades of the twentieth century saw very little change in the supply of faith schools in England due to financial constraints and the requirement for schools to apply for permission to change capacity numbers. Similarly, few faith schools closed over this period, because current (and almost all capital) school expenditure has been met by the State since 1944. Thus, the 2005 levels of faith schooling provision are largely unrelated to current church attendance levels and the capacity of congregations to raise funds [on a typical Sunday in 2005, just 6% of the population attended church, with under 2% in each of the CofE and RC denominations (Brierley 2006)].

## 2.2 Choosing between the faith and secular sectors

Admissions to secondary schools in England take place for most pupils at the age of 11. Most secular secondary schools use catchment areas or proximity to school as their principal allocation criteria. Religious state-funded secondary schools use a wide range of rules (see West et al. 2004, for details), but the general pattern is that they prioritise their own religious denomination (e.g. Catholic families at RC schools), followed by related religious groups (e.g. other Christian families at RC schools), followed by any other religious families (e.g. Muslim families at RC schools) and followed by non-religious families based on proximity to school.

Because the process is administered by schools, there is a wide range of practices in the application of these admission rules, meaning the clear identification of Catholic, Anglican and non-religious families is not possible. For example, levels of religiosity applied by the school may vary from the presence of a religious marriage certificate, baptismal certificate, letter from a Priest attesting involvement in church, years and regularity of worship at the particular church, to commitment to faith displayed in an interview.<sup>1</sup> The stringency of these religiosity requirements is closely related to the level of demand for places at the school, which is determined by the characteristics and preferences of local families, as described below.

Central to our conceptualisation of faith and secular school choice is our argument that potentially large numbers of families can choose between the faith and secular sectors. Despite low levels of churchgoing, 47 and 12% of parents with secondary aged children reported a CofE and RC affiliation, respectively, in the Longitudinal Study of Young People in England (LSYPE) (Allen and West 2011). The underlying religious characteristics of the family are critical in determining both their likelihood of valuing a faith education and securing a place. However, a family with no religious characteristics may engage in active choice if the returns to securing a faith school place in terms of peer group and ethos outweigh the costs of doing so. These costs would be very high for a non-Catholic family in an area such as Manchester or Liverpool since there remains a large Catholic population, and thus, admissions criteria demand high levels of proof of religious adherence. By contrast, Birmingham has large numbers of Catholic schools for historical reasons but a small Catholic population today, so the cost of meeting Catholic school admissions criteria is very low (and faith schools act more like community schools in that geographical proximity is the main criteria for admission).

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<sup>1</sup> Interviews with parents or children are no longer allowed under the current admissions code, but were permissible at the time this cohort of pupils started secondary school.

The model described suggests that the propensity of households to actively choose between faith and secular schools will depend on the family's religious characteristics and the supply of faith school places in an area, relative to demand. We do have some indications that parents can and do choose between faith and non-faith schools because there is movement between these two sectors as the transition from primary to secondary school takes place. The notion that faith and non-faith schools are viable alternatives for both religious and non-religious families is also supported by the survey data on the religious affiliation of parents of secondary-aged children in faith schools. In the LSYPE, only two-thirds of the parents of children in Roman Catholic secondary schools reported that they were Catholic (6% said they had no religion at all). Similarly, about two-thirds of parents with children in CofE secondary schools reported that they were Anglican, with 12% reporting no religion (Allen and West 2009).

### 2.3 School responses to the threat of faith school choice

We have argued that the level of competition that faith schools present to secular schools should be a function of the number of families who are actively choosing between these sectors, but that this is not a simple function of the size of the local religious population. This makes our conceptual model of faith school competition different to one that might be appropriate in Canada or the USA and we have therefore emphasised the importance of faith school supply rather than demand in determining the level of competition. Active choice by local families between the faith and secular sectors is a necessary, but not a sufficient, condition for competition to raise standards. Given that school funding is directly related to pupil numbers, it is reasonable to suggest that non-faith schools will respond to competition from faith schools by attempting to improve the perceived quality of their school. This competitive threat will be particularly strong where the pupils they risk losing are the more able or more desirable to teach.

In this paper, we are testing whether competition induces schools to increase effort directed at improving the test scores of pupils and thus their position in local league tables. Examples of this behaviour include encouraging an academic ethos, monitoring teacher performance through test data, altering the teacher recruitment strategy, focusing effort on pupils with a high capacity to make progress, and so on. However, where parents use school league table position to measure perceived quality (or value peer qualities for other reasons), schools are also incentivised to engage in activities that improve the quality of the peer group intake, but would not manifest themselves in higher area-wide educational achievement even if competition were genuinely significant. Schools can increase the quality of their peer intake by (1) improving the socio-economic profile of applicants through marketing; (2) altering the published over-subscription criteria to favour particular types of families (known as overt cream-skimming); and (3) adjusting the interpretation of these criteria (known as covert cream-skimming).

Of course, stratification of schooling markets may simply happen if more advantaged parents are more likely to choose a faith school. Thus, although this paper measures the effect of Catholic school competition on levels of pupil, sorting it does not explain why it arises or make causal claims regarding cream-skimming. Moreover, although sorting and test scores may appear to be distinct outcomes of school competition, they are actually inextricably linked in the long-run. This is

because if competition from Catholic schools causes the local market to stratify, this may eventually dampen incentives to focus effort on improving test scores, since this effort would have little effect on the ranking of local schools in league tables.

### 3 Method

#### 3.1 Competition effects on area-wide achievement

This section describes the pupil estimation strategy to identify area-wide effects of Catholic schools on achievement. This paper assumes that the education production function for child  $i$  in school  $j$  in area  $k$  can be represented as:

$$Y_{ijk} = \gamma_0 + \gamma_1 \theta_{jk} + \gamma_2 C_{jk} + \gamma_3 RCsch_{jk} + \gamma_4 U_{jk} + \gamma_5 X_{ijk} + e_{ijk}$$

That is, test achievement for child  $i$ ,  $Y_{ijk}$ , is a function of the school cohort's peer group,  $\theta_{jk}$ , the school's effort induced by competitive pressure,  $C_{jk}$ , any effectiveness associated with the school having a Roman Catholic (RC) denomination,  $RCsch_{jk}$ , all other school effort not related to competition,  $U_{jk}$ , and the measured,  $X_{ijk}$ , and unmeasured,  $e_{ijk}$ , characteristics of the child. The measured characteristics of the child include achievement in a range of academic tests prior to starting secondary school.

The presence of Catholic schools has the potential to:

1. change efficiency via the presence of a school that may be differentially effective as a result of its RC status,  $RCsch_{jk}$ , and via competition effects, as measured by  $C_{jk}$ , for any schools;
2. change the relative sizes of schools, which affects mean area-wide achievement if differentially effective schools grow and shrink;
3. produce student sorting effects that change the peer groups, as measured by  $\theta_{jk}$ , at each school.

The overall aggregate effect of the presence of religious schools is the principal parameter of interest in this paper because it is difficult to separately measure these three effects in the presence of unmeasured pupil characteristics.

In the basic pupil-level model, the achievement of the child,  $Y_{ijk}$ , at age 16 is modelled as a function of the area proportion of pupils in religious schools,  $\%RCsch_k$ , the observed characteristics of the area ( $W_k$ ) and the pupil ( $X_{ijk}$ ).  $\%RCsch_k$ , a measure of Catholic school supply rather than demand, is the proxy for the effect of competitive pressure on all students due to religious schools. This makes our estimation strategy distinct from Hoxby (1994) and Card et al.(2010) who use the size of the local Catholic population. The key identifying assumption is that variation in the supply of RC schools (not explained by variation in the current size of the Catholic population) has no direct effect on test score gains of the students in the county, except via the competition mechanisms described above. Note that we cannot control for the home religiosity of individual students, though we do control for overall levels of religious affiliation in areas. Therefore, the specification will be biased if our variables that capture the overall religious affiliations in an area do not adequately reflect differences in the degree of home religiosity across areas.

$$Y_{ijk} = \%RCsch_k \cdot \delta_1 + W_k \cdot \delta_4 + X_{ijk} \cdot \delta_5 + e_{ijk} \quad (1)$$

In the second specification, an identifier for whether the school is Catholic ( $RCsch_{jk}$ ) and school-level variables measuring the school peer group and other characteristics ( $Z_{jk}$ ) are added in an attempt to explain part of the pupil test score growth trajectory. This should have the effect of removing the direct effect of attending a Catholic school or a school with a particular peer group from the model, and thus, the coefficient on  $\%RCsch_k$  reflects a more pure competition effect. However, there is potentially a bias on these school coefficients, since they also capture average test score growth at the school that is due to systematic pupil sorting on unmeasured characteristics in the area. This might be an appropriate specification for isolating a competition effect if any unmeasured pupil characteristics at Catholic schools arise directly from the religiosity of their families. However, if the unobserved characteristics arise from a social selection effect whereby the more affluent pupils on a street attend a Catholic school and the less affluent attend a non-Catholic school, but average street characteristics are assigned to the pupil postcodes, this would lead to a downward bias on  $\%RCsch_k$ .

$$Y_{ijk} = \%RCsch_k \cdot \delta_1 + RCsch_{jk} \cdot \delta_2 + Z_{jk} \cdot \delta_3 + W_k \cdot \delta_4 + X_{ijk} \cdot \delta_5 + e_{ijk} \quad (2)$$

In the third specification, we re-estimate the first model but exclude all pupils who are educated in Catholic schools in an alternative attempt to identify the pure competition effect on secular schools, rather than the combination of the competition effect and any effectiveness of RC schools. This is a standard approach to dealing with any unmeasured correlations between family attributes and RC status, but since RC school supply does not reflect demand in the English context, the unmeasured pupil attributes of those in secular schools may well be correlated with our parameter of interest,  $\%RCsch_k$ .

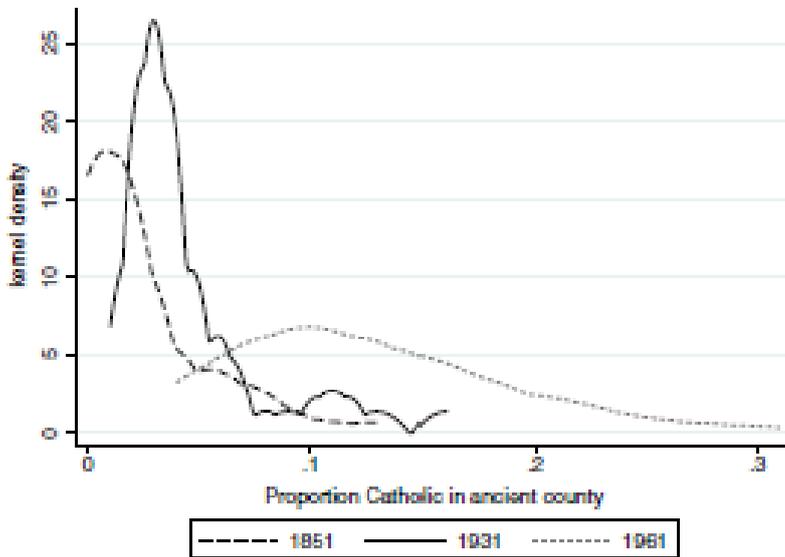
In order for the estimation of whole area effects to be valid, the presence of religious schools should not cause pupils to sort across areas. The models are estimated using ancient (1851) counties as the areal unit of analysis because this is the area for which the historical instrument is available. There are 39 ancient counties in England, meaning they are much larger areas than the 150 modern local authorities. This increases the likelihood of the validity of the assumption that historic counties are contained markets without families re-locating across counties based on school types and quality. However, this is at the expense of possible aggregation bias on the measurement of exposure to religious schools.

### 3.2 Instrumenting Catholic school supply

There may be an endogeneity problem because the supply of places at religious schools is believed to be partially related to current demand for religious schools, which is in turn related to the current religious population in the county and the quality of neighbouring Community schools. For example, if Catholic schools expand in response to poor quality Community schools, this would lead to a downward bias on  $\%RCsch$ . On the other hand, if Catholic schools expand to accommodate a larger Catholic population in the county and if high-religiosity families have characteristics that mean their children are academically successful (regardless of school attended), this would lead to an upward bias on  $\%RCsch$ .

This paper uses a source of variation in the supply of Catholic schools from survey data on the historic sizes of the religious populations in England. As discussed earlier, the Catholic population in England grew rapidly during the nineteenth century as a

result of Catholic emancipation and Irish immigration, which explains the high concentration of Catholic schools in the West Midlands, the north-west of England and London. Figure 1 shows that Catholics became more geographically dispersed across ancient counties from the mid-nineteenth to the mid-twentieth century, but the correlation between Catholic population share in 1851 and 2005 is still relatively high at 0.58.



**Fig. 1** Changes in dispersion of Catholic population across England

It can be shown that the geographical distribution of historic Catholic populations predicts %RCsch, conditional on the current RC population and other county control variables, i.e.:

$$\%RCsch_k = \alpha_0 + \alpha_1 \%RC1931_k + \alpha_2 \%RC2005_k + Z_k \cdot \alpha_3 + v_k \quad (3)$$

The *F*-value on the instrument for this first stage is 20.81. The instrument is applied to the variable %RCsch<sub>*k*</sub> as a first stage to the main pupil specification set out in Eq. 1. The size of the Catholic population by ancient county between 1851 and 1961 is sourced from survey data. It makes relatively little difference to the results which year of data is used to predict %RCsch. The size of the RC population in 1931 (%RC1931) is chosen as an instrument because it is strongly correlated, and it immediately precedes the opening of most RC secondary schools.

The claim of this identification approach is that the county-level controls are sufficient to meet the exclusion restriction. These include the current proportion of Catholic church attendees in the area, and this is a crucial control variable given the absence of religious affiliation of the family in the pupil-level data (and therefore an inability to control for direct family religiosity effects). A full set of socio-demographic indicators are also included to avoid confounding correlations between the type of areas (i.e. industrial and urban) that Catholics historically lived and the demographic characteristics of these areas that persist today. As a further validity check, we can confirm that the historical Catholic share, conditional on the current share, is not correlated with key student characteristics.

## 4 Data

Data for this paper are principally drawn from the National Pupil Database (NPD) of school leavers at age 16 in 2005. This is an administrative database of all pupils in maintained schools from 2002 onwards that allows basic annual pupil background information to be matched to test score data at ages 7, 11, 14 and 16. Only limited data on the 7% of the pupil population who are in private schools are recorded, so these pupils are excluded from the analysis that follows. Table 1 summarises key pupil variables.

**Table 1** Key pupil-level control variables

	Mean	SD	Min	Max
<b>KS2 English score</b>	4.381	0.848	0.000	6.000
<b>KS2 maths score</b>	4.380	0.876	0.000	6.000
<b>KS2 science score</b>	4.665	0.698	0.083	6.000
<b>KS2 total z-score</b>	0.006	0.993	-5.712	2.055
<b>GCSE English score</b>	4.572	1.852	0.000	8.000
<b>GCSE maths score</b>	4.307	1.949	0.000	8.000
<b>GCSE science score</b>	4.240	1.999	0.000	8.000
<b>GCSE capped z-score</b>	0.012	0.991	-2.758	2.367
<b>FSM</b>	12.9%			
<b>SEN statement</b>	2.4%			
<b>SEN action or plus</b>	13.3%			
<b>English not mother tongue</b>	7.4%			
<b>Ethnicity white British</b>	83.3%			
<b>Postcode deprivation (IDACI)</b>	0.208	0.174	0.003	0.993

Complete cases  $N = 546,133$ . Other age, ethnicity and neighbourhood indicators included

Four outcome measures of pupil achievement in exit exams at age 16 (Key Stage 4) are reported in this paper. The pupil's best exam result in each of GCSE English, maths and science is recorded on a scale of 0 (U grade) to 8 (A\* grade). In addition, a total subject score is calculated as the best 8 grades at GCSE and transformed to a z-score for ease of interpretation.

Pupil attainment prior to entry into secondary school at age 11 is calculated separately for externally marked national tests in maths, English and science (Key Stage 2). A standard set of pupil control variables including sex, ethnicity, mother tongue, free schools meals eligibility (FSM) and special educational needs (SEN) are included. NPD is supplemented with census data on the level of deprivation within the child's street, and 57 ACORN (A Classification of Residential Neighbourhoods) indicators of household type (see Webber and Butler 2007, for a description and analysis of the validity of these ACORN indicators).

The ancient county-level variables are sourced from several surveys and summarised in Table 2. First, a large range of pupil-level characteristics are aggregated up to the ancient county level. Second, indicators of levels of Christian church attendance by religious denomination are included from the 2005 English Church Census (see Brierley 2006). These are intended to control for the alternative pathways by which church-going families impact on pupil achievement. Third, the proportions of the population identifying themselves as belonging to each main religious group are included from the 2001 Census of Population.

**Table 2** Proportion of pupils in religious schools by ancient county

	Mean (%)	SD (%)	Min. (%)	Max. (%)
<b>Proportion in religious schools</b>	15.0	7.4	0.0	30.9
<b>Proportion in CofE schools</b>	4.5	3.2	0.0	16.6
<b>Proportion in RC schools</b>	9.5	6.1	0.0	22.6
<b>County % Church attendance (2005)</b>	6.2	1.0	3.8	8.3
<b>County % CofE attendance (2005)</b>	1.7	0.4	1.3	2.8
<b>County % RC attendance (2005)</b>	1.8	0.7	0.8	3.0
<b>County % Christian (2001 census)</b>	72.2	6.1	53.5	83.6
<b>County % No religion (2001 census)</b>	14.1	2.6	9.1	18.5

Weighted by ancient county size;  $N = 39$

## 5 Results

### 5.1 Catholic schools and achievement effects

This section analyses the results from the pupil value-added achievement model of the area-wide effect of Catholic schools. The estimates on key variables are shown in Table 3. Results for all four subjects are discussed simultaneously.

The first specification shows that areas with a higher share of children in Catholic schools make no greater educational progress in secondary school in any of the four subject areas tested. The finding can be interpreted as unbiased estimates of these whole area effects of faith schools provided there is not sorting across areas based on unmeasured characteristics that are correlated with %RCsch. It represents the total effect of competition from Catholic schools, including any differential effectiveness of Catholic schools.

Specification two attempts to separate Catholic school effectiveness from a competition effect by adding a Catholic school dummy as an explanatory variable. Inclusion of this variable leaves the finding of no competition effect unchanged. However, interpretation of the competition variable coefficient is now more complex because if Catholic schools cause within-area sorting based on unmeasured characteristics, the coefficient on the competition effect is biased downwards. According to this specification, test score growth in every subject is superior in Catholic schools and the magnitude of estimates is consistent at around one-tenth of a GCSE grade in each subject and 5% of a standard deviation in the all subjects regression. Thus, these Catholic schools are either more effective or they recruit pupils likely to make greater progress regardless of school attended.

The third specification excludes the observations of pupils at Catholic schools to identify an impact directly on secular schools and finds no association between %RCsch and achievement. The IV specifications instrument %RCsch using %RC1931 but find no statistically significant effects of attending a secondary school in an area with many Catholic schools. This is a local average treatment effect (LATE) estimate for the effect of Catholic school presence that resulted from large historical Catholic populations, relative to today. We think that the LATE may be quite different to the average treatment effect because it identifies competition effects in areas where there is now a significant oversupply of Catholic schools, relative to the size of the Catholic population, and so the Catholic schooling sector may be less likely to achieve an advantaged intake and is therefore less desirable to parents. This would mean that non-Catholic schools may not perceive the competitive threat from this sector to be particularly high. Also, areas with historically high levels of Catholics

compared to current levels (e.g. London and the West Midlands) have continued to be areas where new immigrants have entered the country and settled, and so schools in these areas may face disadvantages and challenges that are captured in the LATE estimates.

**Table 3** Pupil age 16 achievement models (Catholic schools)

X	(1)	(1-IV)	(2)	(3)	(3-IV)
<b>All subjects z-score</b>					
( $\delta_1$ ) %RCsch	0.021	-0.408	0.013	-0.097	-0.341
X	(0.251)	(0.370)	(0.242)	(0.257)	(0.362)
( $\delta_2$ ) RCsch	-	-	0.051***	-	-
(0.010)					
R <sup>2</sup>	0.549	0.549	0.552	0.550	0.550
<b>English score</b>					
( $\delta_1$ ) %RCsch	-0.935*	-1.311	-0.960*	-1.141	-1.206
X	(0.477)	(0.674)	(0.453)	(0.484)	(0.654)
( $\delta_2$ ) RCsch	-	-	0.114***	-	-
(0.021)					
R <sup>2</sup>	0.560	0.560	0.566	0.563	0.563
<b>Maths score</b>					
( $\delta_1$ ) %RCsch	0.192	1.128	0.226	0.048	1.366
X	(0.544)	(0.798)	(0.522)	(0.558)	(0.776)
( $\delta_2$ ) RCsch	-	-	0.058*	-	-
(0.023)					
R <sup>2</sup>	0.587	0.587	0.593	0.590	0.590
<b>Science score</b>					
( $\delta_1$ ) %RCsch	-0.488	0.383	0.419	0.068	-0.538
X	(0.615)	(0.904)	(0.588)	(0.631)	(0.876)
( $\delta_2$ ) RCsch	-	-	0.071**	-	-
X			(0.025)		
R <sup>2</sup>	0.524	0.524	0.530	0.526	0.526
N (pupils)	545,968	545,968	545,968	494,117	494,117
N (schools)	3,103	3,103	3,103	2,766	2,766
N (county)	39	39	39	39	39

Standard errors clustered at school-level

All regressions include pupil indicators for age 11 test scores, sex, FSM, month of birth, SEN, ethnicity, mother tongue, postcode deprivation and household type

All regressions include county indicators of aggregated pupil background characteristics, 2005 church-going levels for RC, CofE and other, religion from 2001 census

\*\*\* Sig. at 0.1 %; \*\* Sig. at 1 %; \* Sig. at 5 %

In these main specifications, variation in competition from Catholic schools is measured across quite a wide geographical area (the ancient county), but it may be that secular schools located very close to a Catholic school experience the greatest competition effects. We test for this by decomposing the competition effect of Catholic schools on secular schools into an effect on secular schools for whom a Catholic school is one of the three nearest secondary schools and those for whom there are no religious schools nearby in the county and so are likely to be under less competitive pressure. The purpose of this specification is to reduce the risk of type II errors (false negatives) posed by measuring competition levels over the large ancient county. However, there will be a sorting of pupils on unmeasured characteristics within counties, and if this sorting is in some way correlated with the geographical supply of Catholic schools, coefficients in this specification will be biased. Once again, we find no statistically significant competition effect,

suggesting that the previous null findings were not likely attributable to aggregation bias (results available from author).

**Table 4** Within-primary school/neighbourhood odds of attending a faith school

X	No fixed effects			Primary schools			Neighbourhoods		
	Coef.	SE	Odds	Coef.	SE	Odds	Coef.	SE	Odds
<b>FSM eligible</b>	-0.04	0.01	0.96	-0.20	0.02	0.82	-0.29	0.01	0.75
<b>KS2 z-score</b>	0.29	0.01	1.34	0.20	0.01	1.22	0.31	0.01	1.37
<b>SEN statemented</b>	0.22	0.03	1.24	0.19	0.04	1.21	0.18	0.03	1.20
<b>SEN action</b>	0.04	0.01	1.04	-0.05	0.02	0.95	-0.02	0.01	0.98
<b>Ethnicity asian</b>	-0.53	0.03	0.59	-0.20	0.04	0.82	-0.73	0.03	0.48
<b>Ethnicity black</b>	1.00	0.02	2.72	0.68	0.03	1.98	0.57	0.03	1.77
<b>Ethnicity other</b>	0.70	0.02	2.01	0.33	0.03	1.39	0.56	0.02	1.74
<b>Number of pupils</b>	547,355			365,228			391,699		
<b>Average group</b>	-			40.5			17.5		

## 6 Discussion

Catholic secondary schools impact on all other schools in the area because they enable genuine choice of school for a group of parents, which produces a high degree of sorting in the local educational market. This paper has examined whether this sorting spills over to the educational achievement of pupils who attend neighbouring schools through school effort induced by competition for pupils. Since religious secondary schools have been a long-term historical feature of the educational landscape in England, any competition effects identified might help inform policy-makers as to the long-term effects of enabling choice and competition, which may be very different to short-run responses by schools to market changes.

The paper combines two estimation strategies previously used in the literature to attempt to identify these effects without the confounding influences of unmeasured pupil characteristics. The pupil value-added achievement models rely on the supply of Catholic schools in an area being uncorrelated with average unmeasured pupil characteristics that might independently enter the production function. This is not a particularly onerous assumption given the rich prior attainment data and institutional rigidities constraining the supply of faith schools. The addition of the instrumental variable requires the levels of the Catholic population in 1931 to be excludable from the education production function, once the modern-day religious and social characteristics of the county are accounted for. Overall, the regressions fail to find a consistently positive (or negative) effect of religious schools on overall area-wide educational performance, thus adding another 'null' finding to the rather inconclusive literature on school competition in England.

There are three possible explanations for the lack of a consistent positive competition effect as the result of Catholic schools being present in an area. The first possibility is that Catholic and non-Catholic schools do not actually compete for pupils. In other words, high levels of pupil mobility and sorting in an area is not sufficient to suggest that competition between schools for pupils is actually taking place. This would be true if they essentially operate in separate markets, with each sector recruiting from different primary schools. In England, it is certainly true that Catholic secondary schools recruit many pupils from Catholic primary schools, using feeder school admissions criteria to segment the market.

The second explanation is that headteachers in secular schools do feel genuinely threatened by the presence of local Catholic schools, but they do not (or cannot) respond to this threat. The most likely reason for this is that they do not possess the means to significantly influence effort exerted on the part of their classroom teachers so the threat does not translate into improved GCSE performance (i.e. there is a principal agent problem). Alternatively, they may find that, although the number and quality of pupils at their schools are being affected by a Catholic school's presence, given little spare capacity in the system their school's position is sustainable so no effort response is necessary for survival.

The final explanation is that competition is actually muted, rather than increased, by the presence of faith schools, because they allow the system to become stratified. This stratification then provides schools with a disincentive to focus effort on improving test scores because marginal changes in school or teacher effort cannot affect a school's league table ranking. There is a positive association between levels of social and ability segregation and the number of Catholic schools in an area (Allen 2007), and these schools have a greater propensity to sit at the top of their local schooling hierarchy. Table 4 reports the odds of a child attending a faith school, given their own background characteristics and with fixed effects to make comparisons with (1) the overall English cohort; (2) those who went to the same primary school; and (3) those who live within the same neighbourhood. The table shows that free school meals (FSM) children are only a little less likely to attend a faith school than non-FSM children overall, but that they are much less likely to attend than non-FSM children who live in the same neighbourhood or who attended the same primary school. These differences result because faith schools are more concentrated in urban areas with many deprived children living locally, yet the odds that a local FSM child attends a faith school is three-quarters that of a non-FSM child. Similarly, a child with a KS2 test score one standard deviation above the average has a 1.4 times increased odds of attending a faith school compared to an average child in the same primary schools.

This observation that many schooling systems have a tendency to become stratified in the long-run is one of the problems with operating a quasi-market. The nature of a school admissions code and the rigour of enforcement are crucial to determining the extent to which sorting happens, but cannot prevent residential sorting. Thus, it is possible that relatively recent competition reforms in countries such as the USA and Sweden might have identifiable short-run competition effects, but if the system is also stratifying, efficiency is likely to fall again in the long-run.

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