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Are Catholic primary schools more effective than public primary schools?

Todd Elder *, Christopher Jepsen

Michigan State University, 110 Marshall-Adams Hall, East Lansing, MI 48824-1038, United States
University College Dublin, D212 Newman Building, Belfield, Dublin 4, Ireland

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ABSTRACT

This paper assesses the causal effects of Catholic primary schooling on student outcomes such as test scores, grade retention, and behavior. Catholic school students have substantially better average outcomes than do public school students throughout the primary years, but we present evidence that selection bias is entirely responsible for these advantages. Estimates based on several empirical strategies, including an approach developed by Altonji et al. (2005a) to use selection on observables to assess the bias arising from selection on unobservables, imply that Catholic schools do not appreciably boost test scores. All of the empirical strategies point to sizeable *negative* effects of Catholic schooling on mathematics achievement. Similarly, we find very little evidence that Catholic schooling improves behavioral and other non-cognitive outcomes once we account for selection on unobservables.

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1. Introduction

Critics of the nation's public education system have long suggested that public schools would benefit from being operated more like private schools. Advocates of vouchers take this reasoning a step further, arguing for the use of public funds to help students defray the costs of attending private schools. These arguments are based largely on research suggesting that private schools boost educational attainment and achievement. In particular, a long line of research has compared outcomes of students in Catholic versus public high schools, finding compelling evidence that attending Catholic high schools positively influences educational attainment. However, much less is known about the efficacy of Catholic primary schooling.

Using data from the Early Childhood Longitudinal Survey: Kindergarten Class of 1998–1999 (ECLS-K), we study the effects of Catholic schooling on cognitive and non-cognitive outcomes measured between kindergarten and eighth grade. Average achievement test scores among Catholic school students are substantially higher than among public school students throughout this grade range, but these advantages may be driven by systematic differences in students across school sector rather than by the effectiveness of Catholic schools. In order to distinguish between the competing explanations for Catholic schooling advantages, we pursue several approaches for controlling for selection bias. Our preferred approach involves using propensity score matching to control for observable differences between Catholic and public school students. We also adopt the methods of Altonji et al. (2005a) to use selection on observed variables to quantify the importance of selection on unobserved variables, a novel approach in the context of the Catholic primary schooling literature.

Our analysis produces five central findings. First, we document that Catholic school attendees have large advantages in both mathematics and reading achievement before entering into formal schooling. Roughly half of the mathematics score gap disappears between kindergarten and eighth grade, while the reading score gap is roughly stable over time. Second, all of the approaches we pursue suggest that Catholic primary schooling *decreases* mathematics achievement, with estimated effects ranging from two to four percentile-point reductions in test scores. Third, estimates based on Altonji et al. (2005a) approach suggest that selection bias drives the small positive OLS and propensity-score estimates of Catholic primary schooling on reading scores. Specifically, selection bias could account for the entire positive OLS estimate if the association between Catholic schooling and unobservable determinants of test scores is only 5% as strong as the association between Catholic schooling and the observable determinants of test scores. Fourth, we find little evidence of a positive Catholic

* Corresponding author.
E-mail addresses: telder@msu.edu (T. Elder), christopher.jepsen@ucd.ie (C. Jepsen).

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primary schooling effect on a set of non-cognitive outcomes available in ECLS-K once we assume even modest amounts of selection on unobserved determinants of these outcomes. Fifth, we illustrate the importance of controls for achievement prior to school entry in analyzing the effects of Catholic primary schooling by comparing estimates based on ECLS-K and NELS data. Overall, the results suggest that the Catholic school advantages present in eighth grade are largely due to differences in the skills (and other attributes) of public and Catholic school students that existed prior to kindergarten.

2. Relationship to the current literature

The vast majority of the literature on Catholic schooling has been devoted to the effect of Catholic high school attendance on test scores and educational attainment. Early work finds large positive effects of attending a Catholic high school (e.g., Coleman et al., 1982; Evans and Schwab, 1995; and Neal, 1997), but Altonji et al. (2005b) argue that these estimates could be driven solely by selection bias. Altonji et al. (2005a) develop techniques to quantify the degree of bias in single-equation models, based on the idea that the relationship between Catholic schooling and observable determinants of outcomes can be informative about the relationship between Catholic schooling and unobservables. They find that Catholic high school attendance increases the likelihood of graduating from high school and enrolling in college, but that the positive effects on test scores implied by OLS models are likely driven by selection bias. Morgan (2001) instead uses propensity score models to nonparametrically control for observable differences between Catholic and public school students, finding positive effects of Catholic high school attendance on test scores.

In contrast to the large literature on Catholic high schools, only a handful of studies have addressed the effects of Catholic primary schooling. Lee and Stewart (1989), Jones (1998), and Lubienski and Lubienski (2006) study differences in National Assessment of Educational Progress (NAEP) test scores between Catholic and public primary schools. Lee and Stewart (1989) and Jones (1998) find higher test scores for Catholic school students, whereas Lubienski and Lubienski (2006) find slightly lower (insignificantly so) test scores for Catholic school students. However, it is difficult to draw causal inferences from NAEP data because they are cross-sectional and contain no controls for student ability.

Carbonaro (2006) uses the ECLS-K to estimate the Catholic schooling effect on test score gains from the fall to spring of kindergarten. He finds negative and often insignificant Catholic school effects in his preferred propensity score model. Lubienski et al., 2008 also find a negative, statistically insignificant Catholic school effect on fifth-grade mathematics test scores in the ECLS-K data, based on models that include controls for kindergarten test scores. Similarly, Reardon et al. (2009) estimate negative and insignificant Catholic schooling effects on test scores for each wave of ECLS-K data from kindergarten through fifth grade. They use propensity score matching models, OLS models, and area-level fixed effects models to control for selection on observable variables.

Jepsen (2003) studies the effects of Catholic schooling for two cohorts of primary school students in the *Prospects* data on Title I programs. Using OLS models, he finds small, statistically-insignificant effects of Catholic schooling on test scores and some suggestive evidence that Catholic schools may positively affect attendance. Finally, Sander (1996) finds positive effects of Catholic primary school attendance on tenth-grade test scores using High School and Beyond data, but because this study does not directly control for Catholic high school attendance, the estimates may instead capture positive effects of Catholic high schools.

3. Data

We use data from the Early Childhood Longitudinal Study: Kindergarten Class of 1998–1999 (ECLS-K), a longitudinal study of kindergarteners beginning in the 1998–1999 academic year. Follow-up surveys were administered in the spring of kindergarten (1999), the fall of first grade (1999), the spring of first grade (2000), the spring of third grade (2002), the spring of fifth grade (2004), and the spring of eighth grade (2007).

We focus on the set of students who participated in the fall kindergarten sample because the extensive set of control variables provides valuable information about children's experiences and aptitudes prior to kindergarten. We limit our estimation samples to students who attended Catholic or public primary schools. Although substantial numbers of students attend other private schools in the ECLS-K, the non-Catholic private schools are sufficiently diverse that measuring a mean effect for these schools is of little value, so we exclude students who attend non-Catholic private schools at any grade level. After excluding these cases, the eighth-grade sample contains approximately 7000 students, and the fifth-grade sample contains approximately 9000 students. Exact sample sizes vary across specifications and estimation techniques; Appendix Table A1 contains descriptive statistics for students in either the fifth- or eighth-grade sample.

As our measure of Catholic schooling, we define an indicator equal to one if a child initially enrolled in a Catholic kindergarten, and zero otherwise.[1] We also measure other demographic variables based on kindergarten-year survey responses. Our measures of cognitive skills are fifth- and eighth-grade mathematics and reading test scores in the ECLS-K. Psychometric evaluations have shown that these assessments provide reliable measures of children's mathematics and reading skills (see Reardon et al. (2009), for a discussion). As measures of non-cognitive skills, we use school-reported measures of number of days absent and the number of days tardy in the fifth-grade wave. From the eighth-grade wave, we use a binary measure of whether a parent reported that the student had ever been suspended, a binary measure of whether a student has fallen behind their cohort's grade advancement, equal to one if a student has not reached the eighth grade at the time of the eighth grade survey, and a student-reported "locus of control" scale, which measures student ratings of agreement to questions such as "I do not have enough control over the direction my life is taking" and "In my life, good luck is more important than hard work for success."

A particularly attractive feature of the ECLS-K lies in its breadth of included information about students, parents, teachers, and schools. We include extensive sets of control variables along each of these dimensions in order to minimize the role of unobserved characteristics in estimates of the effects of Catholic primary schooling. Student characteristics include sex, race/ethnicity, age, birth weight, and fall kindergarten test scores. Family background characteristics include the marital status of the child's primary caregiver, log family income, parental education, and family structure. Appendix Table A1 lists descriptive statistics for all of these variables.

The ECLS-K is designed to be nationally representative in each survey wave through the inclusion of sample weights for each wave (such as spring 2003) as well as for a panel (such as the set of students who participated in all follow-up surveys). We conduct all empirical analyses both with and without the appropriate sample weights to assess the sensitivity of our results, but we report weighted estimates below. Because of the sample restrictions listed above, our analysis sample is a subset of the full ECLS-K

[1] In all cases, our primary empirical results are robust to measuring Catholic schooling based on grade levels other than kindergarten.

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