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ABSTRACT

Four criteria that have been suggested to evaluate the effects of private schooling and education vouchers are: (1) freedom of choice; (2) productive efficiency; (3) equity; and (4) social cohesion. This study uses these criteria to evaluate some of the effects of Catholic schooling in the United States. Catholic schools are shown to increase the ability of Catholic families to promote Catholic values and beliefs. That is, Catholic schools increase the ability of Catholic families to provide a faith-based education for their children. The effect of Catholic schools on productive efficiency is mixed. Data from Illinois suggest that private-school competition does not improve the quality of public schooling. Further, national data indicate that Catholic schools at best only have modest positive effects on educational outcomes for white students. However, Catholic schools seem to have significant and substantial positive effects on educational outcomes for black and Hispanic students. For this reason, Catholic schools have favorable effects on equity. This study did not consider the issue of social cohesion. However, no related research suggests that Catholic schools are less efficient in producing a more cohesive society. Research indicates that Catholics are highly integrated into mainstream society. (Contains 46 references and 11 tables.) (Author/RT)

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National Center for the Study of Privatization in Education

Teachers College, Columbia University

The Effects of Catholic Schools on Religiosity, Education, and Competition

William Sander*

August 2001

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W. Sander

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Abstract – Four criteria that have been suggested to evaluate the effects of private schooling and education vouchers are: (1) freedom of choice, (2) productive efficiency, (3) equity, and (4) social cohesion. This study uses these criteria to evaluate some of the effects of Catholic schooling in the United States. Catholic schools are shown to increase the ability of Catholic families to promote Catholic values and beliefs. That is, Catholic schools increase the ability of Catholic families to provide a faith-based education for their children. The effect of Catholic schools on productive efficiency is mixed. Data from Illinois suggest that private school competition does not improve the quality of public schooling. Further, national data indicate that Catholic schools at best only have modest positive effects on educational outcomes for white students. However, Catholic schools seem to have significant and substantial positive effects on educational outcomes for black and Hispanic students. For this reason, Catholic schools have favorable effects on equity.

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Introduction

There is substantial controversy on the effects of Catholic schools (and other private schools) on academic achievement by students who attend Catholic schools and on academic achievement in public schools through competitive pressures from Catholic schools. Influential studies by Coleman, Hoffer, and Kilgore (1982) and Coleman and Hoffer (1987) indicated that Catholic schools increased test scores and educational attainment. The results of other studies that appeared during the 1980s were more mixed. For example, Murnane, Newstead, and Olsen (1985) found that Catholic schools had a positive effect on Hispanic test scores and no effect on black test scores. Their results for whites were not conclusive. A study by Noell (1982) found that Catholic schools did not increase test scores.

The results of more recent studies on the effects of Catholic schooling are also mixed. Several studies indicate that Catholic schools increase academic achievement (e.g., Bryk, Lee, and Holland, 1993; Evans and Schwab, 1995; Neal, 1997; Sander and Krautmann, 1995). On the other hand, several studies do not indicate a positive Catholic school effect on achievement (e.g., Ludwig, 1997). A related study by Figlio and Stone (1999) on religious and non-religious private schools finds that religious schools only increase achievement for blacks and Hispanics while non-religious private schools have positive effects on achievement. Another related study by Goldhaber (1996) indicates that private schools have no effect on achievement. One of the most rigorous studies on Catholic schools finds that Catholic schools have a positive effect on educational attainment, especially for urban minorities, but no effect on test scores (Altonji, Elder, and Taber, 2000).

Most of the studies on Catholic schools have focused on Catholic high school effects. One study on Catholic grade schools finds a positive Catholic school effect on achievement for respondents who attended a Catholic grade school for eight years only. However, if non-Catholics who attend Catholic schools are excluded from the sample, the Catholic schooling effect becomes zero. Further, the effect of Catholic grade schools on achievement is zero for respondents with one

to seven years of Catholic schooling (Sander, 1996). A more recent study on Catholic grade schools finds that Catholic schools have no effect on mathematics test scores and a positive effect on reading test scores (Jepsen, 2001).

Most of the studies on Catholic schools have focused on Catholic school effects from the 1970s to the 1990s. A study that focuses on the effects of Catholic schooling on educational attainment by older adults finds that higher levels of attainment in Catholic schools were the result of selection (Sander, 2000).

Another line of research has focused on the effects of Catholic and other private schooling on public school achievement. Although Friedman (1962) argued for education vouchers and more competition in education several decades ago, there have been very few studies on the effects of competition on student achievement although a number of studies are now underway. Studies by Hoxby (1994) and Dee (1998) show that private schools raise the quality of public education. Although it is possible that a larger private primary and secondary school sector would increase the quality of public education through competitive pressures, it is also possible that there would be no effect or a negative effect. Epple and Romano (1998) examine some of the possible interrelationships between private school and public schools.

This paper further examines some of the effects of Catholic schooling. It draws heavily from Sander (2001a) where more detail can be found on the effects of Catholic schooling. First, I provide an overview of Catholic schooling in the United States.

Second, I examine the effects of Catholic schooling on several measures of Catholic religiosity. Third, I show how Catholic and other private schooling affect academic achievement in public schools in Illinois. Fourth, I show how Catholic schools affect the probability of graduating from high school and how much homework students do. The paper concludes with a section that

draws upon Levin's (2001) criteria for evaluating the effects of private schools and education vouchers. These criteria are freedom of choice, productive efficiency, equity, and social cohesion.

Catholic Schools: An Overview

Catholic schools have accounted for a large share of the enrollment in private elementary and secondary schools in the United States. The private share in basic education has been between roughly 10 and 13 percent since the 1950s. Catholic schools accounted for about 90 percent of private school enrollment in the 1950s. Over time, Catholic schools have become relatively less important. They account for about 50 percent of private school enrollment today. This implies that the Catholic share in private schooling has declined from slightly over 10 percent in 1950 to about 5 percent in 1998 (Table 1).

Data from the National Opinion Research Center's "General Social Survey" suggests that the percentage of Catholic adults who have attended a Catholic grade school or high school is also declining. For Catholics born before 1935, about half attended a Catholic grade school for at least one year and about one in ten attended for at least nine years. The probability of attending a Catholic school increased for men and women born between 1935 and 1949. More than 50 percent attended a parochial school for at least one year and about one in four attended for nine or more years. For Catholics born between 1965 and 1973, the probability that they attended Catholic schools is significantly lower. Only 44 percent attended for at least one year and 7 percent attended for nine or more years (Table 2). More recent data indicate that the percentage of Catholics who send their children to Catholic schools continues to decline. In 1991, only 20 percent of Catholic children of grade school age attended a Catholic grade school (McLellan, 2000).

Catholic schools are over represented in urban areas and in the east and Midwest regions. About half of all Catholic schools are located in big cities and another 30 percent are located in suburbs of big cities. About 60 percent of the enrollment in Catholic schools is either in the east or

Midwest regions. The dioceses with the largest Catholic school enrollment include Chicago, Philadelphia, New York, Los Angeles, and Brooklyn (National Catholic Educational Association, 1999; United States Department of Commerce, 1999).

If one goes back in time, most of the teachers at Catholic schools were members of religious orders. In 1950, about nine out of ten grade school teachers and eight out of ten high school teachers were in Catholic religious orders. Today, only about one in ten Catholic school teachers are members of religious communities (Table 3). Although most Catholic school teachers are no longer from religious orders, about nine out of ten lay teachers are Catholic (National Catholic Educational Association, 1999). One of the effects of the decline in the percentage of Catholic schoolteachers who are from religious orders is that they are replaced with more expensive lay teachers thus increasing costs. This change might also affect the quality of Catholic schooling and the religious nature of Catholic schooling.

The average tuition and per pupil costs at Catholic schools is relatively low. The median tuition at parish-sponsored grade schools is about $1,500 and the per pupil cost is about $2,400. The median tuition at Catholic high schools is about $4,100 with a per pupil cost of $5,500 (National Catholic Educational Association, 1999). Overall, public schools spent over $6,000 per pupil in 1998 (United States Department of Commerce, 1999). Although Catholic schools spend less than public schools, it is difficult to compare differences in efficiency. Costs in many public schools are higher because they educate more high-cost students. On the other hand, Catholic schools keep costs relatively low by paying teachers substantially less than their public school counterparts.

Almost nine out of ten students in Catholic schools are Catholic. Although most students in Catholic schools are Catholic, non-Catholic student enrollment has been increasing. Less than 3 percent of the Catholic student population was not Catholic in 1970 (Bringham, 1993; National Catholic Educational Association, 1999). In some Catholic schools in big cities like Chicago, there

are more non-Catholic students than Catholic students. The reason for this is that the perceived quality of Catholic schools in many big cities is usually higher than the perceived quality of the public schools.

An important characteristic of Catholic school students that has been overlooked in many studies on Catholic schools is that they are products of relatively more religious Catholic families. Data can be drawn from the National Opinion Research Center's "General Social Survey: 1998" to make this point. A question was asked of respondents with children at least five years old about the type of school their children attended. A question was also asked about the respondent's church attendance. For Catholics with children who attended Catholic schools, 72 percent of the parents attended church nearly every week or more often. For Catholics with children who attended public schools, 28 percent attended church nearly every week or more often. This is important because studies indicate that religiosity as measured by church attendance (by Catholics and Protestants) has a positive effect on academic achievement (Freeman, 1986; Jeynes, 1999). If religiosity is excluded from statistical studies on achievement, the effect of Catholic schools might be confounded with Catholic religiosity.

Part of the growth of the non-Catholic population in Catholic schools can be attributed to an increase in the number of African-Americans families who are choosing a Catholic education for their children. In 1970, less than 4 percent of Catholic high school students were black. By the late 1990s, the percentage of blacks doubled. Further, the percentage of minority students in Catholic schools has increased from about one in ten in 1970 to about one in four by the late 1990s. About one in ten students in Catholic schools are Hispanic (National Catholic Educational Association, 1999). The percentage of minorities in many Catholic school systems in big cities like Chicago is much higher—about 48 percent in Catholic high schools in Chicago and 56 percent in Catholic grade schools (Archdiocese of Chicago, 2000a). The growth in the percentage of minority students

in Catholic schools, especially in big cities, is at least partly a product of the perceived quality of Catholic schooling relative to the perceived quality of public schools that are available to blacks and Hispanics.

Although Catholic schools were never designed to serve an economic elite as Coleman, Hoffer, and Kilgore (1982) note, Catholic school students are products of families with higher levels of educational attainment and income. Data from the United States Department of Education's "High School & Beyond Survey" for sophomores in 1980 indicate that median family income for families with students in Catholic schools was $25,000 to $37,999. Median family income for students in public schools was $20,000 to $24,999. Further, about 30 percent of fathers of students in Catholic schools graduated from college while only 15 percent of fathers of students in public schools graduated from college. More recent data indicate that Catholic schools are increasingly serving fewer low-income students and more high-income students (Riordan, 2000).

One of the key reasons for this is the increase in tuition in Catholic schools (see Harris, 1996). One of the implications of the data on family income and parents' education is that Catholic schools can be expected to display higher levels of achievement than public schools because variables like income and parents' education tend to have positive effects on achievement.

Below, I present empirical evidence on the effects of Catholic schooling on religious and educational outcomes. In addition, I provide evidence on the effects of Catholic schooling and other private schooling on educational outcomes in public schools. In a subsequent section, I use three of the criteria suggested by Levin (2001) to evaluate the empirical results.

Religious Outcomes

According to Archdiocese of Chicago's Francis Cardinal George, Catholic "education that is faith-based, that provides values and discipline, that is Jesus-centered, has the potential to transform the world" (Archdiocese of Chicago, 2000b). For Cardinal George and many other Catholics,

Catholic schools enable Catholics and some non-Catholics to choose a type of schooling that is consistent with their religious values. Education vouchers would enhance the ability of parents to choose a faith-based education for their children. In this section, I assess how effective Catholic schools are in producing more religious Catholics as measured by a number of religious outcomes including prayer, church attendance, religious beliefs, church contributions, and religious identity as an adult. The data are taken from two years (1988 and 1989) of the National Opinion Research Center's "General Social Survey. I select individuals with a Catholic upbringing who are at least eighteen years old and compare how parochial school attendance affected religious outcomes.

The data indicate that respondents who attended Catholic schools are more likely to pray daily, attend church more often, retain a Catholic identify as an adult, and believe in life after death (Table 4). Further, respondents with the most Catholic schooling (nine to twelve years) are more likely to pray daily, attend church more often, retain a Catholic identify as an adult, and donate more to the church than respondents with one to eight years of Catholic schooling. However, respondents with nine to twelve years of Catholic schooling are slightly less likely to believe in life after death relative to respondents with one to eight years of Catholic schooling.

Although there are differences in the measures of religiosity for Catholics who attended parochial schools, it is not necessarily the case that Catholic schools affect religious outcomes. It is important to control for many background factors including the religiosity of parents to test whether Catholic schools affect religious outcomes. Below, I undertake probit estimates of the religious variables that are coded 0-1 and a Tobit estimate of church contributions. Tobit is used to estimate contributions because the dependent variable is censored—a relatively large number of observations (25 percent) are zero. The other background variables in the estimates include male, years of schooling, father's years of schooling, mother's years of schooling, black, Hispanic, age, type of

residence (big city, suburb of a big city, or small city), region, household income, and whether the respondent's mother or father usually attended church weekly when the respondent was growing up.

For brevity, I only report on the results for the Catholic school coefficients. The probit estimate of "pray daily" indicates that Catholic schooling has a highly significant positive effect (Table 5). The probability that respondents with no Catholic schooling pray daily is .32. This increases to .47 for respondents with one to eight years of Catholic schooling and to .63 for respondents with nine to twelve years of Catholic schooling.

The estimate of regular church attendance indicates that respondents who attended Catholic schools are not more likely to attend church weekly. The estimate of whether respondents with a Catholic upbringing retained a Catholic identify as an adult indicates that Catholic schooling has a positive effect. The probability that respondents with no Catholic schooling are still Catholic is .78. This probability increases to .84 for respondents with one to eight years of Catholic schooling and to .86 for respondents with nine to twelve years of Catholic schooling.

Catholic schooling also has a positive effect on the probability that respondents believe in life after death. The probability of believing in life after death is .47 for respondents with no Catholic schooling. This increases to .76 for respondents with one to eight years of Catholic schooling and to .78 for respondents with nine to twelve years of Catholic schooling.

The Tobit estimate of church contributions indicates that respondents with one to eight years of Catholic schooling are not more likely to donate more to the church than respondents with no Catholic schooling. However, respondents with nine to twelve years of Catholic schooling give significantly more than respondents with no Catholic schooling. The magnitude of the Catholic schooling effect for this group is large as well—an additional $258 per year or about twice as much as respondents with no Catholic schooling.

I also estimated Catholic schooling effects for two age groups—ages eighteen to thirty-nine and forty and over (see Sander, 2001a, pp. 130-131). In a related study, it was shown that Catholic school effects on religious outcomes were very modest for young Catholics (Davidson, *et al.*, 1997). Thus, I wanted to test whether the effects of Catholic schooling were less important for younger Catholics. I did not find this to be the case. My results generally support earlier research by Greeley and Rossi (1966) and Greeley, McCready, and McCourt (1976) that show that Catholic schooling at the primary and secondary levels is an important institution for promoting Catholicism.

Effects on Public School Achievement

One of the arguments for education vouchers and more private school choice is that more competition from private schools will increase the quality of public education (Friedman, 1962; Friedman and Friedman, 1981). Apart from studies by Hoxby (1994) and Dee (1998) that show that private schools raise the quality of public education, there is very little empirical evidence on this topic. At least one recent study by Jepsen (2000) indicates that competition from private schools does not increase the quality of public education.

Although it is possible that a larger private primary and secondary school sector would increase the quality of public education through competitive pressures, it is also possible that there would be no effect (or a negative effect). It is possible that a larger primary and secondary school sector could affect the resources for public schools through changes in local political support. It is also possible that a larger private sector could result in increasing per pupil expenditures in the public sector by reducing the tax-price of schooling (see Poterba, 1997). This might result in higher expenditures in public schools. Further if private schools take the best public school students, this could reduce public school achievement both directly through reducing the number of high achieving students in public schools and indirectly through negative peer group effects.

Regarding Catholic schools, it is not clear how much competition they provide for public schools. As indicated above, one of the important objectives of Catholic schools is to provide a values-based religious education for students. Thus, the price of attending a Catholic school for non-Catholics and, perhaps, some Catholics is that students will receive Catholic religious training. This reduces the substitutability of Catholic schooling for public schooling.

Below, I examine the effects of private schooling on educational outcomes in Illinois. Illinois is an interesting case study. An above average percentage of the school-age population attends private school (about 13 percent). Further, there is substantial variation in the percentage in private schools from school district to school district (the range is from zero to about 50 percent). The variation is mostly a product of differences in Catholic population densities.

Private schooling is treated as an endogenous determinant of educational outcomes in the public school sector. One reason that private schooling might be endogenous with achievement in the public school sector is that quality and choice in the public school sector affects the demand for private schooling (Downes and Greenstein, 1996; Martinez-Vazquez and Seaman, 1985).

Illinois Goal Assessment Program (IGAP), high school graduation rates, and the percentage of high school senior who take the ACT (as a proxy for the percentage college bound) are estimated. All of the dependent variables are measured at the school level in Illinois in 1996. The base year test scores have a mean value of 250 with a possible range of 0 to 500 (the standard deviation is about fifty). The test scores that are estimated are mathematics test scores for grades 6 and 10. I focus on test scores in mathematics rather than other test scores that are available because achievement in mathematics is usually considered more school-specific.

Both ordinary-least squares (OLS) and two-stage least square (2SLS) estimates of the dependent variables are undertaken. As suggested above, private school enrollment might be endogenous with public school achievement. The key estimation issue is thus in identifying the

effect of private schooling on academic achievement. Relevant and valid identifying variables should be highly correlated with the suspected endogenous variable and not related to the error term in the academic achievement equation (Bound, Jaeger, and Baker, 1995).

In related work, Dee (1998) uses Catholic religion for identification because of Catholics schools account for the largest share of private school enrollment. In addition to Catholic religion, Hoxby (1994) also uses Lutheran, Jewish, and Episcopalian population densities for identification. Baptist schools, Lutheran schools, and Jewish schools account for the largest shares in private school enrollment after Catholic schools. However, their shares are relatively small—3.5 percent for Jewish schools, 4.4 percent for Lutheran schools, and 5.6 percent for Baptist schools (United States Department of Commerce, 1996). In the two-stage estimates that are presented below, Catholic population densities in counties are used to identify the private school effect. The relevance and validity of using Catholic densities is discussed in more detail in Sander (2001).

I would note that I try to adjust for many family, school, and community background factors. The education production-function literature and the family economics literature suggests that the variables that are included in my model might be of importance. The variables include data on racial and ethnic origin (black, Hispanic, and Asian), average school size in the district, whether the school district is a unit district, percent urban in the district, median household income, the percentage of adults with sixteen or more years of schooling, the percentage of students with limited-English ability, the percentage of a school districts population that is considered poor (the percentage of students who receive free or reduced priced meals, live in families receiving public aid, live in foster homes supported with public funds, or live in institutions for neglected or delinquent children), student mobility (the percentage of students who either transfer in or transfer out each year), and the percentage taking the IGAP test (for the test score estimates). Three data sources are merged for the study including the Illinois State Board of Education's "1996 School Report Card

Data," the United States Department of Education's "199 School District Data Book," and *Churches and Church Membership in the United States.*

For brevity, I will only report on the results for the private school coefficients. See Sander (2001) for the results for the other coefficients. OLS estimates of test scores, high school graduation rates, and the percentage college bound indicate that the percentage of students in private schools has no effect on the measures of student achievement (Table 6). The two-stage least squares estimates of educational outcomes also suggest that the percentage in private schools has no effect on public school achievement.

Thus, my results do not support the hypothesis that private schools directly raise the quality of public education through competitive pressures. On the other hand, the results do not support the contention that private schooling has a negative effect on public education. It could always be the case that a substantially larger private sector in basic education would result in different findings. It could be the case that the private sector in primary and secondary schooling in Illinois is too small to affect public education.

Effects on Graduation Rates and Homework

One of the arguments for education vouchers is that they will improve the quality of schooling for students who are trapped in poor public schools. In this section, I provide evidence on the effects of Catholic schooling on high school graduation rates and homework. Particular attention is given to the effects of Catholic schooling on African Americans and Hispanics in inner cities. A secondary objective of this section is to show how Catholic schooling effects might be confounded with the effects of Catholic religiosity. The data sets for this section are the "Third Follow-Up Survey of the High School and Beyond (HS&B) 1980 Sophomore Cohort Survey" and the "Third Follow-Up Survey of the High School and Beyond 1980 Senior Cohort Survey."

<u>High School Graduation Rate Estimates</u>

Below, I estimate the high school graduation rate. The high school graduation rate variable indicates that the respondent graduated from high school in 1984—four years after their sophomore year. I also adjust for family income, mother's education, father's education, urban, region, black, Hispanic, male, number of siblings, and church attendance. The church attendance (also includes attendance at other places of worship) variable requires some explanation. Respondents were asked how often they attended religious services during the past year. Respondents are given six possible replies including more than once a week, about once a week, and so on. I recoded the responses into a continuous variable indicating the number of times that the respondent attended church during the past year with more than once a week receiving a value of 104, about once a week receiving a value of 52, and so on. I use this variable in my analysis as a proxy for parents' church attendance. Data on parents' church attendance are not available in the data set. I define two church attendance variables—one for Catholics and one for non-Catholics.

One of the concerns in using the respondent's church attendance as a proxy for parents' church attendance is that the respondent's church attendance could be an outcome of Catholic schooling. For example, on certain occasions Catholic schools have masses for students. However, Catholic schools probably do not have a large effect on the regularity of church attendance by students (Davidson, *et al.*, 1997). Parents' church attendance is probably the more important determinant of the regularity of students' attendance. As indicated above, Catholic parents who send their children to parochial schools tend to be more religious as indicated by relatively high rates of church attendance relative to Catholic parents who send their children to public schools. It is important to take this variable into account because it might be a significant determinant of educational outcomes.

Several different estimates of the high school graduation rate are undertaken. First, I estimate two univariate probit models of the probability of graduating from high school. In one

case, I adjust for church attendance and in the other case I do not adjust for attendance. The estimates are weighted by the sample weights from the third follow-up of the "High School and Beyond Survey." The independent variables in the estimates include Catholic religion, urban, region, black, Hispanic, father's education, mother's education, income, and number of siblings.

I also undertake two bivariate probit models of the probability of graduating from high school. Bivariate probit models are estimated to correct for selection in the Catholic school sector. In the first stage, a probit model is used to estimate the likelihood of attending a Catholic school. The high school graduation rate is estimated in the second stage controlling for the effects of selection. The key issue in estimating such models is in identifying the effect of Catholic schooling. At least one variable is needed that strongly affects the probability of attending a Catholic school and is not correlated with the error term in the graduation rate equation.

Goldhaber (1996) uses region and urban to identify the effects of Catholic schooling. His identification strategy is that these variables affect the cost and availability of private schools and are not related to achievement. Sander and Krautmann (1995) use four interaction terms between region and urban and an interaction term between urban and Catholic to identify their model. Their rationale is that Catholics are concentrated spatially—particularly in urban areas. Thus, location variables might be used to identify Catholic schooling effects. The shortcoming to their approach is that location variables might affect educational outcomes. Further, Figlio and Stone (1999) show that location variables are not necessarily highly relevant determinants of Catholic school attendance.

Evans and Schwab (1995) use Catholic religion to identify their models. They also try other variables as instruments including church attendance and percent Catholic in a county. Neal (1997) uses Catholic religion and Catholic school density to identify his model for whites and Catholic religion and Catholic population density to identify his model for minorities.

Although Catholic religion is a relevant instrument for Catholic schooling (the vast majority of students in Catholic schools are Catholic), it is not clear that it is a valid instrument. One of the reasons for this is that parents of children in Catholic schools tend to be more religious Catholics, as indicated above. Thus, if Catholic religion is used to identify the effects of Catholic schooling, it might also pick up the effect of Catholic religiosity on educational outcomes.

The results below suggest that it is problematic to use Catholic religion as an instrument, especially if adjustments are not made for Catholic and non-Catholic church attendance. I thus use Catholic religion for identification, adjusting for Catholic and non-Catholic church attendance. I also provide a bivariate probit estimate without adjusting for church attendance to show how omitting church attendance affects the results.

As indicated above, recent evidence suggests that Catholic schooling effects are probably location specific. For this reason, I also undertake additional bivariate probit estimates of my dependent variable for minorities (blacks and Hispanics) and whites for central city locations in SMSAs and non-central city locations. The additional estimates are weighted by the sample weights and include adjustments for Catholic Church attendance and other church attendance. Catholic religion is used to identify all of the additional estimates. Other work that is not shown also suggests that Catholic religion cannot be excluded as a valid instrument for subsets of the data if adjustments are also made for religiosity.

I also present probit estimates of the probability of attending a Catholic high school. Several estimates are presented to show how Catholic religion and Catholic Church attendance affect the probability of attending a Catholic high school. In the first estimate, I adjust for Catholic religion and the other variables that are used to estimate high school graduation rates (excluding church attendance). In the second estimate, I additionally adjust for two continuous church attendance

variables. In a third case (not shown), I use dummy variables for church attendance rather than continuous variables (see Sander, 2001a).

A summary of the probit estimates of attending a Catholic high school is presented in Table 7. For brevity, I only present the results for Catholic religion and church attendance. The first estimate indicates that Catholic religion has a highly significant positive effect on the probability of attending a Catholic school. The second and third estimates show that both Catholic religion and Catholic Church attendance increase the probability of attending a Catholic high school. Further, when church attendance is taken into account, the magnitude of the Catholic religion effect declines.

Probit estimates of graduating from high school are presented in Table 8. For brevity, I only present the results for the Catholic school and religion coefficients. The first univariate probit estimate ("Univariate 1") indicates that Catholic high schools increase the probability of graduating from high school. The other important result in this estimate is that Catholic religion has a highly significant positive effect on the likelihood of graduating from high school if adjustments are not made for Catholic and non-Catholic church attendance. The second univariate probit estimate ("Univariate 2") additionally adjusts for Catholic Church attendance and other church attendance. When adjustments are made for church attendance, the Catholic religion variable becomes highly insignificant and the Catholic school coefficient decreases. Further, Catholic Church attendance and other church attendance both have highly significant positive effects on the probability of graduating from high school.

The first bivariate probit estimate ("Bivariate 1") adjusts for differences in church attendance. This estimate indicates that there is no Catholic school effect on the probability of graduating from high school. Once again, Catholic Church attendance and other church attendance have highly significant positive effects on the probability of graduating from high school. If the church attendance variables are excluded from the bivariate estimate ("Bivariate 2"), the Catholic

school coefficients are positive and highly significant. These results imply that Catholic schooling effects might be confounded with Catholic Church attendance.

In Table 9, estimates of Catholic schooling effects are presented by minority status and location. For brevity, I only present the bivariate probit results for the Catholic school coefficients adjusting for Catholic Church attendance, other church attendance, and the other background variables that were used to estimate Catholic schooling effects for the whole sample. Once again, Catholic religion is used to identify the model. The results indicate that there is a positive Catholic school effect on the high school graduation rate for minorities in big cities. The Catholic school coefficient is insignificant in the other cases. Further, if I evaluate the coefficients in the high school graduation rate estimate for minorities in big cities at their mean values, the expected graduation rate is 94 percent in the Catholic school sector and 64 percent in public schools. This result is close to Neal's (1997). He finds that Catholic schools increase the high school graduation rate for minorities in inner cities by 28 percentage points (from 62 percent in public schools to 88 percent in Catholic schools).

The results above thus suggest that Catholic high school effects might be confounded with Catholic religiosity effects as measured by church attendance if Catholic religion is used to identify the effects of Catholic schooling and Catholic religiosity is not taken into account. The likely reason for this is that more religious Catholic families are more likely to send their children to Catholic schools. Further, children from more religious Catholic families are more likely to graduate from high school.

Homework Estimates

Studies indicate that homework has a relatively large effect on academic achievement (Betts, 1997; Walberg, 1991). Further, studies on Catholic schools suggest that higher levels of achievement in the Catholic school sector are possibly a result of more homework assigned in Catholic schools

(Coleman, Hoffer, and Kilgore, 1982; Coleman and Hoffer, 1987). In this section, I estimate the effect of Catholic schooling on homework. Particular attention in given to the effects of selection in the Catholic school sector. Although students in Catholics schools tend to do more homework, it is not necessarily the case that Catholic schools have a positive effect on homework. It could be the case that Catholic schools select students who do more homework.

The data indicate that students in Catholic schools do more homework relative to students in public schools (Table 10). This is the case for white students and minority students. The largest difference is for minority students. Minority students in Catholic schools do about fifty percent more homework (about two additional hours per week) than their counterparts in public schools.

The dependent variable that is estimated is hours of homework per week by students during their senior year in high school in 1980. The estimates are undertaken for white students and minority students. The homework variable was recoded from the HS&B as follows: no homework=0, less than 1 hour=. 5, 1 to 3 hours=2, 3 to 5 hours=4, 5 to 10 hours=7.5, and more than 10 hours=15. The right-hand side variables in my estimates of homework include whether the respondent attended a Catholic high school (relative to public high school), Catholic religion, Catholic religiosity, non-Catholic religiosity, urban, suburban, region, male, number of siblings, whether the respondent's mother worked while the respondent was in high school, family income, father's education, mother's education, black, and Hispanic.

As was the case in estimating high school graduation rates, the key issue in estimating hours of homework is in identifying the effect of attending a Catholic school on homework. At least one variable is needed that is strongly correlated with the probability of attending a Catholic school. This variable should be unrelated to the error term in the homework equation. Once again, I use Catholic religion for identification.

Catholic religion is a relevant identifying variable because the vast majority of Catholic high school students are Catholic. The other issue in my estimation strategy is whether Catholic religion is a valid instrument. Although I cannot formally prove that the estimation strategy is valid in my just-identified model, I would note that when adjustments are made for Catholic religiosity and other background variables, Catholic religion is not significantly related to homework. This is the case for white students and minority students. When adjustments are not made for Catholic religiosity, this is not the case. Estimates that are not shown indicate that Catholic religion has a positive effect on homework if Catholic religiosity is not taken into account.

Uncorrected OLS estimates of hours of homework and corrected estimates are undertaken. The corrected estimates follow the approach suggested by Heckman (1979). First, a probit estimate of attending a Catholic high school is undertaken. This estimate includes all of the variables that are used to estimate hours of homework and an additional variable (Catholic religion) for identification. Second, OLS is used to estimate hours of homework correcting for selection in the Catholic school sector. The selection-correction term (lambda) is the inverse of Mill's ratio that is derived from the first-stage probit model.

The uncorrected estimates of hours of homework indicate that Catholic schools have a significant positive effect for both whites and minorities (Table 11). For white students, attending Catholic school increases the number of hours of homework by about one-half hour per week. For minority students, the Catholic schooling effect is more substantial—about one and one-half additional hours per week. The corrected estimates indicate that the Catholic schooling effect is insignificant for white students and significant for minority students. Further, the magnitude of the Catholic schooling effect for minorities increases to about two and one-fourth additional hours per week.

Discussion

Levin's (2001) first criterion that he uses to evaluate the effects of private schools and education vouchers is whether they increase the ability of families to choose schools that are consistent with their values such as their religious beliefs. My results suggest that Catholic schools help to preserve a Catholic culture through a faith-based education. Men and women with a Catholic upbringing who have attended Catholic schools tend to be more religious Catholics as indicated by their religious identity as an adult, their religious beliefs, and their church contributions. Education vouchers would further increase the ability of Catholic families (and non-Catholic families) to choose a Catholic education for their children. Hoxby (1996) estimates that a $1,000 voucher would induce private school enrollment to increase from about 10 percent to approximately 14 percent. Education vouchers would be particularly advantageous to Catholic families because private schools are disproportionately Catholic.

The second criterion that is suggested to evaluate private schools and education vouchers is productive efficiency. On one hand, Catholic schools seem to provide an education that is at least as good as public schools. Further, the cost of education in the Catholic sector is lower although comparisons on cost are problematic because the cost of education differs between public schools and Catholic schools. Costs tend to be lower in Catholic schools because of low teacher salaries and a higher pupil-teacher ratio. Thus, in some respects Catholic schools might be considered more efficient than public schools. On the other hand, I could not find any evidence that Catholic schools and other private schools increased the quality of public education in Illinois.

Although Catholic schools are probably not better than public schools on the average, some Catholic schools are probably superior to the public schools in a community. This is probably the case for blacks and Hispanics in big cities. Catholic schools in inner-city areas that disproportionately serve a low-income population are probably more efficient than public schools, at least at the high school level. It is less clear whether Catholic grade schools are superior to public

school grade schools in big cities. The results above suggest that blacks and Hispanics in inner-city areas gain from Catholic schooling. They have substantially higher high school graduation rates and do more homework if they attend Catholic schools. In results not shown, I also found that test scores were higher for minority students in Catholic schools (Sander, 2001a). I could not show significant gains for white students in Catholic schools.

Although Catholic schools seem to have positive effects on educational outcomes for blacks and Hispanics, it is less clear why this is the case. Some of the reasons that are often given for a positive Catholic school effect include a greater emphasis on a core curriculum, Catholic schools being embedded within a larger communal organization, discipline, the decentralized nature of Catholic education, and the low quality of public education in some locations (Bryk, Lee, and Holland, 1993; Coleman, Hoffer, and Kilgore, 1982; Neal, 1997).

Data for Chicago support the hypothesis that low-income minority students gain from Catholic schooling. Out of 168 Catholic schools in Chicago, 114 are classified as Big Shoulders schools—schools that mostly serve low-income minority students. More than 50 percent of the students in Big Shoulders schools are products of poor families and 80 percent are from minority groups. The dropout rate in Big Shoulders schools is less than 1 percent, and 97 percent of Big Shoulders students graduate from high school. This past year, 81 percent of high school graduates from Big Shoulders schools went on to college (Archdiocese of Chicago, 2000b). For Chicago's public schools, the annual high school dropout rate is about 15 percent and the high school graduation rate is about 62 percent (Sander, 2001b). The evidence thus suggests that African Americans and Hispanics from poor backgrounds do better in Catholic schools in big cities like Chicago than in public schools. A recent study on Catholic schooling in Los Angeles also comes to the conclusion that Catholic schools are more effective at educating minority students (Dawson and Helland, 2001).

My results suggest that white students in Catholic schools have higher levels of achievement mostly because of selection. White students are products of families with relatively high levels of education and income. Further, white students in Catholic schools are products of more religious Catholic families. Parents' religiosity is associated with higher levels of children's achievement and is usually an omitted variable in many related studies. If parents' religiosity is not taken into account, this can result in Catholic schooling effects being confounded with parents' religiosity effects.

Levin's third criterion for evaluating private schools is equity. My results suggest that Catholic high schools have favorable effects on equity by providing higher quality schooling for low-income minority students in big cities. To date, this effect is not large because most students from poor backgrounds in large cities do not have access to Catholic schools. If more students from disadvantaged backgrounds were given more access to Catholic schools through education vouchers, this should result in higher levels of achievement for students who might otherwise attend lower quality public schools.

Finally, Levin's fourth criterion for evaluating private schooling is social cohesion. The research that I have undertaken does not consider this issue. However, I know of no related research that suggests that Catholic schools are less efficient in producing a more cohesive society. Research by Greeley (1990) and Sander (1995) indicates that Catholics are highly integrated into mainstream society.

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Table 1: Private and Catholic Primary and Secondary School Enrollment, 1940-94

	(1)	*(2)*	*(3)*
	% Private	*% Catholic of (1)*	*% Catholic (1) x (2)*
1940	9.3	91.8	8.5
1950	12.2	93.4	11.4
1960	13.6	92.6	12.6
1970	11.1	76.5	8.5
1980	11.5	58.3	6.7
1990	11.3	47.3	5.3
1994	11.2	46.8	5.2

Sources: United States Bureau of the Census, 1975 and United States Department of Commerce, 1998.

Table 2: Percentage of Catholic Adults Who Attended Parochial Schools by Year of Birth

Year of Birth	*1+ Years*	*9+Years*
Less Than 1935	47.4%	12.9%
1935-1949	63.4	23.2
1950-1964	59.6	21.5
1965-1973	44.1	6.9

Source: National Opinion Research Center, "General Social Survey: 1988, 1989 1991."

Table 3: Religious Teachers in Catholic Schools, 1930-1995

	Elementary	*Secondary*
1930	91%	82%
1940	92	82
1950	93	82
1960	73	75
1970	46	50
1980	26	29
1990	12	15
1995	8	13

Sources: United State Department of Commerce (1975 and 1997).

Table 4:Catholic School Attendance and Religious Behavior for Respondents with a Catholic Upbringing

Years in Catholic School	*Pray Daily*	*Attend Church Nearly Every Week*	*Catholic Now*	*Believe in Life After Death*	*Yearly Church Contributions*
0	23%	36%	77%	43%	$225
1-8	32%	39%	83%	68%	$275
9-12	40%	54%	85%	63%	$510

Source: National Opinion Research Center, "General Social Survey: 1988, 1989, and 1991."

Table 5: Estimates of Religious Behavior for Respondents with a Catholic Upbringing

	1-8 Years			9-12 Years		
Estimate	*Coefficient*	*Standard Error*	*Marginal Effect*	*Coefficient*	*Standard Error*	*Marginal Effect*
Probit Estimate Of Pray Daily	.40***	.11	.15	.89***	.14	.31
Probit Estimate of Attend Nearly Every Week	-.08	.11	0	.17	.14	0
Probit Estimate Of Catholic Now	.25**	.13	.06	.34**	.16	.08
Probit Estimate of Believe In Life After Death	.78***	.11	.29	.84***	.14	.31
Total Estimate Of Church Contributions	19.1	79.1	0	258***	96.8	258

* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

Table 6: Estimates of Public School Achievement

	Private Coefficient	*Standard Error*
OLS Estimates		
Math 6	-.23	.14
Math 10	.04	.16
Graduation Rate	-.02	.05
College-bound	-.08	.08
2SLS Estimates		
Math 6	-.38	.68
Math 10	1.03	.60
Graduation Rate	.16	.15
College-bound	.41	.27

Table 7: Probit Estimates of Catholic High School Attendance (Standard errors in parentheses)

	(1)	*(2)*
Catholic Religion	1.52***	1.14***
	(.06)	(.12)
Catholic Church Attendance		.009***
		(.001)
Other Church Attendance		-.0002***
		(.002)

* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

Table 8: Probit Estimates of High School Graduates (Standard errors in parentheses)

	Univariate 1	*Univariate 2*	*Bivariate 1*	*Bivariate 2*
Catholic School	.29***	.23***	-.14	.59***
	(.11)	(.11)	(.23)	(.13)
Catholic Religion	.14**	.003		
	(.06)	(.08)		
Catholic Attendance		.006***	.008***	
		(.002)	(.001)	
Other Attendance		.002***	.002***	
		(.008)	(.008)	

* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

Table 9: Bivariate Probit Estimates of High School Graduates by Minority Status and Location

Estimate	*Catholic School Coefficient*	*Standard Error*
Minority & Big City	1.23*	.74
White & Big City	-.26	1.05
Minority & Other	-.39	.53
White & Other	.12	.42

* Significant at the 10% level.

Table 10: Mean Hours of Homework per Week by Type of School and Minority Status (Standard deviations in parentheses)

	Public	*Catholic*
White	4.0	5.2
	(3.8)	(4.0)
Black and Hispanic	3.6	5.9
	(3.6)	(4.6)

Sources: U.S. Department of Education, "High School and Beyond 1980 Senior Cohort Third Follow-up (1986)."

Table 11: Estimates of Homework

Estimate	*Catholic School Coefficient*	*Standard Error*
Uncorrected		
White Students	.59***	.22
Minority Students	1.49***	.35
Corrected		
White Students	.25	1.0
Minority Students	2.27**	.98

* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

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