

PRIVATE SCHOOL CHOICE:
THE EFFECTS OF RELIGIOUS AFFILIATION AND PARTICIPATION

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Abstract. In this paper, we quantify the religious factor in private education in the United States by estimating a Random Utility Model of school-choice in which households choose among public, private-nonsectarian, Catholic and Protestant schools. In our model households differ not only in their income levels but also in their religion and religiosity levels. The model is then estimated using multinomial logit and multinomial probit regressions of attendance at different types of private schools using individual data from the *General Social Survey*. We find that both religion and religiosity have important effects on the demand for the different types of private schools. Further, it is shown that if religiosity is not taken into account (the usual case), the effect of religion on demand is biased. Our results imply that previous studies on the treatment effect of Catholic schools that have not taken into account the selection of high-religiosity youth into Catholic schools overestimate the positive influence of Catholic schools.

Keywords: School choice; demand for schooling; religious education

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I. Introduction

Most private elementary and secondary school students in the United States attend parochial schools. Non-religious private schools only account for about 17% of private school enrollment (United States Department of Commerce, 2006). Religious values in the demand for private schooling are clearly important although they have not received much consideration in studies on private schools. Parents send their children to religious schools in part to help preserve a religious identity and instill religious values (Cohen-Zada, 2006). Further, participants in voucher programs in Milwaukee and Cleveland have overwhelmingly chosen religious schools. If we want to better understand why parents choose private schools and what effect voucher programs might have it is important to pay more attention to the religious factor in private education.

Yet, most of the empirical and theoretical studies on private schooling have not directly taken into account the effects of religion and religiosity. Some exceptions include a study by Campbell, West, and Peterson (2005) which considers the effects of religion and religiosity on participation in a voucher program and Sander (2005) which considers the effect of Catholic religiosity on the demand for Catholic schooling. Also, Figlio and Stone (2001) adjust for religious participation in a study on private school cream-skimming. Most estimates of the demand for private schools tend to at best adjust for Catholic religion (or a proxy for Catholic religion). Non-Catholic religious effects and the effects of religiosity have usually not been considered. Further, the broader effects of religion at the aggregate level that Cohen-Zada and Justman (2003 and 2005) and Ferreyra (2005) show are usually not considered in either empirical or theoretical studies (Rangazas 1995, Epple and Romano, 1996; Glomm and Ravikumar 1998). Also, the

different determinants of demand for different types of religious schooling have not been considered. The focus is usually on Catholic schools or private schools although there is substantial heterogeneity within the private school sector.

In this paper, we first present a theoretical model of school-choice in which households can choose between public, Catholic, Protestant and non-sectarian private schooling. In our model, households differ not only in their income levels but also in their religion and religiosity levels. The model is used to derive the probability that a household attends various types of schooling. We then estimate this probability using multinomial logit and multinomial probit regressions. Finally, we illustrate the importance of quantifying the religious factor in private education for public policy. It is shown that households with a higher probability of attending private schools would be more affected by a voucher program than households with a lower probability.

For the empirical section, we use the *General Social Survey* (GSS), a dataset that has not been used very often in studies on private schooling. Both household and community-level effects of religion and religiosity on the demand for private schooling are considered.¹ Probit and multinomial logit estimates of the demand for private schools, Catholic schools, Protestant schools, and non-sectarian private schools are undertaken. It is shown that both religion and religiosity have important effects on the demand for private, Catholic, Protestant, and non-sectarian schools. However, when religiosity is not taken into account, the effect of religion on demand is biased. For Catholic schools, the share of Catholics in the local population is also demonstrated to be an important determinant of demand. It is also shown that as the percentage of African-

¹ The present paper, which emphasizes religious differentiation, ignores the detrimental impact of cultural differences on productivity (Lazear, 1999) and its implications for education policy (Gradstein and Justman, 2000, 2002, 2005).

Americans increase in an area, there is “flight” to private and Protestant schools. This is less an issue with Catholic schools. Further, we find that blacks are more likely to opt for Catholic schools all other things being equal while they are less likely to opt for Protestant schools even though blacks are disproportionately Protestant. Finally, our findings indicate that non-sectarian private schools tend to be more elitist in the population that they serve relative to Catholic schools and Protestant schools.

Our finding that religiosity has a substantial and significant positive effect on the demand for private schooling also bears on research that estimates the treatment effect of Catholic schools. In numerous studies researchers try to control for selection by first estimating the probability of attending a Catholic (private) school. The predicted probabilities from the first stage are then used to estimate the treatment effect of Catholic (private) school attendance on student outcomes. Most of these studies fail to control for religiosity in estimating the probability of attending a Catholic or private school (Evans and Schwab 1995, Sander 1996; Neal, 1997; Dee 2005, among others). Other research indicates that children who grow up in homes with more religious involvement tend to have better educational outcomes (Parcel and Geschwender 1995, Elder and Conger 2000, Regnerus 2000, Muller and Ellison 2001, Bankston and Zhou 2002, Regnerus and Elder 2003, Glanville et. al 2006, among others) implying that studies on Catholic school effects have tended to over-estimate the treatment effect of Catholic schools.

The paper is organized as follows. First, a brief overview of related research is given. Second, a theoretical model of private school choice is presented. Third, the empirical models and data sources are reviewed. Fourth, the empirical results are presented. Fifth, the importance of quantifying the religious factor in private education to

the analysis of voucher programs is illustrated. The paper closes with a discussion of the findings.

II. Related Literature: A Thumbnail Sketch

Numerous studies have investigated the demand for private schooling, most of which have not considered religious effects beyond the effect of being Catholic. Studies that show a positive Catholic religion effect on private school attendance include Long and Toma (1988), West and Palsson (1988), and Downes and Greenstein (1996). Several studies use ethnic background as a proxy for Catholic religion to estimate private school choice. These studies include Lankford and Wycoff (1992), Hamilton and Macauley (1991), Chiswick and Koutroumanes (1996), and Hofrenning and Chiswick (1999). Some of the key non-religious factors that are found to be significant in these studies include positive income (and the variability of income), parents' education, and central city effects, as well as negative tuition and public school quality effects.

Another branch of literature has focused on the effects of attending private schools on educational attainment and academic achievement rather than on the demand for private schooling. To some extent, this literature has suggested that parents choose private schools for their children if they are superior to public schools. Most of these studies focus on Catholic schools because they account for the largest share of the private school sector. Early studies by Coleman, Hoffer, and Kilgore (1982) and Coleman and Hoffer (1987) suggested that Catholic schools have positive effects on test scores and high school graduation rates. Since these studies, there have been numerous attempts to estimate private school effects taking into account selection (e.g., Evans and Schwab,

1995; Grogger and Neal, 2000; Jepsen, 2003; Neal, 1997; Sander, 1996; Sander and Krautmann, 1995). The most recent contribution to this literature concludes that Catholic high schools have a large effect on high school graduation rates, especially for minorities, but no effect on test scores (Altonji, Elder, and Taber, 2005). These studies try to control for the possibility of positive selection into Catholic schools by first estimating the probability of attending a Catholic school and then using the predicted probability of Catholic school attendance to estimate the treatment effect of Catholic schools on student achievement. However, they fail to control for religiosity in the first stage selection equation. In this case, if students in Catholic schools are relatively more religious than students in public schools and religiosity has a positive effect on student outcomes, then the treatment effect that researchers find are likely to be biased upward. Thus, it is important to consider how both religion and religiosity affects school choice.

Indeed, many studies show that both religion and religiosity have important effects on economic outcomes (Chiswick 1986 and 1988, Freeman 1986, Lehrer 1999, 2004a and 2004b, Gruber 2005, among others). These studies show that there is a systematic pattern of differences by religious affiliation in educational attainment, and that higher levels of religiosity tend to be associated with more favorable educational outcomes. A related literature has developed causal mechanisms for the connection between religious involvement among youth and beneficial outcomes in many areas including education, mental health, and substance use (Waite and Lehrer, 2003).

Yet another line of research has considered the effects of “white flight” to private schools. This literature shows that white parents are more likely to send their children to private schools as the concentration of African-American children in public schools

increases (Chiswick and Koutroumanes 1996; Fairlie and Resch, 2002). Betts and Fairlie (2001) show that immigrants also increase “flight” to private schools. Coleman, Hoffer, and Kilgore (1982) also examined the related issue of segregation and educational opportunity in schooling. They found that Catholic schools lessened inequality in educational opportunity while public schools and other private schools increased it.

Although the effects of religion and religiosity have not generally been the focus of empirical studies on the demand for private schooling, there are a few studies where they are considered. Using 1963-64 survey data, Greeley and Rossi (1966) show that parents’ religiosity had a large effect on Catholic school enrollment. Sander (2005) also shows this to be the case.

Cohen-Zada and Justman (2005) follow another line of research on the religious factor in private education by calibrating the distribution of households' religiosity in a model of school choice where parents choose among public, private non-sectarian, and religious schools. They then simulate how household income and the size of vouchers affect the demand for private schools. In another study, Cohen-Zada and Justman (2003) show that the share of Catholics in the local population has a concave effect on the demand for private schools. The reasons that Catholic population density might affect the demand for Catholic schools include the effects of density on costs through scale economies and tuition subsidies and the effects of the concentration of Catholics in public schools on the demand for Catholic schooling. For example, an increase in the percentage of Catholic students in public schools might reduce the demand for Catholic schools if Catholic parents prefer that their children attend school with other Catholics (Cohen-Zada, 2006).

III. Formal Analysis ²

Basic definition of the model

An empirical model of how households choose among school alternatives should be grounded upon a theoretical model that describes the factors that affect school-choice. In this section we posit a rational model of school choice in which each household evaluates its utility from each type of schooling and chooses the alternative that maximizes its utility.

Consider an economy with a fixed population of households of measure one, indexed by i , each household comprising one parent and one child. The economy consists of two religious groups: Catholics and Protestants of measures r and $1 - r$, respectively.³ Each household is characterized by the group to which it belongs, by its level of religiosity z_i , and by its after-tax income y_i . Each child attends a public school, Catholic school, Protestant school, or non-sectarian private school.

Household utility depends on consumption of a numeraire good c , on the academic quality of their children's education x , on the religious orientation of the school given the household religion and religiosity levels, and on unobservables captured by a stochastic term, ε . We set the utility function to be equal to

$$U(c_i, x_i, z_i) = \begin{cases} a \cdot \ln(c_i) + (1 - \alpha) \ln(x_i) + R_S^J + \beta_S^J \cdot z_i + \varepsilon_{iS}^J & \text{if religious school} \\ a \cdot \ln(c_i) + (1 - \alpha) \ln(x_i) + \varepsilon_{iS}^J & \text{if non-religious school} \end{cases}, \quad (1)$$

² The formal analysis builds on previous efforts by Cohen-Zada and Justman (2005).

³ To simplify the model we ignore households who belong to other religions and households that do not belong to any religion. In our dataset, only 4.5% of the households reported they do not belong to any religion.

where R_S^J denotes the utility or disutility that a household of denomination $J = (CA, PRT)$ with $z_i = 0$ derives from the religious environment in religious schooling of type $S = (CS, PS)$. For example, R_{CS}^{CA} reflects the utility that a Catholic household with $z_i = 0$ derives from the religious environment in Catholic schooling. We assume that $R_{S=J}^J > R_{S \neq J}^J$, which means that each household with $z_i = 0$ derives greater utility (or less disutility) from the religious environment in religious schooling of its denomination than from religious schooling of another denomination.

The matrix $\{\beta_S^J\}$ reflects the effect of religiosity on the utility that households derive from each type of religious schooling. Two assumptions are made on the elements of the matrix β . First, we assume that $\beta_{S=J}^J > 0$, which implies that religiosity increases the utility that households derive from the religious schooling of their denomination. Second, we assume that $\beta_{S=J}^J > \beta_{S \neq J}^J$. That is, the effect of religiosity on household utility is greater when the school belongs to the denomination of the household than when it belongs to another denomination. These restrictions leave space for $\beta_{S \neq J}^J$ to be either positive or negative. A positive value of $\beta_{S \neq J}^J$ implies that among households who belong to denomination J , religiosity increases the utility they derive from religious schooling of type $S \neq J$. On the other hand, a negative value of $\beta_{S \neq J}^J$ implies that as households of denomination J are more religious, they derive less utility from a religious school of type $S \neq J$.

Public education is available free of charge to all households at an exogenous uniform quality \bar{x} . Private schools, religious and non-religious, are available as alternatives to public schooling, and can be purchased from a competitively-priced

private sector at any desired quality. Thus, households can choose to forgo free public education and instead buy religious education or non-sectarian private education.

We assume that each religious group operates a religious school and that the cost per unit of quality in each religious school depends negatively on the share of the religious group in the local population. This assumption is supported by Hoxby (1994) who provides evidence that Catholic secondary schools receive more revenues from non-tuition sources and consequently charge lower tuitions in localities where the share of Catholics is higher. In addition, she mentions several other reasons why the price of a denominational school depends negatively on the relative share of the denomination in the local population. First, denominational schools reduce their costs by sharing facilities and personnel services with the church. The supply of these facilities and personnel services become more available as the share of the denomination in the local population grows. Second, as the share of a religious group in the population grows, the density of the group's religious schools increases thus reducing transportation costs to the school. The price (cost per unit of quality) of Catholic schooling is then

$$p_{CS} = r^{-\gamma_1}, \quad (2A)$$

and in Protestant schooling it is

$$p_{PS} = (1-r)^{-\gamma_2}. \quad (2B)$$

According to these functions, as the share of each denomination in the local population grows the price of its denominational schools decreases. In addition, these functions reflect the idea that scale effects are more pronounced when the share of the

religious group in the population is relatively small. That is, school's costs decreases more rapidly when the share of the religious group in the local population increases from 0% to 5% than when it grows from 40% to 45%.

On the other hand, the price of non-sectarian private schooling, p_{NS} , is exogenous and does not depend on the religious composition of the community. Thus, we set

$$p_{NS} = p. \quad (2C)$$

School Choice

Consider how households choose between public, Catholic, Protestant, and non-sectarian private schooling to maximize utility. A household of group J that chooses public education receives free schooling of quality \bar{x} . Therefore, it spends all its disposable income on consumption, $c_i = y_i$. Denoting by V_S^J the non-stochastic component of the utility function of a household of denomination J from a school of type S , equation (1) then implies that the utility of a household that sends its child to a public school equals

$$W_G^J = V_G^J + \varepsilon_{iG}^J = a \cdot \ln(y_i) + (1 - \alpha) \ln(\bar{x}) + \varepsilon_{iG}^J. \quad (3)$$

A household that chooses a Catholic school solves:

$$\begin{aligned} \text{Max } U(c_i, x_i, s_i) &= a \cdot \ln(c_i) + (1 - \alpha) \ln(x_i) + R_{CS}^J + \beta_{CS}^J \cdot z_i + \varepsilon_{iCS}^J, \\ \text{s.t. } c + x \cdot p_{CS} &= y_i \end{aligned}$$

and has indirect utility

$$W_{CS}^J = V_{CS}^J + \varepsilon_{iCS}^J = a \cdot \ln(\alpha) + (1 - \alpha) \cdot \ln[(1 - \alpha) / p_{CS}] + \ln(y_i) + R_{CS}^J + \beta_{CS}^J \cdot z_i + \varepsilon_{iCS}^J. \quad (4)$$

Similarly, a household that sends its child to a Protestant school solves:

$$\begin{aligned} \text{Max } U(c_i, x_i, s_i) &= a \cdot \ln(c_i) + (1 - \alpha) \ln(x_i) + R_{PS}^J + \beta_{PS}^J \cdot z_i + \varepsilon_{iPS}^J \\ \text{s.t. } c + x \cdot p_{PS} &= y_i \end{aligned}$$

Its utility is then

$$W_{PS}^J = V_{PS}^J + \varepsilon_{iPS}^J = a \cdot \ln(\alpha) + (1 - \alpha) \cdot \ln[(1 - \alpha) / p_{PS}] + \ln(y_i) + R_{PS}^J + \beta_{PS}^J \cdot z_i + \varepsilon_{iPS}^J. \quad (5)$$

Finally, a household that sends its child to a non-sectarian private school solves:

$$\begin{aligned} \text{Max } U(c_i, x_i, s_i) &= a \cdot \ln(c_i) + (1 - \alpha) \ln(x_i) + \varepsilon_{iNS}^J \\ \text{s.t. } c + x \cdot p_{NS} &= y_i \end{aligned}$$

and derives utility

$$W_{NS}^J = V_{NS}^J + \varepsilon_{iNS}^J = a \cdot \ln(\alpha) + (1 - \alpha) \cdot \ln[(1 - \alpha) / p_{NS}] + \ln(y_i) + \varepsilon_{iNS}^J. \quad (6)$$

We assume that the error terms in the utility functions are identically and independently distributed across individuals according to the double exponential with zero mean and variance equal to $6 / \pi^2$ (McFadden, 1974). In this case, the probability that a household of religion J will send its child to a Catholic school is

$$\pi_{CS}^J = \frac{\exp(V_{CS}^J)}{\exp(V_G^J) + \exp(V_{CS}^J) + \exp(V_{PS}^J) + \exp(V_{NS}^J)}; \quad (7A)$$

to a Protestant school it is ,

$$\pi_{PS}^J = \frac{\exp(V_{PS}^J)}{\exp(V_G^J) + \exp(V_{CS}^J) + \exp(V_{PS}^J) + \exp(V_{NS}^J)}; \quad (7B)$$

to a non-sectarian school it is,

$$\pi_{NS}^J = \frac{\exp(V_{NS}^J)}{\exp(V_G^J) + \exp(V_{CS}^J) + \exp(V_{PS}^J) + \exp(V_{NS}^J)}; \quad (7C)$$

and to a public school it is,

$$\pi_G^J = \frac{\exp(V_G^J)}{\exp(V_G^J) + \exp(V_{CS}^J) + \exp(V_{PS}^J) + \exp(V_{NS}^J)}. \quad (7D)$$

Dividing (7A), (7B) and (7C) by (7D) we obtain that

$$\frac{\pi_{CS}^J}{\pi_G^J} = \frac{\exp(V_{CS}^J)}{\exp(V_G^J)} = \frac{\alpha^\alpha \cdot (1 - \alpha)^{1-\alpha} \cdot y_i^{1-\alpha} \cdot \exp(R_{CS}^J) \cdot \exp(\beta_{CS}^J \cdot z_i)}{[p_{CS} \cdot \bar{x}]^{1-\alpha}}, \quad (8A)$$

$$\frac{\pi_{PS}^J}{\pi_G^J} = \frac{\exp(V_{PS}^J)}{\exp(V_G^J)} = \frac{\alpha^\alpha \cdot (1 - \alpha)^{1-\alpha} \cdot y_i^{1-\alpha} \cdot \exp(R_{PS}^J) \cdot \exp(\beta_{PS}^J \cdot Z_i)}{[p_{PS} \cdot \bar{x}]^{1-\alpha}}, \quad (8B)$$

and

$$\frac{\pi_{NS}^J}{\pi_G^J} = \frac{\exp(V_{NS}^J)}{\exp(V_G^J)} = \frac{\alpha^\alpha \cdot (1 - \alpha)^{1-\alpha} \cdot y_i^{1-\alpha}}{[p_{NS} \cdot \bar{x}]^{1-\alpha}}. \quad (8C)$$

Substituting (2A) into (8A) and taking its logarithm we obtain that

$$\log\left(\frac{\pi_{CS}}{\pi_G}\right)^J = f(\alpha) + (1-\alpha) \cdot \ln(y_i) + R_{CS}^J + \beta_{CS}^J \cdot z_i + \gamma_1 \cdot (1-\alpha) \cdot \ln(r) - (1-\alpha) \cdot \ln \bar{x}. \quad (9A)$$

Equation (9A) then presents explicitly the factors that affect the odds-ratio to attend a Catholic rather than a public school among Catholics and among Protestants. It shows that:

- a) income has a positive concave effect on the probability of attending Catholic rather than public schools;
- b) the share of Catholics in the population has a positive concave effect on the probability of attending Catholic rather than public education because it reduces the price of Catholic schools;
- c) among Catholics, religiosity has a positive effect on the probability of attending Catholic rather than public schools;
- d) among Protestants, the effect of religiosity on the probability of attending Catholic rather than public schools depends on the sign of β_{CS}^{PRT} . If β_{CS}^{PRT} is positive, religiosity increases the probability that a Protestant household will send its child to Catholic rather than public schools. On the other hand, if β_{CS}^{PRT} is negative, religiosity decreases the probability among Protestants of attending Catholic rather than public schools.

Similarly, substituting (2B) into (8B) and taking its logarithm yields

$$\log\left(\frac{\pi_{PS}}{\pi_G}\right)^J = f(\alpha) + (1-\alpha) \cdot \ln(y_i) + R_{PS}^J + \beta_{PS}^J \cdot z_i + \gamma_2 \cdot (1-\alpha) \cdot \ln(1-r) - (1-\alpha) \cdot \ln \bar{x}. \quad (9B)$$

Equation (9B) introduces the determinants of the odds-ratio to attend Protestant rather than public schooling among Catholics and among Protestants. It shows that:

- a) among Protestants, religiosity increases the probability of attending Protestant rather than public schools;

- b) among Catholics, the probability of attending Protestant rather than public schools depends on the sign of β_{PS}^{CA} : If $\beta_{PS}^{CA} > 0$, Catholics who are more religious are more likely to choose Protestant rather than public schooling, while if $\beta_{PS}^{CA} < 0$ Catholics who are more religious are less likely to choose Protestant rather than public schooling.

We next analyze the effect of household religion on the probability of attending Catholic rather than public schools. For this purpose, we first specify equation (9A) separately for Catholics and for Protestants and obtain

$$\log\left(\frac{\pi_{CS}}{\pi_G}\right)^{CA} = f(\alpha) + (1-\alpha) \cdot \ln(y_i) + R_{CS}^{CA} + \beta_{CS}^{CA} \cdot z_i + \gamma_1 \cdot (1-\alpha) \cdot \ln(r) - (1-\alpha) \cdot \ln \bar{x} \quad (10A)$$

$$\log\left(\frac{\pi_{CS}}{\pi_G}\right)^{PRT} = f(\alpha) + (1-\alpha) \cdot \ln(y_i) + R_{CS}^{PRT} + \beta_{CS}^{PRT} \cdot z_i + \gamma_1 \cdot (1-\alpha) \cdot \ln(r) - (1-\alpha) \cdot \ln \bar{x} \quad (10B)$$

Subtracting (10B) from (10A) we obtain the effect of being Catholic on the probability of attending Catholic rather than public schools

$$\log\left(\frac{\pi_{CS}}{\pi_G}\right)^{CA} - \log\left(\frac{\pi_{CS}}{\pi_G}\right)^{PRT} = R_{CS}^{CA} - R_{CS}^{PRT} + (\beta_{CS}^{CA} - \beta_{CS}^{PRT}) \cdot Z_i. \quad (11)$$

Equation (11) shows that the effect of being Catholic on the probability of attending Catholic rather than public schools depends on the level of religiosity. As $\beta_{CS}^{CA} > \beta_{CS}^{PRT}$, the effect of being Catholic on the probability of attending Catholic rather than public schools is larger for higher values of z_i . Thus, *failing to control for religiosity would yield an average Catholic effect that is lower than the effect of religious Catholics and higher than the effect of non-religious Catholics*. Thus, correct estimation of the

probability of attending Catholic rather than public schooling among the whole population should include interaction terms between each religion and religiosity. Such estimations may take the form:

$$\log\left(\frac{\pi_{CS}}{\pi_G}\right) = \begin{cases} a_0 + a_1 \cdot \text{Catholic}_i + a_2 \cdot z_i \cdot \text{Catholic}_i + a_3 \cdot z_i \cdot \text{Protestants}_i + a_4 \cdot \ln(y_i) + \\ + a_5 \cdot \ln(r) - a_6 \cdot \ln\bar{x} + \varepsilon_i \end{cases} . \quad (12)$$

We next show that the specification of equation (12) is consistent with our theoretical model and try to relate each of its coefficients to the parameters of the model. In equation (12), a_1 captures the effect of being Catholic at $z_i = 0$, which implies that

$$a_1 = \log\left(\frac{\pi_{CS}}{\pi_G}\right)^{CA=1, Z=0} - \log\left(\frac{\pi_{CS}}{\pi_G}\right)^{CA=0, Z=0} = R_{CS}^{CA} - R_{CS}^{PRT} > 0 . \quad (13)$$

Similarly, a_2 captures the increase in the Catholic effect when z_i increases by one. This is represented in our model by the positive parameter β_{CS}^{CA} in equation (10A). That is,

$$a_2 = \log\left(\frac{\pi_{CS}}{\pi_G}\right)^{CA=1, Z_i=Z_0+1} - \log\left(\frac{\pi_{CS}}{\pi_G}\right)^{CA=1, Z_i=Z_0} = \beta_{CS}^{CA} > 0 . \quad (14)$$

Then, we interpret a_3 in the terms of our model using equation (10B):

$$a_3 = \log\left(\frac{\pi_{CS}}{\pi_G}\right)^{PRT=1, Z=Z_0+1} - \log\left(\frac{\pi_{CS}}{\pi_G}\right)^{PRT=1, Z_i=Z_0} = \beta_{CS}^{PRT} \quad (15)$$

Finally, the coefficient of the logarithm of income is $a_4 = 1 - \alpha$; the coefficient of the Catholic share in the population is $a_5 = \gamma_1 \cdot (1 - \alpha)$; and the coefficient of the quality of public schooling is $a_6 = -(1 - \alpha)$.

Substituting equations (13), (14) and (15) into (12) we obtain the correct specification for estimating the probability of attending Catholic rather than public schools among the whole population which is consistent with our theoretical model:

$$\log\left(\frac{\pi_{CS}}{\pi_G}\right) = \left\{ a_0 + (R_{CS}^{CA} - R_{CS}^{PRT}) \cdot Catholic_i + \beta_{CS}^{CA} \cdot z_i \cdot Catholic + \beta_{CS}^{PRT} \cdot z_i \cdot Protestant + \right. \\ \left. + (1 - \alpha) \cdot \ln(y_i) + \gamma_1 \cdot (1 - \alpha) \cdot \ln(r) - (1 - \alpha) \cdot \ln \bar{x} + \varepsilon_i \right. , \quad (16)$$

where $R_{CS}^{CA} - R_{CS}^{PRT} > 0$, $\beta_{CS}^{CA} > 0$ and β_{CS}^{PRT} can be either positive or negative.

Following the same steps as outlined above, we obtain that the implied specification for the probability to attend Protestant rather than public schools in the whole population in the terms of our model is

$$\log\left(\frac{\pi_{PS}}{\pi_G}\right) = \left\{ a_0 + (R_{PS}^{CA} - R_{PS}^{PRT}) \cdot Catholic_i + \beta_{PS}^{CA} \cdot z_i \cdot Catholic + \beta_{PS}^{PRT} \cdot z_i \cdot Protestant + \right. \\ \left. + (1 - \alpha) \cdot \ln(y_i) + \gamma_2 \cdot (1 - \alpha) \cdot \ln(1 - r) - (1 - \alpha) \cdot \ln \bar{x} + \varepsilon_i \right. , \quad (17)$$

where $R_{PS}^{CA} - R_{PS}^{PRT} < 0$, $\beta_{PS}^{PRT} > 0$ and β_{PS}^{CA} can be either positive or negative.

Finally, substituting (2C) into (8C) and taking its logarithm yields

$$\log\left(\frac{\pi_{NS}}{\pi_G}\right) = f(\alpha) + (1 - \alpha) \cdot \ln(y_i) - (1 - \alpha) \cdot \ln \bar{x} - (1 - \alpha) \cdot \ln p . \quad (18)$$

That is, as both public and non-sectarian private schooling do not include any religious instruction in their curriculum, religion and religiosity are not expected to have any effect

on the odds ratio to choose between non-sectarian private schooling and public schooling. The only factors that affect the choice between non-sectarian private schooling and public schooling are household income, which increases the probability of attending non-sectarian private schooling rather than public schooling, and the quality of the public schools which decreases this probability.

Equations (16), (17) and (18) present the factors that affect school-choice between all types of schooling.

Proposition 1

The following factors affect school-choice between Catholic, Protestant, non-sectarian and public schooling:

1) *Choice between all types of private schooling and public schooling*

- a) Income has a positive effect on the probability of attending all types of private schooling rather than public schooling.
- b) The quality of the local public schools has a negative effect on the probability of attending all types of private schooling rather than public schooling.

2) *Choice between Catholic and public schooling (Equation (16))*

- c) Catholic religion increases the probability of attending Catholic rather than public schooling.
- d) The interaction term between Catholic religion and religiosity has a positive effect on the probability of attending Catholic rather than public schooling.
- e) The share of Catholics in the local population has a positive concave effect on the probability of attending Catholic rather than public schooling.

3) *Choice between Protestant and public schooling* (Equation (17))

- f) Catholic religion decreases the probability of attending Protestant rather than public schooling.
- g) The interaction term between Protestant and religiosity has a positive effect on the probability of attending Protestant rather than public schooling.
- h) The share of Protestants in the population has a positive concave effect on the probability of attending Protestant rather than public schooling.

In the next section we estimate equations (16), (17) and (18) simultaneously using both multinomial logit and multinomial probit regressions.

IV. Empirical Models and Data

We estimate the probability of attending a private school (all types), a Catholic school, a Protestant school or a non-sectarian private school. All of the estimates are relative to attending public schools. In the data set, information is available on whether respondents send (sent) their children to Catholic schools, Protestant/Christian schools, other non-Christian religious schools, and private non-sectarian schools. Particular attention is given to attendance at Catholic schools and Protestant schools because they account for the largest shares of the private school population. We do not estimate attendance at non-Christian religious schools because the sample is too small.

First, we undertake a probit estimate of the probability of attending a private school. The right-hand variables include religion (relative to non-fundamentalist protestant), an interaction term between attendance at religious services and religion (Catholics, fundamentalist Protestants, and non-fundamentalist Protestants), household income (measured categorically relative to income of \$110,000 and over), education of the respondent (relative to high school graduate), age of the respondent, African-American,

Hispanic, region (relative to west), population density, percent Catholics in the population, percent African-American in the population, percent Hispanic in the population, and whether the respondent lives in one of the 100 largest central cities in the United States. In addition, following the theoretical model, we also include in the estimation the share of Catholics in the population squared to allow the share of Catholics in the population to have a concave effect on the probability of attending Catholic rather than public schooling.⁴ The income variables are defined as follows: “Income 1” indicates household with income less than \$8,000; “Income 2” indicates income of \$8,000 to \$17,499; “Income 3” indicates income of \$17,500 to \$24,999; “Income 4” indicates income of \$25,000 to \$39,999; “Income 5” indicates income of \$40,000 to \$59,999; “Income 6” indicates income of \$60,000 to \$89,999; and “Income 7” indicates income of \$90,000 to \$109,000. The density variables are for the sampling areas (called primary sampling units). They are either metropolitan statistical areas or non-metropolitan counties.

Second, we undertake two multinomial logit estimates of attending a Catholic school, Protestant school, non-sectarian private school, or a public school (the omitted category). In the second case, we exclude the religiosity variables. We do this to show the effects of omitted variable bias if religiosity is excluded. Using multinomial logit for

⁴ While the theoretical multinomial logit specification (equation 16) defines the odds-ratio of attending Catholic rather than public schooling as a function of the logarithm of %Catholic, we preferred to allow for concavity in our estimation by including a squared term of %Catholic rather than by taking its logarithm. The reason for this is that a squared term for %Catholic allows the share of Catholics in the population, above a critical point, to have a negative effect on the probability of attending Catholic rather than public schooling. Although in our model the share of Catholics in the population affects school-choice only through scale effects and thus predicts a positive effect of %Catholic on the probability of attending Catholic rather than public schooling, %Catholic may also reduce the demand for Catholic schooling if Catholic parents prefer that their children attend school with other Catholics (Cohen-Zada, 2005). In this case, one could expect that when the share of Catholics in the population is high enough and scale effects become less important, %Catholic would have a negative effect on the probability to attend Catholic rather than public schooling. Indeed, we found that by adding a squared term for %Catholic we better predict choice between Catholic and public schools than if we only take a logarithm term of %Catholic.

the estimation has both advantages and disadvantages. One advantage is that it allows us to make a direct link between the theoretical model and the estimated one. Yet, it is widely recognized that a potentially important drawback of the multinomial logit model is the independence from irrelevant alternatives property. According to this property, one assumes that the ratio of the probabilities of choosing between two alternatives is independent of the existence and attributes of any other alternative. For example, households' choice between public and Catholic schools does not depend on the existence of non-sectarian private schooling. We deal with this concern by first testing the validity of the IIA assumption using the Hausman and McFadden (1984) test and also by comparing the results to those obtained from a multinomial probit estimation.

Last, we present predicted probabilities of attending Catholic schools, Protestant schools, non-sectarian private schools, and public schools for typical Catholic households, fundamentalist Protestant households, and black fundamentalist Protestant households. The predicted probabilities are based upon the multinomial logit and multinomial probit regressions with adjustments for religiosity.

One of the shortcomings in our study is that it is possible that participation in religious services is not completely exogenous. For example, parents who send their children to religious schools might attend church more often than they would otherwise. It is probably more plausible that some parents might join a certain church (synagogue, mosque, etc.) so that they can send their children to a school that is associated with it, especially if the school is subsidized by the religious institution. This does not necessarily increase religious participation by parents. In our sample, 59% of parents attend religious services almost every week or more if they are sending (or have sent)

their children to religious schools. For parents less than 40 years old, 51% attend religious services regularly if their children attended (or have attended) religious schools. For older parents who are sending or have sent (more likely as parent's age increases) their children to religious schools, rates of church attendance tend to increase (61% for parents 50+ and 66% for parents 60+). If attendance by parents was a result of religious schooling, older parents with older children who attended religious schools might be less likely to attend religious services regularly. Although this is not rigorous evidence that endogeneity is not a problem, it does suggest that it is more plausible that higher rates of religious participation by parents are a determinant of the demand for religious schooling and less a result of it. More attention might be given to this issue in future research.

Household data from the National Opinion Research Center's *General Social Survey* are combined with aggregate data on the sample area. The GSS is a cross-sectional national survey that has been carried out since 1972. The sample is limited to respondents who are at least eighteen years old and live in a non-institutional setting. For 1998 and 2000, questions were asked of respondents with children older than five years regarding the type of school they were sending (or sent) their children. The possible responses were public school, home school, Catholic school, Christian/Protestant school, other (non-Christian) religious school, and non-sectarian private school. We excluded respondents who home schooled their children, a very small percentage.

The GSS is a useful data set for this study because data are also available on the respondent's religion and religiosity as measured by attendance at religious services. However, one of the shortcomings in the data set is that information on tuition is not available. Summary statistics for the data set are provided below (Table 1). In Table 2,

data are arrayed on attendance at religious services for all respondents, Catholic respondents, and Protestant respondents. Respondents were given nine possible responses from never to more than once per week. For Catholics and Protestants, about one in three attends at least weekly. About one in three respondents regardless of their religious affiliation (including none) attend once or twice per year or less. Table 3 presents attendance at religious services for each type of schooling. It shows that those who choose Catholic and Protestant schooling attend religious services more often than those who choose public schooling or non-sectarian schooling.

The individual data from the GSS database were combined with aggregate demographic variables on the sample area. These variables were constructed from several resources. First, county-level data on the population, Hispanic population, African-American population, and on the density of population, were taken from the *County and City Data Book* (2000). Second, data on the number of Catholic members in each county were taken from the *Religious Congregation and Membership in the United States* (2000). Finally, all of these variables were aggregated to the PSU level according to the county composition of each PSU.

V. Empirical Results

A probit estimate of private school attendance is presented in Table 4. This estimate shows the probability of attending any type of private school relative to a public school. The results show that the religion of the respondent is not significant. However, Catholic religiosity (Catholic x Attend) and fundamentalist Protestant religiosity (Fundamentalist x Attend) have significant positive effects on attendance. While previous

studies focused on the effect of religion on school choice, our results show that respondent's religiosity as measured by participation is a more important determinant of school choice. The three lowest income variables have significant negative effects on attendance. That is, households with very low income levels cannot afford paying tuition to private schools and are thus much less likely to send their children to them. Higher levels of education have a positive effect on the probability to send a child to private schools. One explanation for this result is that given the income of the household, more educated parents attribute greater importance to better schooling relative to less educated parents. Finally, the share of African-Americans in the local population, central city, and age are also associated with higher levels of attendance.

A multinomial logit estimate of Catholic school attendance, Protestant school attendance, and non-sectarian private school attendance is presented in Table 5. Public school attendance is the omitted category. For Catholic school attendance, the results indicate that Catholic religion and Catholic religiosity (Attend x Catholic) have significant positive effects on attendance. The share of Catholics in the population has a significant concave effect on the probability of attending a Catholic school, which peaks when the share of Catholics in the population is about 27%. This result is consistent with Cohen-Zada (2006) that shows that the share of Catholics in the population may reduce the demand for Catholic schools if Catholic parents prefer that their children attend schools with other Catholics. Family income is mostly not significant apart from a significant negative effect for the lowest income category. Since tuition in Catholic schools is subsidized households with relatively low-income levels can sometimes afford sending their children to Catholic schools (except for households with very low income

levels). Parent's education indicates a significant positive effect of some college and a significant negative effect of high school dropout. The college graduate coefficient is not significant. Black, age, and central city are shown to have significant positive effects.

The only religion variable that is significant for Protestant schools is a positive effect for fundamentalist religiosity (Attend x Fundamentalist). The other significant results include positive effects of college graduate and the share of African-Americans in the population and negative effects of "Income 2", age, and African-American. Non-sectarian private schools, other religion, no religion, and nonfundamentalist Protestant religiosity (Attend x Nonfundamentalist) are found to significantly increase attendance. All of the income coefficients below "Income 7" have significant negative effects on attendance while college graduates are significantly more likely to send their children to non-sectarian schools. In this equation the income effect and the effect of college graduates are much stronger than in the Catholic school attendance equation and the Protestant school attendance equation. This indicates that non-sectarian private schools tend to be more elitist in the population that they serve than Catholic schools and Protestant schools. Finally, the other significant coefficients include positive African-American and central city effects.

As mentioned earlier, multinomial logit has the property of independence from irrelevant alternatives. Under this property, the ratio of probabilities for any two alternatives is the same whether or not there are other alternatives. Hausman and McFadden (1984) suggest testing if this property holds in a particular dataset by estimating the model on a subset of the alternatives. If IIA holds then the estimated coefficients obtained on the subset of alternatives will not be significantly different from

those obtained on the full set of alternatives. Hausman and McFadden (1984) also provide a statistic for this test. Applying their test we find that IIA is not violated in our estimation. In order to further illustrate that in our estimation the ratio of probabilities for two school-alternatives does not depend on the existence of a third school-alternative we report the results of a multinomial logit regression eliminating the non-sectarian private school alternative. The results are presented in Table 6. It shows that the ratio of probabilities between Catholic schooling and public schooling and between Protestant schooling and public schooling is not affected by the existence of non-sectarian private schooling.

To further show that our results are not driven by the IIA assumption we also run a multinomial probit regression. The results are very similar to those obtained by the multinomial logit estimation. Table 7 reports the marginal effects, multiplied by 100, of each of the right-hand side variables on the probabilities of attending each type of schooling for the multinomial logit and probit regressions. It shows that the two estimation procedures yield very similar results and that the religious variables are even slightly more significant under the multinomial probit regression.

Multinomial logit estimates of attending Catholic, Protestant, or non-sectarian private schools relative to public schools without the religiosity adjustments are presented in Table 8. The key changes in the results from Table 5 include Catholic religion increasing in size and significance as a determinant of Catholic school attendance, Catholic religion becoming negative and significant as a determinant of Protestant school attendance, and fundamentalist becoming positive and significant as a determinant of Protestant school attendance. These results are consistent with what we showed in the

theoretical model (i.e., that the effect of the religion variables becomes stronger when one fails to control for religiosity).

Table 9 shows how religiosity affects the probability of attending Catholic schools, Protestant schools, non-sectarian private schools, and public schools. The predicted probabilities are generated from the multinomial logit and probit regressions presented above (Table 7). The probabilities are for a typical Catholic household.⁵ The results show that church attendance has a large effect on the probability of attending a Catholic school. Catholics who attend church at least weekly are about as likely to send their children to Catholic schools as they are to send them to public schools. Catholic attendance at religious services is not strongly related with Protestant school attendance or non-sectarian school attendance.

For the typical Protestant fundamentalist household, Protestant school attendance is also shown to increase with church attendance (Table 10). However, the magnitude of the relationship is not as strong as was the case for Catholics and Catholic schools: Protestant fundamentalists who attend church at least weekly are more than twice as likely to attend public schools as Protestant schools. The probability that fundamentalist Protestants attend Catholic schools or non-sectarian private schools is not strongly related to attendance at religious services.

Finally, in Table 11 data are presented on the probability of Catholic school attendance, Protestant school attendance, non-sectarian private school attendance, and public school attendance for a typical black fundamentalist Protestant family. The results

⁵ We set the quantitative variables of the typical household equal to their values at the mean: Age = 52, Percent Black in the population = 13.15%, Percent Catholic in the population = 20.94%, Percent Hispanic in the population = 10.29, and Density of population = 0.59. We set the dummy variables according to the categories that are most frequent: Income category 4 (\$25,000 - \$40,000), Non-Hispanic, White, Region = North.

show that both Catholic school attendance and Protestant school attendance increases with religiosity. It is interesting to note that the relationship between Protestant church attendance and private school attendance is about the same for Catholic schools and Protestant schools—about one in ten with weekly church attendance send their children to Catholic schools or Protestant schools. Non-sectarian private school attendance is very low regardless of church attendance.

VI. Vouchers

In this section we illustrate the importance of quantifying the religious factor in private education for assessing school-choice programs. Consider, for example, a universal voucher program of value v_0 available for use in both religious and non-sectarian private schools.

In this case a household that chooses public education still have the utility level given by equation (3). A household that choose a Catholic school now solves:

$$\begin{aligned} \text{Max } U(c_i, x_i, s_i) &= a \cdot \ln(c_i) + (1 - \alpha) \ln(x_i) + R_{CS}^J + \beta_{CS}^J \cdot z_i + \varepsilon_{iCS}^J \\ \text{s.t. } c + x \cdot p_{CS} &= y_i + v_0 \\ x \cdot p_{CS} &\geq v_0 \end{aligned} ,$$

and has indirect utility ⁶

$$W_{CS}^J = V_{CS}^J + \varepsilon_{iCS}^J = a \cdot \ln(\alpha) + (1 - \alpha) \cdot \ln[(1 - \alpha) / p_{CS}] + \ln(y_i + v_0) + R_{CS}^J + \beta_{CS}^J \cdot z_i + \varepsilon_{iCS}^J \quad (4')$$

⁶ As $x \cdot p_{CS} \geq v_0$ this indirect utility is correct only for households with income level higher than a threshold income $y_i = \alpha / (1 - \alpha) \cdot v_0$. Below this threshold income households do not supplement the voucher and thus the deterministic part of the indirect utility function is $a \cdot \ln(y_i) + (1 - \alpha) \ln(v_0 / p_{CS})$. We concentrate here on households with income above this threshold income.

Similarly, a household that sends its child to a Protestant school derives utility

$$W_{PS}^J = V_{PS}^J + \varepsilon_{iPS}^J = a \cdot \ln(\alpha) + (1 - \alpha) \cdot \ln[(1 - \alpha) / p_{PS}] + \ln(y_i + v_0) + R_{PS}^J + \beta_{PS}^J \cdot z_i + \varepsilon_{iPS}^J \quad (5')$$

and a household that chooses non-sectarian private schooling derives utility

$$W_{NS}^J = V_{NS}^J + \varepsilon_{iNS}^J = a \cdot \ln(\alpha) + (1 - \alpha) \cdot \ln[(1 - \alpha) / p_{NS}] + \ln(y_i + v_0) + \varepsilon_{iNS}^J \quad (6')$$

Following the same steps as in the basic model we obtain for example an equation that determines the factors that affect the relative probability of attending Catholic rather than public schooling

$$\frac{\pi_{CS}^J}{\pi_G^J} = \frac{\exp(V_{CS}^J)}{\exp(V_G^J)} = \frac{\alpha^\alpha \cdot (1 - \alpha)^{1-\alpha} \cdot \exp(R_{CS}^J) \cdot \exp(\beta_{CS}^J \cdot z_i) \cdot (y_i + v)}{[p_{CS} \cdot \bar{x}]^{1-\alpha} \cdot y_i^\alpha}, \quad (8A')$$

Differentiating π_{CS}^J / π_G^J with respect to the amount of the voucher we obtain:

$$\frac{\partial(\pi_{CS}^J / \pi_G^J)}{\partial v} = \frac{\alpha^\alpha \cdot (1 - \alpha)^{1-\alpha} \cdot \exp(R_{CS}^J) \cdot \exp(\beta_{CS}^J \cdot z_i)}{[p_{CS} \cdot \bar{x}]^{1-\alpha} \cdot y_i^\alpha} = \frac{\pi_{CS}^J}{\pi_G^J \cdot (y_i + v)} \quad (19)$$

This result implies that the impact of a voucher program on the relative probabilities of attending Catholic rather than public schooling is larger among households with originally higher probability of attending Catholic schools.

In order to check whether a voucher program is expected to have a different effect on households with different religiosity levels we differentiate equation (19) with respect to z_i and obtain

$$\frac{\partial(\pi_{CS}^J / \pi_G^J)}{\partial v \partial z_i} = \frac{\alpha^\alpha \cdot (1 - \alpha)^{1-\alpha} \cdot \exp(R_{CS}^J) \cdot \exp(\beta_{CS}^J \cdot z_i) \cdot \beta_{CS}^J}{[p_{CS} \cdot \bar{x}]^{1-\alpha} \cdot y_i^\alpha} = \frac{\pi_{CS}^J \cdot \beta_{CS}^J}{\pi_G^J \cdot (y_i + v)} > 0$$

That is, a voucher program is expected to have a larger effect on households who are more religious. Furthermore, the effect of religiosity on the probability of attending Catholic rather than public schooling estimated from the basic model without vouchers, β_{CS}^J , also reflects how much stronger the effect becomes of a given voucher on the probability of attending Catholic rather than public schooling as religiosity level increases. Of course, similar patterns exist also with respect to Protestant schooling and non-sectarian private schooling.

VII. Discussion

One of the key results in this study is that both religion and religiosity have important effects on the demand for private schools. If religiosity is not taken into account, the measurement of the effect of religion is seriously biased. Further, the effects of religion and religiosity vary depending upon the type of private school in question. It was shown that Catholic religiosity increases the demand for Catholic schools and has no effect on the demand for other types of private schooling. Fundamentalist Protestant religiosity increases the demand for Protestant schools and has no effect on the demand for other types of private schooling. Non-fundamentalist Protestant religiosity increases the demand for non-sectarian private schools and has no effect on the demand for other types of private schooling. It was also shown that households with no religion were more likely to choose non-sectarian private schools for their children. These results suggest that religiosity is a key factor that affects who attends private schools and who might

respond to voucher initiatives. The latter point is supported by related research (Campbell, West, and Peterson, 2005).

Other aspects of religion also bear upon who goes to private schools. It was shown that the share of Catholics in the population has a concave effect on the likelihood of attending Catholic schools. Further, it was shown that African-Americans, a disproportionately Protestant group, were more likely to attend Catholic schools and less likely to attend Protestant schools. One of the probable reasons for the Catholic result is that Catholic schools have been more open to minority students relative to other private schools (see Coleman, Hoffer, and Kilgore, 1982). The most recent data puts the minority share in Catholic education at 27.1% in the United States (McDonald, 2005). In big cities like Chicago, the minority share is higher—37% in the Chicago Archdiocese. Of the blacks in Chicago Catholic schools, three out of four are not Catholic (Office of Catholic Schools, 2006). This would also help to explain our result that a larger black population results in more “flight” to Protestant schools and non-sectarian private schools than it does to Catholic schools.

Another result of interest is that a more favorable family background in terms of income and parents’ education is positively associated with the probability that children attend non-sectarian private schools. These factors were less associated with the demand for Catholic and Protestant schools. One reason for this in the case of Catholic schools is that they are subsidized. However, recent data indicate that declines in subsidies and increases in costs are resulting in a decline in the ability of Catholic schools to support students from modest economic backgrounds (Sander, 2005).

In summary, this paper contributes to a better understanding of the demand for private schooling, which is necessary in order to analyze how policy programs might affect school choice. It distinguishes between different types of private schooling and shows that households tend to send their children to private schools belonging to their denomination. Our main finding that religiosity has a strong and significant effect on the demand for private schooling implies that previous studies on Catholic/private schooling effects have tended to overestimate the positive influence of Catholic (private) schooling. The reason for this is that the effects of Catholic and other religious schooling are confounded with the effects of religiosity.

Although this paper adds to our knowledge about private schooling, more work on this topic is warranted. As noted above, more attention could be given to the possibly endogeneous relationship between parents' church attendance and private schooling. Other measures of religiosity might be tried including contributions, religious beliefs, and so on. Finally, more attention could be given to differences for more types of religious schools like Lutheran schools, Christian schools, Jewish schools, and so on.

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Table 1
Summary Statistics

Variable	Mean	Standard Deviation
Private School	12.9%	33.5
Catholic School	7.1%	25.7
Protestant School	3.1%	17.3
Non-Sectarian School	2.7%	16.2
Income 1	7.5%	26.4
Income 2	13.2%	33.8
Income 3	9.7%	29.6
Income 4	17.6%	38.1
Income 5	16.2%	36.8
Income 6	12.7%	33.3
Income 7	3.9%	19.3
Income Missing	8.3%	27.6
College Graduate	21.0%	40.8
Some College	26.3%	44.0
High School Dropout	19.9%	39.9
Age	51.7 years	15.4
African-American	17.0%	37.6
Hispanic	5.3%	22.4
Catholic	23.5%	42.4
Fundamentalist Protestant	32.8%	47.0
Other Protestant	27.6%	44.7
Other Religion	2.6%	0.16
No Religion	10.1%	30.1
Attend x Catholic	95.7	215
Attend x Fundamentalist	151.9	268
Attend x Other Protestant	107.5	221
East	19.7%	40.0
West	17.6%	38.1
North	24.8%	43.2
Central City	22.1%	41.5
Density (1000s)	0.59/square mile	0.67
Catholics	20.8%	14.4
African-Americans	13.1%	11.9
Hispanics	10.3%	11.5
N	2,447	

Table 2
Distribution of Attendance at Religious Services by Religion

Attendance	All	Catholic	Fundamentalist Protestant	Non-Fundamentalist Protestant
Never	18.2%	13.2%	10.6%	14.5%
Less Than Once/Year	7.7%	7.7%	7.2%	7.8%
Once or Twice/Year	10.7%	13.2%	8.5%	11.2%
Several Times/Year	12.4%	12.9%	11.3%	13.6%
Once/Month	7.2%	6.6%	7.7%	8.7%
Two or Three Times/Month	8.9%	8.0%	9.3%	12.0%
Nearly Weekly	6.0%	4.9%	7.2%	8.1%
Weekly	19.9%	29.4%	20.9%	17.3%
More Than Once/Week	9.1%	4.2%	17.2%	6.7%
All	100%	100%	100%	100%

Table 3
Distribution of Attendance at Religious Services by School Type

Attendance	Catholic	Protestant	Public	Non-sectarian
Never	7.5%	7.9%	19.4%	18.2%
Less Than Once/Year	2.9%	3.9%	8.4%	3.0%
Once or Twice/Year	5.7%	5.3%	11.5%	4.5%
Several Times/Year	10.9%	14.5%	12.4%	12.1%
Once/Month	3.4%	5.3%	7.4%	13.6%
Two or Three Times/Month	6.9%	7.9%	9.1%	9.1%
Nearly Weekly	8.0%	7.9%	5.8%	7.6%
Weekly	43.1%	27.6%	17.8%	16.7%
More Than Once/Week	11.5%	19.7%	8.4%	15.2%
All	100%	100%	100%	100%

Table 4
Probit Estimate of Private School Attendance

Variable	Coefficient	Standard Error	Marginal Effect
Catholic	.04	.18	.01
Fundamentalist	.07	.18	.01
Other Religion	.04	.24	.01
No Religion	.20	.17	.04
Attend x Catholic	.16***	.02	.03
Attend x Fundamentalist	.06***	.024	.01
Attend x Nonfundamentalist	.03	.02	.005
Income 1	-.55***	.19	-.07
Income 2	-.45***	.15	-.07
Income 3	-.28*	.15	-.04
Income 4	-.20	.13	-.03
Income 5	-.18	.13	-.03
Income 6	-.18	.13	-.03
Income 7	-.12	.18	-.02
Income Missing	-.26*	.15	-.04
College Graduate	.32***	.10	.06
Some College	.28***	.09	.05
High School Dropout	-.29**	.12	-.05
Age	.007***	.002	.001
African-American	-.09	.11	-.02
Hispanic	-.08	.17	-.01
East	.01	.16	.002
West	-0.04	0.13	-0.007
North	.03	.13	.005
Density	.06	.08	.01
%Catholic	.02	.01	.003
% Catholic Squared	-.00027	.00019	-.00005
% African-American	.011***	.004	.002
% Hispanic	-.006	.005	-.001
Central City	.26***	.09	.05
Constant	-2.11		
N	2,447		

*Significant at the 10% level.

**Significant at the 5% level.

***Significant at the 1% level

Table 5
Multinomial Logit Estimate of Catholic, Protestant, and Non-Sectarian School
Attendance with Religiosity

	<u>Catholic</u>		<u>Protestant</u>		<u>Non-Sectarian</u>	
	Coefficient	Standard	Coefficient	Standard	Coefficient	Standard
Catholic	.80*	.46	-.79	.98	-.02	1.1
Fundamentalist	-.69	.67	.38	.54	.69	.77
Other Religion	-.89	1.08	-0.63	1.09	1.25*	0.73
No Religion	-.01	.55	-.48	.63	1.65***	.60
Attend x Catholic	.32***	.05	-.17	.25	.03	.18
Attend x Fundamentalist	.13	.09	.13**	.06	.11	.09
Attend x Nonfundamentalist	-.01	.08	.02	.09	.19**	.09
Income 1	-.94*	.53	-.68	.72	-2.03*	1.09
Income 2	-.64*	.38	-1.38**	.70	-.93*	.54
Income 3	-.33	.39	-.52	.56	-.96*	.55
Income 4	-.35	.35	.06	.44	-.95**	.44
Income 5	.19	.32	-.44	.48	-1.21**	.48
Income 6	-.42	.37	.20	.44	-1.00**	.43
Income 7	-.08	.45	-.64	.81	-.30	.54
Income Missing	-.18	.36	-.73	.70	-1.14*	.59
College Graduate	.16	.26	.56	.35	1.43***	.38
Some College	.68***	.23	.50	.32	.39	.42
High School Dropout	-.81***	.33	.06	.44	-.73	.61
Age	.03***	.01	-.018*	.009	.01	.01
African-American	.77***	.29	-1.06***	.41	-.44	.43
Hispanic	.03	.35	-.77	1.06	-.90	1.07
West	-.22	.37	-.39	.48	.49	.47
East	.35	.43	-.81	.72	-.35	.63
North	.20	.35	.30	.40	-.70	.55
Density	.03	.19	.12	.34	.46	.30
%Catholic	.06**	.03	.06	.04	-.06	.04
% Catholic Squared	-.001**	.0005	-.001	.001	.0011	.0007
% African- American	.011	.013	.026**	.011	.028**	.01
% Hispanic	-.009	.01	-.003	.02	-.01	.02
Central City	.71***	.23	.06	.34	.55*	.31
Constant	-6.3		-3.5		-4.8	
N	2,447					

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

Note: The estimates are relative to public school attendance.

Table 6
Multinomial Logit Estimate of Catholic and Protestant schooling relative to Public schooling, with and without non-sectarian schooling

	With non-sectarian alternative				Without non-sectarian alternative			
	Catholic		Protestant		Catholic		Protestant	
	Coeff.	StD	Coeff.	StD	Coeff.	StD	Coe	StD
Catholic	.80	.46	-.79	.98	0.80	0.46	-.79	.98
Fundamentalist	-.69	.67	.38	.54	-0.70	0.67	.37	.54
Other Religion	-.89	1.0	-0.63	1.09	-0.91	1.1	-0.65	1.09
No Religion	-.01	.55	-.48	.63	-0.01	0.55	-.47	.63
Attend x Catholic	.32	.05	-.17	.25	0.32	0.05	-.17	.25
Attend x Funda	.13	.09	.13	.06	0.13	0.09	.14	.06
Attend x nfunda	-.01	.08	.02	.09	-0.01	0.08	.01	.09
Income 1	-.94	.53	-.68	.72	-0.94	0.53	-.69	.72
Income 2	-.64	.38	-1.38	.70	-0.63	0.38	-1.38	.70
Income 3	-.33	.39	-.52	.56	-.34	.39	-.53	.57
Income 4	-.35	.35	.06	.44	-.36	.35	.09	.44
Income 5	.19	.32	-.44	.48	.18	.32	-.46	.48
Income 6	-.42	.37	.20	.44	-.40	.38	.21	.44
Income 7	-.08	.45	-.64	.81	-.10	.45	-.63	.81
Income Missing	-.18	.36	-.73	.70	-.19	.36	-.73	.70
College Graduate	.16	.26	.56	.35	.15	.26	.56	.35
Some College	.68	.23	.50	.32	.67	.23	.50	.32
High School Dropout	-.81	.33	.06	.44	-.82	.33	.07	.44
Age	.03	.01	-.018	.009	.03	.01	-.018	.009
African-American	.77	.29	-1.06	.41	.77	.29	-1.07	.41
Hispanic	.03	.35	-.77	1.06	.03	.35	-.79	1.06
West	-.22	.37	-.39	.48	-.20	.37	-.39	.48
East	.35	.43	-.81	.72	.34	.43	-.84	.72
North	.20	.35	.30	.40	.19	.35	.28	.40
Density	.03	.19	.12	.34	.02	.19	.12	.34
%Catholic	.06	.03	.06	.04	.06	.03	.06	.04
% Catholic Squared	-.001	.00	-.001	.001	-.001	.0005	-.001	.001
% African-American	.011	.01	.026	.011	.011	.013	.026	.011
% Hispanic	-.009	.01	-.003	.02	-.009	.01	-.004	.02
Central City	.71	.23	.06	.34	.71	.23	.07	.34
Constant	-6.3		-3.5		-6.3		-3.4	
N	2,447				2,447			

Note: The estimates are relative to public school attendance.

Table 7
Marginal effects on the probabilities to attend each type of schooling for the multinomial
Logit and Probit regressions

	Catholic		Protestant		Public		Non-sectarian	
	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT
Catholic	3.2	3.1	-1.0	-1.1	-2.1	-1.8	-0.05	-0.2
Fundamentalist	-2.0	-2.0	0.6	0.6	0.4	-0.2	1.0	1.6
Other Religion	-2.0	-2.2	-0.7	-0.9	-0.3	-1.2	3.0	4.2
No Religion	-0.1	-0.2	-0.7	-0.8	-3.5	-4.3	4.3	5.3*
Attend x Catholic	1.0***	1.5***	-0.3	-0.3	-0.8*	-1.3***	0.03	0.1
Attend x Funda	0.4	0.4	0.2*	0.2*	-0.7**	-0.8**	0.1	0.1
Attend x nfunda	-0.05	-0.09	0.02	0.00	-0.2	-0.2	0.2**	0.3**
Income 1	-2.0**	-2.4**	-0.8	-0.9	4.1***	4.6***	-1.3***	-1.4***
Income 2	-1.6**	-1.8	-1.3***	-1.6***	3.7***	4.3***	-0.8**	-1.0**
Income 3	-0.9*	-0.8	-0.6	-0.8	2.3**	2.6	-0.8**	-1.0**
Income 4	-1.0	-1.1	0.1	0.09	1.7	2.1	-0.9**	-1.1***
Income 5	0.7	0.9	-0.6	-0.8	1.0	1.1	-1.0***	-1.3***
Income 6	-1.1	-1.4	0.4	0.5	1.6	2.0	-0.9***	-1.1***
Income 7	-0.2	0.4	-0.7	-0.8	1.2	1.0	-0.3	-0.5
Income Missing	-0.5*	-0.2	-0.8	-1.0	2.2*	2.3	-0.9***	-1.1***
College Graduate	0.4	0.3	0.9	1.5	-4.1***	-5.2***	2.8**	3.5***
Some College	2.4**	3.0**	0.8	1.0	-3.7***	-4.5***	0.5	0.5
High School Dropout	-2.1***	-2.8***	0.1	0.4	2.6**	3.1**	-0.7	-0.7
Age	0.1***	0.1***	-0.03**	-0.04**	-0.09***	-0.09***	0.01	0.02
African-American	3.2**	3.5**	-1.2***	-1.5***	-1.5	-1.3	-0.5	-0.6
Hispanic	0.2	0.1	-0.8	-1.1	1.5	2.00.	-0.8	-1.1
West	-0.6	-0.6	-0.5	-0.8	0.4	0.4	0.7	-1.0
East	1.3	1.4	-1.0	-1.1	0.1	0.2	-0.4	-0.4
North	0.7	0.6	0.5	0.5	-0.4	-0.2	-0.8	-0.9
Density	0.07	0.2	0.2	-0.06	-0.8	-1.0	0.6	0.9*
% Catholic	0.2**	0.2*	0.09	0.1	-0.2*	-0.3	-0.08	-0.1
% Catholic Squared	-0.00**	-0.00**	-0.00	-0.00	0.00*	0.00*	0.00*	0.00*
% African-American	0.03	0.05	0.04**	0.05**	-0.1**	-0.1**	0.03**	0.04*
% Hispanic	-0.03	-0.05	-0.00	-0.00	0.05	0.07	-0.02	-0.02
Central City	2.7**	3.2**	0.04	-0.03	-3.4***	-3.9**	0.8	0.8
N	2,447							

*Significant at the 10% level.

**Significant at the 5% level.

***Significant at the 1% level.

Note: Marginal effects of multinomial probits and logits multiplied by 100.

Table 8
Multinomial Logit Estimate of Catholic and Protestant School Attendance without
Religiosity

	<u>Catholic</u>		<u>Protestant</u>		<u>Non-Sectarian</u>	
	Coefficient	Standard	Coefficient	Standard	Coefficient	Standard
Catholic	2.43***	.26	-1.36**	.64	-.70	.53
Fundamentalist	.06	.32	1.01***	.29	.42	.34
Other Religion	-0.80	1.04	-0.69	1.05	0.44	0.76
No Religion	.11	.47	-.51	.57	.84**	.40
Income 1	-.97*	.52	-.74	.72	-2.10*	1.08
Income 2	-.59	.37	-1.44**	.70	-.98*	.54
Income 3	-.35	.38	-.53	.56	-.96*	.54
Income 4	-.41	.34	.04	.44	-.98**	.44
Income 5	.18	.31	-.44	.47	-1.2**	.48
Income 6	-.38	.36	.23	.44	-.97**	.43
Income 7	-.02	.44	-.64	.81	-.27	.54
Income	-.003	.35	-.74	.70	-1.15*	.59
College Graduate	.31	.25	.65**	.34	1.53***	.38
Some College	.61***	.22	.53*	.32	.46	.42
High School Dropout	-1.08***	.32	.03	.44	-.78	.61
Age	.04***	.01	-.016*	.009	.013	.01
African-American	.90***	.29	-0.99***	.41	-.35	.43
Hispanic	.12	.34	-.70	1.1	-.79	1.1
West	-0.18	.36	-.42	.48	.43	.47
East	.40	.42	-.83	.72	-.27	.62
North	.28	.34	.30	.40	-.65	.54
Density	-.10	.18	.09	.34	.42	.30
% Catholic	.06*	.03	.06	.04	-.07	.04
% Catholic Squared	-.001**	.0005	-.001	.001	.0013*	.0007
% African-American	.012	.013	.027**	.012	.028**	.013
% Hispanic	-.007	.01	-.002	.02	-.012	.02
Central City	.59***	.22	.06	.34	.55*	.31
Constant	-6.5		-3.6		-4.0	
N	2,447					

*Significant at the 10% level.

**Significant at the 5% level.

***Significant at the 1% level.

Note: The estimates are relative to public school attendance.

Table 9
 Predicted Probabilities of Type of School for Catholics by Church Attendance

Attendance	Catholic School		Protestant School		Non-Sectarian Private School		Public School	
	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT
Never	8.4%	7.8%	3.5%	4.0%	.3%	0.1%	87.8%	88.1%
Less Than Once/Year	11.3%	10.8%	2.9%	3.4%	.3%	0.1%	85.5%	85.7%
Once or Twice/Year	15.0%	14.6%	2.3%	2.7%	.3%	0.1%	82.4%	82.6%
Several Times/Year	19.5%	19.2%	1.9%	2.1%	.3%	0.1%	78.3%	78.6%
Once/Month	25.1%	24.4%	1.5%	1.6%	.3%	0.1%	73.2%	73.8%
Two or Three Times/Month	31.6%	30.4%	1.2%	1.2%	.2%	0.1%	67.1%	68.3%
Nearly Weekly	38.8%	36.9%	.9%	0.8%	.2%	0.1%	60.1%	62.2%
Weekly	46.6%	43.7%	.6%	0.6%	.2%	0.1%	52.5%	55.7%
More Than Once/Week	54.6%	50.7%	.5%	0.4%	.2%	0.1%	44.8%	48.9%

Table 10
 Predicted Probabilities of Type of School for Protestant Fundamentalists by Church Attendance

Attendance	Catholic School		Protestant School		Non-Sectarian Private School		Public School	
	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT
Never	1.9%	2.1%	11.1%	10.0%	.5%	0.4%	86.5%	87.6%
Less Than Once/Year	2.1%	2.3%	12.5%	11.1%	.5%	0.4%	84.9%	86.2%
Once or Twice/Year	2.3%	2.5%	14.0%	12.4%	.6%	0.5%	83.1%	84.7%
Several Times/Year	2.6%	2.7%	15.6%	13.7%	.7%	0.5%	81.1%	83.1%
Once/Month	2.8%	2.9%	17.4%	15.1%	.8%	0.6%	79.0%	81.5%
Two or Three Times/Month	3.1%	3.1%	19.3%	16.5%	.8%	0.7%	76.7%	79.7%
Nearly Weekly	3.4%	3.4%	21.4%	18.1%	.9%	0.7%	74.3%	77.8%
Weekly	3.8%	3.6%	23.6%	19.8%	1.0%	0.8%	71.7%	75.8%
More Than Once/Week	4.1%	3.9%	26.0%	21.5%	1.0%	0.8%	68.9%	73.8%

Table 11
 Predicated Probability of Type of School for Black Protestant Fundamentalists by Church
 Attendance

Attendance	Catholic School		Protestant School		Non-Sectarian Private School		Public School	
	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT	LOGIT	PROBIT
Never	4.3%	5.1%	4.1%	3.9%	.4%	0.3%	91.3%	90.8%
Less Than Once/Year	4.8%	5.5%	4.6%	4.4%	.4%	0.3%	90.2%	89.8%
Once or Twice/Year	5.4%	6.0%	5.2%	5.0%	.4%	0.3%	89.0%	88.7%
Several Times/Year	6.0%	6.5%	5.9%	5.6%	.5%	0.4%	87.6%	87.5%
Once/Month	6.7%	7.1%	6.6%	6.3%	.5%	0.4%	86.2%	86.2%
Two or Three Times/Month	7.5%	7.7%	7.4%	7.1%	.6%	0.4%	84.6%	84.8%
Nearly Weekly	8.3%	8.3%	8.3%	7.9%	.6%	0.5%	82.8%	83.3%
Weekly	9.2%	8.9%	9.3%	8.8%	.7%	0.5%	80.9%	81.8%
More Than Once/Week	10.1%	9.5%	10.3%	9.8%	.8%	0.6%	78.8%	80.1%