RELIGIOUS PLURALISM, RELIGIOUS MARKET SHARES AND THE DEMAND FOR RELIGIOUS SCHOOLING

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Religious Pluralism, Religious Market Shares and the Demand for Religious Schooling*

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Abstract

We develop a model of school choice in which the demand for religious schooling is driven partly by the desire of parents to limit their children's exposure to the influences of competing religions. This framework links the literature on the effects of religious market shares on the within-denomination intensity of religious activity with a separate literature relating religious pluralism to the overall level of religious participation. The model predicts that when a religious group's share of the local population grows, the fraction of that group's members whose children attend religious schools decreases. In addition, it implies that the overall demand for religious schooling is a positive function of both the local religiosity level and the level of religious pluralism, as measured by a Herfindahl Index. Using both U.S. county-level data and individual data from ECLS-K and NELS:88, we find evidence strongly consistent with the model's predictions. Our findings also illustrate that failing to control for the local religiosity level in estimating the effect of religious pluralism on religious participation, as is common in previous studies, may lead a researcher to erroneously conclude that pluralism has a negative effect on participation.

Keywords: Religious participation, school choice, religious pluralism
JEL Codes: I21, Z12

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1. Introduction

A large literature in economics and the sociology of religion examines the relationship between religious market share – the proportion of people in a geographical area who belong to a given denomination – and religious participation within that denomination. Most studies find that religious participation is negatively related to market share. For example, Bisin and Vardier (2000) present evidence that, compared to cultural majorities, minority groups exercise greater efforts to prevent their children from "marrying out". Similarly, Bisin et al. (2004) estimate a structural model of marriage and child socialization in the United States, finding that "as a group grows towards being a majority, marriage segregation and socialization efforts become decreasing in the group's population share" (p. 618). Iannaccone (1991) finds that among seventeen Western countries, religious commitment among Protestants decreases as the Protestant share in the population grows.[1] However, some authors find a positive association between within-denomination participation and market share; for example, Phillips (1998) finds greater rates of Church activity among Mormons in areas with large Mormon market shares.

A related debate among sociologists focuses on the effects of religious pluralism on religious participation. Traditionally, sociologists (cf. Berger, 1969) have argued that an increase in religious pluralism decreases participation since it undermines the plausibility of belief, causing religion to lose its power as an absolute truth. On the other hand, "rational choice" theories of religious competition suggest that pluralism increases overall religious participation by fostering competition, which makes each religious group work harder to attract adherents

[1] Along similar lines, Abramitzky et al. (2010) find that American Jews are more likely to celebrate Hanukkah if they live in areas with relatively low Jewish market shares, suggesting that one role for the celebration of religious holidays is to counteract the effects of outside religious influences. Among sociologists, Stark (1992) shows that among forty-five traditionally Christian countries, the Catholic share varies inversely with the ratio of priests to parishioners, and Stark and McCann (1993) find that Catholic commitment is inversely related to the proportion of Catholics in the population. Zalenski and Zech (1995) find that both Catholics and Mainline Protestants have higher rates of financial giving in areas where they are a small proportion of the population.

(Finke and Stark, 1988, 1989, 2002). In addition, religious pluralism may increase religious participation by expanding an individual's religious choice set, thereby increasing the likelihood of becoming involved in at least one religious group.

A large number of empirical studies have explored these issues. In an overview of the literature, Chaves and Gorski (2001) found 193 separate tests of the relationship between pluralism and participation. These studies typically measure pluralism by a Herfindahl index of the market shares of the different denominations in the local population, and participation is defined as the fraction of the population who are religious adherents (regardless of denomination). Some of these studies find a positive association between pluralism and participation (Hamberg and Pettersson, 1994; Finke, Guest, and Stark, 1996; North and Staha, 2004) while others find a negative association (Breault, 1989a, 1989b; Bruce, 1992; Chaves and Cann, 1992; Olson, 1999; Borgonovi, 2008). However, a seminal paper by Voas et al. (2002) argues that the majority of these estimates, both positive and negative, capture nothing more than spurious correlations between pluralism and participation. Specifically, participation rates and pluralism are mechanically correlated when they are measured using the same membership data (Hungerman, 2010). Moreover, Hungerman (2010) also notes that the relationship between participation and pluralism is not grounded in any formal economic theory of participation.

In this paper, we develop a model of school choice that connects the literature on the relationship between pluralism and participation to the literature on the effects of religious market share on within-denomination participation. The model explicitly incorporates the role of education in preserving religious identity.[2] It also incorporates multiple denominations,

[2] As such, we extend previous studies of school choice that abstract from the religious motive in private education by modeling the demand for private schooling as motivated by differences in desired school quality (see Rangazas, 1995, and Epple and Romano, 1996, among others). Religious content and scholastic achievement are not contradictory goals, and evidence has shown that scholastic achievement in religious schools is greater than in

extending Cohen-Zada's (2006) framework that allowed for only two types of households (religious and non-religious) and three types of schools (public, private secular and private religious).

We posit that parents' decisions to send their children to religious schools reflect a desire to preserve their religious identity by shielding their children from the outside influences of competing religions. An important implication of this desire is that a child's likelihood of attending a religious school declines as his denomination's share of the local population grows, i.e., as the strength of competing influences in public schools diminishes. Consequently, the fraction of *all* children who attend a given denomination's schools is a concave function of that denomination's share in the population. Additionally, under some weak regularity conditions, the fraction of children who attend any denomination of religious schooling is a positive function of both the share of the population that are adherents of any denomination and the denominational diversity of these adherents, as measured by a Herfindahl index. This result implies that empirical researchers, at a minimum, must control for the share of the population that are church adherents when estimating the effects of religious pluralism on measures of religious activity.

We then use aggregate county-level data and individual survey data from the National Educational Longitudinal Study of 1988 (NELS:88) and the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K) to test the predictions of our model. We have four main substantive findings. First, in agreement with the model's predictions, the fraction of Catholics who attend Catholic schools is inversely related to the share of Catholics in the population. A similar pattern holds among both Mainline and Evangelical Protestants. These relationships are stronger in elementary schooling than in secondary schooling, as one might expect if the

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public schools (see, e.g., Sander and Krautmann, 1995; Evans and Schwab, 1995; Sander, 1996, 1997, 1999; and Jepsen, 2003).

preservation of religious identity is an especially important concern for the parents of young children. Second, we find evidence that the fraction of *all* students who attend schools of a specific denomination is a concave function of the market share of that denomination, particularly for Catholics and Evangelicals. Third, we find that religious pluralism increases religious school attendance, as predicted by "rational choice" models of religious competition. Finally, we show that failing to control for the market share of each denomination may lead a researcher to mistakenly conclude that religious pluralism has a negative effect on religious activity.

2. A Model of Religious and Secular School Choice

2.1. Market Shares and Religious Identity

Consider an economy with a fixed population of households of measure one, with each household comprising one parent and one child. Households differ in their after-tax income level, y, and in their religious denomination, j. The parent of each household belongs to one of n+1 groups indexed by $j \in \{0,\ldots, n\}$, such that $\sum_{j=0}^{n} r_j = 1,$ where r_j is the fraction of the population that belongs to group j. Groups 1,…, n are organized religious groups – we will refer to them as denominations – and group 0 includes non-religious persons. For simplicity, we assume that each parent belongs to only one denomination. We also assume that the distribution of after-tax income is identical in all groups, and we denote its cumulative density function by F and its mean by $\bar{y}$.

Households derive utility from a numeraire consumption good, c; from the quality of their children's education, x, as measured by per-pupil spending (the quantity of education is the same for all households); and from the probability that their children will remain in their denomination when becoming adults, z. The utility function is given by

(1) $$U(c, x, z) = \alpha c^{\delta} / \delta + (1-\alpha) x^{\delta} / \delta + \gamma z^{\delta} / \delta.$$

Public education is available free of charge to all households at an exogenous uniform quality $\overline{x}$.[3] Private schooling, both secular and religious, can be purchased from a competitively-priced private sector at any desired quality.[4] There are n+2 types of schools, where school type is indexed by s: types $s = 0,\ldots, n$ are private schools corresponding to the different groups in the population (so that $s = 0$ represents private non-sectarian schools and $s = 1,\ldots, n$ represent denominations of religious private schools), and type $s = g$ represents public schools.

The probability that a child from denomination j' belongs to denomination j as an adult is given by the following transition matrix:

(2) $$T_{j',j}(s, r_j) = \begin{pmatrix} \omega + (1-\omega) \times e_j(s, r_j) & , \ j = j' \\ (1-\omega) \times e_j(s, r_j) & , \ j \neq j' \end{pmatrix},$$

where $e_j(s, r_j)$ denotes the impact of the school and neighborhood environments and ω represents the relative impact of the home environment ($0 < \omega < 1$). We assume that if a child attends religious school of type $s \in \{1,\ldots, n\}$ they become strongly linked to the denomination of that school, which insulates them from peer influences of other groups. In this case, the environment effect $e_j(s, r_j)$ equals one for $j = s$ and equals zero for all $j \neq s$. If a child instead attends a secular school (either public or private), the school has no effect on preferences for any specific denomination, so the environment effect equals the share of each group in the local

[3] By holding $\overline{x}$ and after-tax incomes fixed, we abstract from the effect of private school attendance on public school expenditure.

[4] This assumption neglects the fixed costs of education, which might limit quality choice in smaller communities. We also abstract from the possibility of privately supplementing public education.

population: $e_j(s, r_j) = r_j$. Formally, the effect of the school and neighborhood environments on the probability of belonging to each group *j* equals

$$(3) \qquad e_j(s, r_j) = \begin{pmatrix} 1 & \text{if } s = j \text{ and } s \neq 0 \\ r_j & \text{if } s \in \{0, g\} \\ 0 & \text{otherwise} \end{pmatrix}.$$

Because $\sum_{j=1}^{n} e_j(s, r_j) = 1$, the sum of the group-membership probabilities across all possible groups is $\sum_{j=1}^{n} T_{j',j}(s, r_j) = 1$.

From (2) and (3), the probability *z* that a religious child in group $j \in \{1,\ldots, n\}$ who attends a secular school will remain in that group equals $\omega + (1-\omega) \times r_j$. If the child instead attends a religious school of the household's denomination $s = j$, then $z = 1$. Finally, if the child attends a religious school of a different denomination $s \neq j$, then $z = \omega$. Table 1 summarizes these probabilities, as well as the analogous transition probabilities for children from non-religious households.

Given the assumption that all types of private schooling are available at any desired quality, each household prefers sending its child to a religious school of its denomination to sending her to a religious school of any other denomination. Put another way, a central motivation for parents to opt for religious schooling is to preserve their children's religious identity. This motivation may be quite strong, as a vast literature argues that "religious and ethnic traits are usually adopted in the early formative years of children's psychology" (Bisin and Verdier, 2000). It is also grounded in an extensive literature on religious choice, which shows that religion-specific capital formation plays a key role in determining adherence to a particular religious group (Greeley, 1989; Iannaccone, 1984, 1991, 1998; Chiswick, 1990; Durkin and

Greeley, 1991). Furthermore, since most religious capital is group-specific, adults generally adopt the religious values of the denomination to which they were exposed in their childhood (Iannaccone, 1990).

As expression (3) shows, the population share of group j, r_j, is positively related to the probability that a publicly-educated child from that group remains in the group as an adult. Thus, parents have a weaker motivation to incur the added expense of sending their children to private religious schools as their religion's market share increases. In the limiting case in which the entire population belongs to the same group, parents have no religious motivation to enroll their children in a religious school, regardless of the strength of their preferences.

2.2 School choice

2.21 School choice among secular households

We next consider how secular households (those in group $j = 0$) choose between public, private secular, and private religious schooling to maximize their utility. A household i that chooses public education receives free schooling of quality $\bar{x}$. Therefore, it spends all its after-tax income on consumption, so that $c_i = y_i$. Equation (1) then implies that the utility of a secular household whose child attends public school equals

$$(4) \qquad V_{0g}(\bar{x}, r_0, \omega, y) = \alpha y^{\delta}/\delta + (1-\alpha)\bar{x}^{\delta}/\delta + \gamma[\omega + (1-\omega) r_0]^{\delta}/\delta .$$

Given the assumption that private non-religious schooling is available at any desired quality, a non-religious household will always prefer a secular private school to a religious one. Denoting by p the cost per student of a unit of quality, a non-religious household that sends its child to a secular private school solves

$$\text{Max}_{c,x}\, U(c, x) = \alpha c^{\delta}/\delta + (1-\alpha)x^{\delta}/\delta + \gamma[\omega + (1-\omega) r_0]^{\delta}/\delta$$

s.t. $c + px = y$

and has indirect utility

(5) $V_{00}(r_0, \omega, y) = g_0(\alpha, p, \delta)\, y^{\delta}/\delta + \gamma\,[\omega + (1-\omega)\, r_0]^{\delta}/\delta$,

where

(6)
$$g_0(\alpha, \delta, p) = \frac{\alpha\left(\frac{1-\alpha}{\alpha p}\right)^{\frac{\delta}{\delta-1}} + (1-\alpha)}{\left[\left(\frac{1-\alpha}{\alpha p}\right)^{\frac{1}{\delta-1}} + p\right]^{\delta}}$$
$$= (1-\alpha) \times \left[\left(\alpha/(1-\alpha)\right)^{\frac{1}{1-\delta}} \times p^{\frac{\delta}{1-\delta}} + 1\right]^{1-\delta} p^{-\delta}.$$

Because opting out from public to secular private education does not change the probability that a child remains in the household's religious group, the only motivation for doing so is to obtain a higher quality of education. Therefore, as education quality is a normal good, the non-religious households that opt out of public schooling will be those with higher incomes. A comparison of (4) and (5) shows that for a given public education quality $\bar{x}$, either all non-religious households prefer public education, or there exists a threshold income level

(7) $y_0(\bar{x}) = g_1(\alpha, \delta, p)\,\bar{x}$,

where $g_1(\alpha, \delta, p) = \left(\frac{1-\alpha}{g_0 - \alpha}\right)^{\frac{1}{\delta}}$, such that all non-religious households with incomes below y_0 send their children to public schools and all those with incomes above y_0 send their children to secular private schools. The share of non-religious households whose children attend secular private schools is then

(8) $\theta_0 = 1 - F(y_0(\bar{x}))$.

2.2.2 School choice among religious households

As in the derivation of (5) above, it is straightforward to show that a religious household whose child attends public school has indirect utility

(9) $V_{jg}(\bar{x}, r, \omega, y) = \alpha y^{\delta}/\delta + (1-\alpha)\bar{x}^{\delta}/\delta + \gamma[\omega + (1-\omega) r_j]^{\delta}/\delta$.

As noted above, a household of group *j* will always prefer a religious private school of its denomination to any other private school. A household of group *j* that sends its child to a religious private school of its denomination solves

$$\text{Max}_{c,x}\, U(c, x) = \alpha c^{\delta}/\delta + (1-\alpha)x^{\delta}/\delta + \gamma/\delta$$

$$\text{s.t.} \quad c + px = y$$

and has indirect utility

(10) $V_{jj}(y) = g_0(\alpha, p, \delta) y^{\delta}/\delta + \gamma/\delta$,

with g_0 defined as above in (6). Comparing (9) and (10), we find that for a given level of public school quality, either all households of group *j* prefer public education, or there exists a threshold income level

(11) $$y_j(\bar{x}, r_j, \omega) = \left\{ y_0(\bar{x})^{\delta} + \frac{\gamma}{g_0 - \alpha}\left[(\omega + (1-\omega) r_j)^{\delta} - 1\right] \right\}^{\frac{1}{\delta}},$$

such that all households of group *j* with incomes below y_j send their children to public school, and all those with incomes above y_j send their children to their denominational school. Thus, the share of households from group *j* who send their children to their denominational schools is

(12) $\theta_j = 1 - F(y_j(\bar{x}, r_j, \omega))$.

As we show in Proposition 1, θ_j is a decreasing function of the size of group *j* in the population.

Proposition 1. The share of households from group *j* whose children attend religious schools, θ_j, decreases with the share of group *j* in the local population, r_j.

Proof.

θ_j is given by (12) above, so that

$$\frac{\partial \theta_j(r_j)}{\partial r_j} = -F'(y_j(\bar{x}, r_j, \omega)) \frac{\partial y_j(\bar{x}, r_j, \omega)}{\partial r_j}$$

$$= -F'(y_j(\bar{x}, r_j, \omega)) y_j(\bar{x}, r_j, \omega)^{1-\delta} \frac{\gamma}{g_0 - \alpha} \left[\omega + (1-\omega) r_j\right]^{\delta-1} (1-\omega).$$

Note that $\left[\omega + (1-\omega) r_j\right]^{\delta-1}(1-\omega)$ is always positive because $0 < \omega < 1$ and $0 < r_j < 1$. From expression (7), $y_0(\bar{x}) = \left(\frac{1-\alpha}{g_0 - \alpha}\right)^{\frac{1}{\delta}} \bar{x}$, so $g_0 - \alpha = (1-\alpha)\left(\frac{\bar{x}}{y_0(\bar{x})}\right)^{\delta}$ which is positive because $\bar{x}$ and y_0 are positive and because $0 < \alpha < 1$. Because γ and $y_j(\bar{x}, r_j, \omega)$ are also positive, $\frac{\partial \theta_j(r_j)}{\partial r_j} < 0$.

Q.E.D.

Proposition 1 shows that as the share of group *j* in the population grows, outside influences from competing religions become less threatening, weakening parents' religious motivation for sending their children to their denominational schools. Consequently, a lower percentage of households from group *j* will opt to enroll their children in these schools.

Next, define the share of *all* children in the population that attend private religious schooling of type $s = j$ as q_j, where

(13) $\quad q_j = r_j \times \theta_j(r_j)$.

The market share of group *j* has two opposite effects on q_j. First, r_j directly and linearly increases q_j, so for a given share of parents from group *j* who send their children to religious

schooling, θ_j, there is a linear relationship between q_j and the share of group j in the population. On the other hand, Proposition 1 showed that θ_j decreases with r_j. As Proposition 2 shows, under the assumption that the elasticity of $\partial\theta_j(r_j)/\partial r_j$ with respect to r_j is greater than -2, these competing effects imply a concave effect of r_j on q_j.

Proposition 2. If the elasticity of $\partial\theta_j(r_j)/\partial r_j$ with respect to r_j is greater than -2, then the enrollment rate in denominational schools of type $s = j$, q_j, is a concave function of the size of group j in the population.

Proof.

From (13), $\frac{\partial^2 q_j}{\partial r_j^{\,2}} = 2\frac{\partial\theta_j(r_j)}{\partial r_j} + r\frac{\partial^2\theta_j(r_j)}{\partial r_j^{\,2}}$. Denote the elasticity of $\partial\theta_j(r_j)/\partial r_j$ with respect to r_j as $\sigma_{\theta r}$, where $\sigma_{\theta r} = \frac{\partial^2\theta_j(r_j)}{\partial r_j^{\,2}}\frac{r_j}{\partial\theta_j(r_j)/\partial r_j}$, so $\frac{\partial^2 q_j}{\partial r_j^{\,2}}$ can be written as $\frac{\partial^2 q_j}{\partial r_j^{\,2}} = (2+\sigma_{\theta r})\left[\frac{\partial\theta_j(r_j)}{\partial r_j}\right]$.

Because $\frac{d\theta_j(r_j)}{dr_j} < 0$ by Proposition 1, $\frac{\partial^2 q_j}{\partial r_j^{\,2}}$ is negative if and only if $\sigma_{\theta r} > -2$.

Further, note that $\lim_{r_j\to 0}\frac{\partial q_j}{\partial r_j} = \lim_{r_j\to 0}\left[\theta_j(r_j) + r_j\frac{\partial\theta_j(r_j)}{\partial r_j}\right] = \lim_{r_j\to 0}\theta_j(r_j) \geq 0$, where the second equality holds because $\frac{\partial\theta_j(r_j)}{\partial r_j}$ is finite as r_j approaches zero, as is evident based on Proposition 1. Because $\lim_{r_j\to 0}\frac{\partial q_j}{\partial r_j} \geq 0$ and $\frac{\partial^2 q_j}{\partial r_j^{\,2}} < 0$, q_j is a concave function of r_j.[5]

[5] The technical assumption that the elasticity of $\partial\theta_j(r_j)/\partial r_j$ with respect to r_j is greater than -2 is very likely to hold in practice. For example, it holds for every $\theta_j(r_j)$ that is linear, i.e., $\theta_j = a_0 - a_1 r_j$ (with $a_1 > 0$), which implies that $q_j = a_0 r_j - a_1 r_j^{\,2}$. In this case, it is straightforward to show that $\partial^2 q_j/\partial r_j^{\,2} = -2a_1 < 0$, so that q_j

Q.E.D.

Finally, we consider the implications of our model for the relationship between religious pluralism and the overall enrollment rate into religious schools. Assume that $\theta_j(r_j)$ can be written as a linear function of r_j:

(14) $\theta_j(r_j) = a_{0j} - a_{1j} r_j.$

Proposition 1 implies that a_{1j} is positive, with the subscript j reflecting that denominations may vary in their response to increased competition from other denominations. Similarly, q_j is a quadratic function of r_j:

(15) $q_j = r_j \times \theta_j(r_j) = r_j \times (a_{0j} - a_{1j} r_j) = a_{0j} r_j - a_{1j} r_j^{\,2}.$

Aggregating (15) across all denominations, the total religious enrollment rate Q is given by

(16) $Q \equiv \sum_{j=1}^{n} q_j = \sum_{j=1}^{n} \left(a_{0j} r_j - a_{1j} r_j^{\,2} \right).$

Therefore, in the general case in which a_{0j} and a_{1j} vary across denomination, the religious enrollment rate is a quadratic function of the market share of each denomination. The religious enrollment rate can be interpreted as a function of the weighted market shares in the population and the weighted Herfindahl index, where a_{0j} and a_{1j} are the weights.[6] On the other

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is concave (i.e., Proposition 2 holds). Alternatively, suppose that $\theta_j(r_j) = r_j^{-\alpha}$ (with $\alpha > 0$). In this case, α must be < 1 in order for $\lim_{r_j \to 0} \partial q_j / \partial r_j \geq 0$ to hold. For every $0 < \alpha < 1$, $\partial^2 q_j / \partial r_j^{\,2} = -\alpha(1-\alpha) r_j^{-(\alpha+1)} < 0$, so Proposition 2 again holds.

[6] Iannaccone (1991) used a specification similar to (16) to investigate the effects of religious pluralism on religious attendance among Protestants. However, subsequent studies have used more restrictive specifications similar to that given by (17) below. Our behavioral model of school choice implies that Iannaccone's specification, rather than the more restrictive version, is more appropriate for studying the association between pluralism and participation. Additionally, in the empirical study we undertake below, we strongly reject the restricted specifications in favor of the general one given by (16).

hand, if and only if a_{0j} and a_{1j} are identical among all religious groups, expression (16) simplifies to the following:

(17) $$Q_j = a_0 \sum_{j=1}^{n} r_j - a_1 \sum_{j=1}^{n} r_j^2 .$$

In this case, the total religious enrollment rate is a function of the share of the population that belongs to any religious group, $\sum_{j=1}^{n} r_j$, and the level of religious pluralism as measured by the Herfindahl index, $\sum_{j=1}^{n} r_j^2$. This insight implies that one should first estimate the more general equation, given by (16), and test the hypothesis that the parameters a_{0j} and a_{1j} are identical for all denominations. Only if this hypothesis is true can one justify estimating the religious enrollment rate as a function of the overall religiosity rate (as measured by $\sum_{j=1}^{n} r_j$) and the Herfindahl index, $\sum_{j=1}^{n} r_j^2$. Moreover, even if a_{0j} and a_{1j} are both constant across denominations, one should control for the religiosity rate when assessing the effect of pluralism on religious activity. Analyses that instead exclude the religiosity rate will generate biased estimates of the effects of pluralism on religious activity because of the mechanical relationship between the r_j^2 and the (omitted) r_j terms in (17).

3. Data

We use both county-level data and individual survey data from NELS:88 and ECLS-K in the empirical analyses below. We note at the outset that the central models are those based on the county-level data, which includes all students rather than a small subset of students in each

county. While the individual-level survey data includes individual-level controls, this advantage is quite limited in this context because the key explanatory variables vary at the county level.

3.1 County-level data

We combine data from several sources. County-level data on elementary and secondary enrollment by school type were created using school-level measures from the Private School Survey of 1999-2000. For each school, this survey reports enrollment by grade, which permits distinguishing between elementary (K-8) and secondary enrollment (9-12). The survey also includes whether each private school is religious and, if so, to which denomination it belongs. It identifies twenty-eight types of religious schools, which we aggregated into four broader categories: Catholic, Mainline Protestants, Evangelical Protestants and Other Religions.[7]

We supplemented these enrollment data with data on elementary and secondary enrollment in public schooling taken from the Public Elementary / Secondary School Universe Survey available at http://nces.ed.gov/ccd/pubschuniv.asp. These enrollment data allow us to calculate the enrollment rate of each sector of private schooling. In order to control for the supply of each type of schooling, we used the Private School Survey of 1989-1990 (ten years prior to the period of the analysis) and constructed the density of each type of schooling by dividing the number of schools of each type in the county by the area of the county in 1990.

County data on the share of each denomination in the population were taken from Jones et al. (2002), which provides county data for the year 2000 on the market shares of each of 149 denominations. We aggregated these shares to the four broader categories mentioned above –

[7] The categories and the denominations included in each are as follows: *Catholic*, *Mainline Protestant* (Calvinist, Disciples of Christ, Episcopal, Friends, Evangelical Lutheran Church in America, Methodist, Presbyterian), *Evangelical Protestant* (African Methodist Episcopal, Amish, Assembly of God, Baptist, Brethren, Christian (no specific denomination), Church of Christ, Church of God, Church of God in Christ, Lutheran Church – Missouri Synod, Wisconsin Evangelical Lutheran Synod, Other Lutheran, Mennonite, Pentecostal, Seventh-Day Adventists), and *Other Religion* (Greek Orthodox, Islamic, Jewish, Latter-Day Saint, and all others not listed above).

Catholics, Evangelical Protestants, Mainline Protestants and Other religions – according to an aggregation scheme recommended by Jones et al. (2002). Finally, we combined these data with demographic variables taken from the County and City Data Book 2000, available at www.census.gov. County data on the share of the population that lives in a rural area were taken from the STF3 files of the 2000 U.S. Census.

Table 2 presents summary statistics for all county-level variables used in the analyses below. We weight each observation by the county's population to produce weighted summary statistics. The average Catholic, Evangelical, Mainline, and "Other Religions" market shares were 22.04 percent, 14.19 percent, 9.64 percent, and 4.35 percent, respectively. Similarly, the Catholic school enrollment rate was 4.81 percent, the Evangelical enrollment rate was 2.66 percent, the Mainline enrollment rate was 0.47 percent, and the non-sectarian private enrollment rate was 1.56 percent.

3.2 NELS:88 and ECLS-K

NELS:88 is a nationally representative sample of eighth graders that was initially conducted in 1988 by the US National Center for Education Statistics (NCES). This survey included 24,599 students from 1032 schools, with subsamples of these respondents resurveyed in 1990, 1992, 1994, and 2000 follow-ups. The survey provides information on household and individual backgrounds and on attendance at a Catholic school or a non-Catholic religious school (NCES aggregates all non-Catholic religious schools into an "other religious school" category). For all students included in the base-year sample, NELS:88 includes detailed Census zip code-level information on their eighth grade school, which allows for identification of the zip code in which the school is located; we treat this as the zip code of the student's home. This allows for a merging with the county-level data described above, such as county measures of the shares of the

population who are Catholic, Mainline Protestant, and Evangelical. Table 3 presents summary statistics from the NELS:88 data.

We also analyze the base year of the ECLS-K survey, which includes 18,644 kindergarteners from over 1000 schools in the fall of the 1998–1999 school year. As in NELS:88, the base year survey includes information on the school's zip code, which permits merging of these data with information on the within-county religious distribution of the population and the other county-level variables described above. Table 4 presents summary statistics from the ECLS-K data.

4. Empirical Results

4.1 Specifications Based on County-level data

We first test Proposition 1, which states that share of households from group j whose children attend religious schools, θ_j, is decreasing in the share of group j in the local population, r_j. As the county-level data do not allow us to identify which individuals belong to each religious group, we use the ratio of denomination enrollment to denomination membership as a proxy for θ_j.[8] One possible approach to testing Proposition 1 would involve regressing this proxy for θ_j on r_j and then testing whether the regression slope coefficient is negative. For example, one could regress the ratio of Catholic enrollment to Catholic membership on the Catholic share in the local population, including a set of relevant demographic controls. These controls should include state fixed effects in order to control for state-specific factors that may

[8] For example, the ratio of Catholic school enrollment to Catholic membership is equal to the share of Catholic households that sends their children to Catholic schools under the assumption that no non-Catholic households send their children to Catholic schools. This assumption holds approximately, but not strictly, in practice. Altonji et al. (2005) estimate that fewer than 0.3 percent of non-Catholic households in NELS:88 send their children to Catholic schools.

influence the demand for a particular type of schooling. Using this approach, one would estimate the following equations, separately for each denomination *j*:

$$(18) \quad enroll_{jcs} / members_{jcs} = a_0 + a_1 r_{jcs} + \beta' X_{cs} + \gamma_s + \varepsilon_{jcs},$$

where $enroll_{jcs}$ refers to the number of students in county *c* in state *s* that are enrolled in school type *j*, $members_{jcs}$ refers to the number of members of denomination *j* in that county, r_{jcs} is defined as above as the fraction of the population that belongs to denomination *j*, X_{cs} refers to observed demographic controls in county *c* of state *s*, and γ_s denotes state fixed effects.

A potential problem with direct estimation of (18) stems from the fact that denominational membership appears both in the denominator of the dependent variable and in the numerator of r_{jcs}, the key regressor. Because membership is likely measured with error, OLS estimation of (18) will typically produce biased estimates of a_1. A solution to this problem involves simply multiplying both sides of the equation by $members_{jcs}$, yielding a regression of $enroll_{jcs}$ on each right-hand side variable (including the constant term) multiplied by $members_{jcs}$. We can therefore test Proposition 1 by estimating the following specification:

$$(19) \quad \begin{aligned} enroll_{jcs} &= a_0 members_{jcs} + a_1 (r_{jcs} \times members_{jcs}) + \beta' (X_{cs} \times members_{jcs}) \\ &\quad + \gamma_s members_{jcs} + \eta_{jcs}, \end{aligned}$$

where $\eta_{jcs} = \varepsilon_{jcs} \times members_{jcs}$. We weight each observation by the county's population, based on the 2000 U.S. Census, and estimate (19) via weighted least squares. [9]

Table 5 presents estimates of a_1 from specification (19), with the upper panel of the table showing results for Catholic school enrollment. The first two columns show results for elementary schooling (grades K-8), the next two columns show results for secondary schooling

[9] Our results are insensitive to instead using unweighted OLS models, as well as to using weighted Tobit models that explicitly account for the fact that $enroll_{jcs}$ is bounded below by zero. Results from these alternative specifications are available upon request.

(grades 9-12), and the last two columns show results for combined K-12 enrollment. For each of these grade spans we use two different specifications. The first does not include any controls while the second includes all of the demographic controls described above, including a measure of the density of Catholic schools in 1990, which is intended to capture supply-side capacity effects. Specifically, Catholic school enrollment levels may be constrained by the number of Catholic schools operating within a county, and including this measure is a straightforward way of controlling for these possible effects.[10]

As the top panel of the table shows, the estimates of a_1 are negative in all six specifications. Including demographic controls slightly increases (in absolute value) the magnitudes of the estimates in all cases. In general, the estimates are much more negative for elementary schooling than for secondary schooling. As noted above, this pattern is as expected because the motive to preserve religious identity is presumably a stronger factor in elementary school choice than in secondary school choice.

The middle panel of the table shows the results for enrollment into Evangelical schools. The estimates of a_1 are larger (in absolute value) than those for Catholic enrollment in all six cases, and five of the six estimates are statistically significant at the 5 percent level. The estimates are again much larger for elementary schooling than for secondary schooling. The bottom panel reports the results for enrollment into Mainline Protestant schools. The estimates of a_1 are negative in five out of the six columns, and they are significant at the five percent level in four cases. The only exceptions are the coefficient for secondary schooling in the regression without controls, which is positive and insignificant, and the coefficient for elementary schooling in the regression with controls, which is negative and nearly significant at the ten percent level.

[10] We also estimated alternative specifications in which we include all of the demographic variables except for the density of Catholic schools. We found that controlling for the supply of Catholic schools in 1990 has essentially no effect on the estimates in all cases.

In sum, the findings are supportive of Proposition 1, as 17 of the 18 estimates in the table are negative, with 11 significantly so.[11]

We next turn to tests of Proposition 2, which implies that the share of *all* students that enrolls in schools of denomination j, q_j, is a concave function of the market share of that denomination in the local population. To test this proposition, we estimate the following models, again separately for each denomination j:

$$q_{jcs} = b_0 + b_1 r_{jcs} + b_2 r_{jcs}^2 + \gamma' X_{cs} + \varepsilon_{jcs}. \quad (20)$$

Table 6 presents estimates of b_1 and b_2 for all three denominations, with the upper panel of the table showing results for Catholic school enrollment. In each specification, the Catholic market share has a strong concave effect on the Catholic enrollment rate. The estimates of b_1 are positive and significant (at the five percent level) in all six cases, while the estimates of b_2 are negative and significant in all cases. The middle panel of the table presents analogous results for Evangelicals. Again, the Evangelical market share has a significant concave effect on the Evangelical enrollment rate in all six columns. Finally, the bottom panel presents estimates for Mainline Protestants. In contrast to the results described above, we do not find evidence that enrollment into Mainline schools is a function (either linear or quadratic) of the Mainline market

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[11] In Appendix Table 1, we present estimates based on another approach to testing Proposition 1, derived from a logarithmic version of (18):

$$\ln\left[enroll_{jcs} / members_{jcs}\right] = b_0 + b_1 \ln\left[members_{jcs} / pop_{cs}\right] + \beta' \ln(X_{cs}) + \gamma_s + \varepsilon_{jcs}.$$

This log-log approach allows for an easy solution to the problem of measurement error in $members_{jcs}$ because this equation can be rewritten as

$$\ln(enroll_{jcs}) = b_0 + (b_1 + 1) \times \ln(members_{jcs}) - b_1 \ln(pop_{cs}) + \beta' \ln(X_{cs}) + \gamma_s + \varepsilon_{jcs}.$$

Proposition 1 implies that b_1 is negative, so that the coefficient on $\ln(members_{jcs})$ is less than 1 (so that a 1-percent increase in denominational membership causes a less than 1-percent increase in denominational enrollment). The estimates strongly support Proposition 1 for all three denominations; specifically, the estimates of $(b_1 + 1)$ are significantly less than 1 in 17 of the 18 cases.

share. This null finding may stem from the fact that Mainline enrollment rates are uniformly low. Note that the adjusted r^2 values in all of the models in the bottom panel of Table 6 are substantially lower than those shown in the middle and upper panels, implying that Mainline enrollment rates are less responsive to all of our demographic controls (not just the denominational shares) than are Catholic and Evangelical enrollment rates.

We turn next to tests of the final prediction of our model, which relates the overall demand for religious schooling to quadratic functions of the market shares of each denomination. The unrestricted version of this model is

$$(21) \qquad Q_{cs} = c_0 + \sum_{j=1}^{n} [c_{1j} r_{jcs} + c_{2j} r_{jcs}^2] + \delta' X_{cs} + \varepsilon_{jcs},$$

where Q_{cs} represents the overall enrollment rate into religious schools. As noted above, several previous researchers have estimated restricted versions of this model, such as a version that imposes equality of the c_{1j} and c_{2j} coefficients across denominations:

$$(22) \qquad Q_{cs} = c_0 + c_1 \sum_{j=1}^{n} r_{jcs} + c_2 \sum_{j=1}^{n} r_{jcs}^2 + \delta' X_{cs} + \varepsilon_{jcs}.$$

Yet another version, common in the literature on the effects of religious pluralism on religious activity, additionally imposes that the c_{1j} coefficients all equal zero:

$$(23) \qquad Q_{cs} = c_0 + c_2 \sum_{j=1}^{n} r_{jcs}^2 + \delta' X_{cs} + \varepsilon_{jcs}.$$

Table 7 presents estimates of models (21)-(23) for elementary schooling. The first column shows estimates of the c_{1j} and c_{2j} coefficients from specification (21). The estimates imply that the overall enrollment rate into religious elementary schools is a concave function of the Catholic and Evangelical market shares but not a concave function of the market share of Mainline Protestants. The bottom two rows of the table, labeled "Test 1" and "Test 2", present

p-values of the hypotheses that the c_{1j} and c_{2j} coefficients, respectively, do not vary across denominations. Both tests are rejected at the 5 percent level.

Column (2) presents estimates from a specification in which all c_{2j} terms are restricted to be equal, and column (3) additionally restricts all c_{1j} terms to be equal, representing specification (22) above. In these columns, the linear market shares (or, alternatively, their sum) positively affect the religious enrollment rate. Likewise, the negative and significant coefficient on the Herfindahl index implies that religious pluralism also increases the religious enrollment rate.[12] However, the estimate in column (4) shows the consequences of failing to control for the market shares of each denomination. In this case, the positive coefficient on the Herfindahl index incorrectly implies that religious pluralism decreases the demand for religious schooling. More generally, this example illustrates that excluding the market share terms r_j from models relating religious pluralism to religious activity may produce misleading results – the omission of the r_j terms induces omitted variables bias because of the correlation between r_j and r_j^2.

Table 8 presents the estimates from models (21)-(23) for secondary schooling. The results are very similar to those in Table 7. Specifically, the market shares have concave effects on the demand for religious schooling among Catholics, Evangelicals and the "Other religions" category. Columns (2) and (3) show that the overall religious enrollment rate is positively associated with both the linear market shares and religious pluralism (as implied by the negative coefficient on the Herfindahl index). As was the case in Table 7, column (4) again shows that failing to control for the linear market shares yields estimates that incorrectly imply that pluralism *decreases* religious enrollment.

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[12] The Herfindahl index $\sum_{j=1}^{n} r_{jcs}^2$ varies from a minimum of $1/n$, in which all religions' market shares are equal, to a maximum of 1, in which all adherents practice only one religion. As such, the index is increasing in religious concentration and decreasing in religious pluralism.

4.2 Specifications Based on Individual-level data

We next turn to using individual data from NELS:88 and ECLS-K to test the implications of the model. The ECLS-K does not include measures of a household's religion, making it impossible to assess Proposition 1. We therefore proceed with testing Proposition 2, that the share of all students that enrolls in schools of denomination *j* is a concave function of that denomination's market share. We use the individual analog of expression (20):

$$(24) \qquad \Pr(d_i = j) = c_0 + \sum_{j=1}^{n}[c_{1j} r_{jcs} + c_{2j} r_{jcs}^2] + \delta' X_{ics} + \varepsilon_{ijcs},$$

where $d_i \in \{0,...,n\}$ measures the denomination of the school in which student *i* is enrolled. X_{ics} includes both county-level demographics and the individual control variables listed in Tables 3 and 4. Catholic schools are the only religious schools identified in NELS:88 and ECLS-K, so in practice (24) is a binary model of Catholic school attendance. We estimate this model by linear probability, although the substantive results are unaffected if we instead use probit or logit models.

Table 9 presents the estimates of c_{1j} and c_{2j}. For all grade levels and specifications, the Catholic market share has a significant concave effect on Catholic school attendance. Focusing on our preferred specifications in columns (2), (4), and (6), these effects again appear to be slightly stronger in early grades than in high school, reflecting that the preservation of religious identity is strongest in early grades.

Finally, Table 10 presents estimates of the individual-level analogs of expressions (21)-(23) in order to assess whether overall religious school attendance rates are a concave function of each of the religious market shares. Again, the estimates largely agree with those based on the county-level data. Column (1) indicates that all four market shares have a concave effect on the probability of attending a religious kindergarten. Similar results are obtained for eighth grade

attendance (column (5)) and for high school attendance (column (9)). However, restricted models that impose equality of the c_{2j} coefficients imply that pluralism decreases the probability of attending religious schooling in eight of the nine cases (see the coefficients on the Herfindahl index in columns (2)-(4), (6)-(8), and (10)-(12)), although the estimate is significantly different from zero in only one instance.

In sum, the results based on the individual-level data generally agree with those based on county-level data. The local Catholic market share has a significant concave effect on Catholic school attendance, and estimates of the effect of religious pluralism on religious school attendance are sensitive to the choice of specification. We emphasize, however, that the individual-level data include only a small subset of counties within the U.S. and a small subset of students within each county. As a result, the estimates based on these data are typically imprecise; note that the standard errors in Table 10 are roughly five to ten times larger than those shown in Tables 7 and 8. We therefore view the estimates based on county-level data as our preferred results.

5. Summary and Concluding Remarks

We develop a model of school choice that incorporates religious parents' desires for their children to maintain their religious identities into adulthood. We posit that religious parents enroll their children in religious schools in order to shield their children from exposure to other religions (and to secularism), based on the idea that the principal threats to the preservation of a child's religious beliefs stem from these competing influences. The behavioral model generates two primary implications. First, the proportion of children in a given denomination who attend religious schools declines as that denomination becomes more prevalent in the population. The negative association between enrollment rates and market shares arises because the threat of

outside influences in non-religious schools declines as the denomination's market share increases – in the limiting case in which the entire population belongs to the same denomination, parents have no motivation to enroll their children in a religious school. Second, a given denomination's market share has a concave effect on *overall* attendance rates in that denomination's schools, due to two competing factors. On one hand, an increase in the market share increases the fraction of children attending that denomination's schools, holding the within-denomination attendance rate constant. On the other hand, the within-denomination attendance rate declines due to the aforementioned weakening of the motivation to attend religious schools.

Using county-level data from the U.S., supplemented with individual-level data from ECLS-K and NELS:88, we find support for the model's implications. Among Catholics and both Mainline and Evangelical Protestants, the within-denomination rate of religious school attendance is strongly negatively related to denominational market shares. Moreover, overall attendance rates at Catholic and Evangelical schools are concave functions of the Catholic and Evangelical market shares, respectively. These findings support the notion that parents' wishes to preserve their children's religious identities play a fundamental role in the demand for private religious education.

Finally, this study is the first to provide a theoretical underpinning for empirical studies of the links between religious activity and religious pluralism. We show that a commonly used empirical specification, in which religious activity is modeled as a function of a Herfindahl index-based measure of religious pluralism, is a restricted version of the more general specification implied by our behavioral model. Failing to include religious market shares in such empirical models can severely bias estimates of the effect of pluralism on religious activity. These findings provide important guidance for future empirical research on the effects of religious pluralism on a variety of measures of religious activity.

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Table 1. The Probability That a Child Shares His Parent's Religious Orientation

		Parent's Orientation	
		0	***j'***
School Orientation	$(s = g) \cup (s = 0)$	$z = \omega + (1 - \omega)\, r_0$	$z = \omega + (1 - \omega)\, r_j$
	$s = j', s \in \{1,...,n\}$	$z = \omega$	$z = 1$
	$s \neq j', s \in \{1,...,n\}$		$z = \omega$

Table 2. Summary Statistics of County-Level Variables

Variable	Obs.	Mean	Std. Dev.
Percent Hispanic in county	3139	12.55	15.07
Median income	3139	39324.51	9419.75
Average number of people per household	3139	2.61	0.23
Percent of population at school age (5 to 17)	3139	18.88	2.14
Percent African-Americans in county	3139	12.32	13.19
Percent of population living in rural areas	3138	21.15	25.63
Population density	3139	2.12	6.59
Pupils per teacher ratio	3127	15.75	4.97
Percent Catholics in county	3138	22.04	15.15
Catholic schools per square mile	3139	0.10	0.33
Catholic members (in thousands)	3138	330.46	737.22
Catholic enrollment/Total enrollment × 100	3120	4.81	4.75
Catholic enrollment/Catholic members × 100	2985	4.26	5.32
Percent Evangelical Protestants in county	3139	14.19	12.64
Total enrollment in Evangelical schools	3139	5175.14	10366.09
Evangelical schools per square mile	3139	0.04	0.06
Evangelical protestant members (in thousands)	3138	87.47	140.51
Evangelical enrollment/Total enrollment × 100	3120	2.66	2.36
Evangelical enrollment/Evangelical members × 100	3111	5.22	4.20
Percent Mainline Protestants in county	3138	9.65	6.47
Total enrollment in Mainline schools	3139	1062.95	2079.14
Mainline schools per square mile	3139	0.01	0.03
Mainline protestant members (in thousands)	3138	63.69	86.29
Mainline enrollment/Total enrollment × 100	3120	0.47	1.17
Mainline enrollment/Mainline members × 100	3119	1.29	4.88
Non-sectarian private enrollment / Total enrollment × 100	3120	1.56	1.96
Percent Other religions in county	3139	4.35	7.27
Herfindahl index	3139	-12.83	9.23

Table 3. Summary Statistics in NELS:88 (N=13,710)

Variable	Mean	Std. Dev.
Catholic High School Attendance	0.054	0.226
Catholic 8th Grade Attendance	0.083	0.276
Parents Reported Catholic Religion	0.340	1.727
Catholic Schools / Sq. Mile in County	0.055	0.162
Percent Catholic in County Population	0.230	0.197
Percent Catholic in County Population in 1890	0.097	0.095
Female	0.508	0.500
Asian	0.054	0.226
Hispanic	0.122	0.327
Black	0.099	0.299
HH composition		
Both Parents in HH	0.701	0.458
Mother + another adult	0.105	0.306
Father + another adult	0.021	0.142
Mother only	0.143	0.350
Father only	0.023	0.151
HH composition missing	0.008	0.090
Parents' Marital Status		
Married	0.781	0.413
Divorced	0.108	0.311
Widowed	0.025	0.155
Separated	0.032	0.176
Never Married	0.022	0.146
Marriage-Like Long-term Relationship	0.016	0.127
Marital Status missing	0.015	0.123
Father's Education	12.455	4.184
Mother's Education	12.913	2.640
Log(Family Income)	9.814	2.136
County Percent Rural	26.222	27.036

Table 4. Summary Statistics in ECLS-K (N=10,549)

Variable	Mean	Std. Dev.
Catholic Kindergarten Attendance	0.128	0.334
Parents Reported Catholic Religion	N/A	N/A
Catholic Schools / Sq. Mile in County	0.053	0.129
Percent Catholic in County Population	0.218	0.173
Female	0.492	0.500
Asian	0.055	0.227
Hispanic	0.169	0.375
Black	0.146	0.353
HH composition		
Both Parents in HH	0.711	0.453
Mother + another adult	0.069	0.254
Father + another adult	0.007	0.082
Mother only	0.190	0.392
Father only	0.015	0.122
HH composition missing	0.008	0.090
Parents' Marital Status		
Married	0.669	0.471
Divorced	0.084	0.278
Widowed	0.009	0.093
Separated	0.045	0.206
Never Married	0.141	0.348
Marriage-Like Long-term Relationship		
Marital Status missing	0.053	0.224
Father's Education	12.737	3.881
Mother's Education	12.988	3.100
Log(Family Income)	10.506	0.986
County Percent Rural	28.386	31.115

Table 5. Tests of Proposition 1: Denomination-Specific Enrollment Rates into Religious Schools

	Elementary		Secondary		Overall	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Catholic school enrollment					
% Catholic × Catholic members	-0.185	-0.276*	-0.059	-0.085	-0.243	-0.352*
	(0.161)	(0.121)	(0.061)	(0.069)	(0.217)	(0.167)
Demographic controls × Catholic members	N	Y	N	Y	N	Y
Adjusted R-Squared	0.837	0.996	0.85	0.992	0.843	0.996
	Evangelical school enrollment					
% Evangelical × Evangelical members	-2.802*	-0.729*	-0.409*	-0.093	-3.211*	-0.804*
	(0.491)	(0.137)	(0.093)	(0.056)	(0.581)	(0.181)
Demographic controls × Evangelical members	N	Y	N	Y	N	Y
Adjusted R-Squared	0.939	0.996	0.913	0.989	0.939	0.996
	Mainline school enrollment					
% Mainline × Mainline members	-1.258*	-0.365	0.122	-0.339*	-1.135*	-0.692*
	(0.338)	(0.223)	(0.106)	(0.114)	(0.251)	(0.315)
Demographic controls × Mainline members	N	Y	N	Y	N	Y
Adjusted R-Squared	0.82	0.945	0.269	0.701	0.785	0.912
Observations	3,138	3,126	3,138	3,126	3,138	3,126

Notes:

1) Standard errors, in parentheses, are robust to clustering at the state level.

2) Demographic controls include median income, density of population, percent of population at school-age, percent African–Americans in the population, percent Hispanics in the population, population, percent of population that lives in a rural area, average number of people per household and pupil to teacher ratio, as well as their square terms. In addition we also include state fixed effects and the market share of other denominations.

3) Estimates marked with "*" are significantly different from zero at the five percent level.

Table 6. Tests of Proposition 2: Enrollment Rates into Religious Schools as a Quadratic Function of Denomination Market Share

	Elementary		Secondary		Overall	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Catholic school enrollment					
% Catholic	0.298*	0.342*	0.287*	0.137*	0.294*	0.310*
	(0.072)	(0.053)	(0.057)	(0.028)	(0.067)	(0.046)
% Catholic squared / 100	-0.218*	-0.230*	-0.216*	-0.078*	-0.216*	-0.211*
	(0.109)	(0.072)	(0.087)	(0.032)	(0.100)	(0.062)
Demographic controls	N	Y	N	Y	N	Y
Adjusted R-Squared	0.345	0.770	0.281	0.368	0.349	0.782
	Evangelical school enrollment					
% Evangelical	0.190*	0.238*	0.140*	0.126*	0.176*	0.205*
	(0.034)	(0.052)	(0.020)	(0.024)	(0.029)	(0.041)
% Evangelical squared / 100	-0.330*	-0.325*	-0.221*	-0.189*	-0.299*	-0.285*
	(0.055)	(0.069)	(0.027)	(0.035)	(0.046)	(0.056)
Demographic controls	N	Y	N	Y	N	Y
Adjusted R-Squared	0.097	0.329	0.079	0.256	0.100	0.327
	Mainline school enrollment					
% Mainline	0.004	0.019	0.025	0.009	0.01	0.018
	(0.018)	(0.017)	(0.021)	(0.024)	(0.018)	(0.019)
% Mainline squared / 100	-0.008	0.011	-0.037	0.020	-0.017	0.012
	(0.046)	(0.044)	(0.052)	(0.052)	(0.047)	(0.046)
Demographic controls	N	Y	N	Y	N	Y
Adjusted R-Squared	0.000	0.206	0.004	0.205	0.001	0.200
Observations	3,120	3,119	3,107	3,106	3,120	3,119

Notes:

1) Standard errors, in parentheses, are robust to clustering at the state level.

2) Demographic controls include median income, density of population, percent of population at school-age, percent African–Americans in the population, percent Hispanics in the population, population, percent of population that lives in a rural area, average number of people per household and pupil to teacher ratio, as well as their square terms. In addition we also include state fixed effects and the market share of other denominations.

3) Estimates marked with "*" are significantly different from zero at the five percent level.

Table 7. Overall Enrollment Rates in Religious Elementary Schools as a Quadratic Function of Religious Market Shares

Variable	(1)	(2)	(3)	(4)
% Catholic	0.354*	0.332*		
	(0.063)	(0.045)		
% Catholic squared / 100	-0.251*			
	(0.088)			
% Evangelical	0.307*	0.181*		
	(0.084)	(0.053)		
% Evangelical squared / 100	-0.421*			
	(0.104)			
% Mainline	-0.040	0.088*		
	(0.058)	(0.031)		
% Mainline squared / 100	0.042			
	(0.096)			
% Other	0.104	0.201*		
	(0.062)	(0.068)		
% Other squared / 100	-0.045			
	(0.057)			
Sum of Religions			0.199*	
			(0.041)	
Herfindahl Index / 100		-0.228*	-0.159*	0.085*
		(0.053)	(0.055)	(0.026)
Demographic controls?	Y	Y	Y	Y
Adjusted R-Squared	0.649	0.644	0.616	0.598
Observations	3,119	3,119	3,119	3,119
Test 1	0.001			
Test 2	0.005			

Notes:
1) Standard errors, in parentheses, are robust to clustering at the state level.
2) Demographic controls are identical to those listed in Tables 5 and 6.
3) Estimates marked with "*" are significantly different from zero at the five percent level.
4) For the two F tests, the value reported is the relevant p-value. In "Test 1", the null hypothesis is that the coefficients on all market shares are equal. In "Test 2", the null hypothesis is that the coefficients on all squared market shares are equal.

Table 8. Overall Enrollment Rates in Religious Secondary Schools as a Quadratic Function of Religious Market Shares

Variable	(1)	(2)	(3)	(4)
% Catholic	0.218*	0.212*		
	(0.035)	(0.024)		
% Catholic squared / 100	-0.135*			
	(0.045)			
% Evangelical	0.124	0.090*		
	(0.065)	(0.037)		
% Evangelical squared / 100	-0.177*			
	(0.084)			
% Mainline	-0.132*	-0.028		
	(0.056)	(0.031)		
% Mainline squared / 100	0.109			
	(0.092)			
% Other	0.156*	0.134*		
	(0.080)	(0.051)		
% Other squared / 100	-0.171			
	(0.103)			
Sum of Religions			0.086*	
			(0.029)	
Herfindahl Index / 100		-0.127*	-0.045	0.061*
		(0.033)	(0.040)	(0.021)
Demographic controls?	Y	Y	Y	Y
Adjusted R-Squared	0.599	0.598	0.575	0.571
Observations	3,106	3,106	3,106	3,106
Test 1	0.000			
Test 2	0.070			

Notes:
1) Standard errors, in parentheses, are robust to clustering at the state level.
2) Demographic controls are identical to those listed in Tables 5 and 6.
3) Estimates marked with "*" are significantly different from zero at the five percent level.
4) For the two F tests, the value reported is the relevant p-value. In "Test 1", the null hypothesis is that the coefficients on all market shares are equal. In "Test 2", the null hypothesis is that the coefficients on all squared market shares are equal.

Table 9. Test of Proposition 2: Catholic School Enrollment as a Quadratic Function of Catholic Market Shares, NELS:88 and ECLS-K

	Kindergarten		*Eighth Grade*		*High School*	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
% Catholic	0.532	0.605	0.987	0.614	0.827	0.322
	(0.184)	(0.180)	(0.140)	(0.127)	(0.088)	(0.083)
% Catholic squared/100	-0.657	-0.770	-0.756	-0.665	-0.722	-0.302
	(0.292)	(0.298)	(0.164)	(0.171)	(0.089)	(0.113)
Demographic Controls?	N	Y	N	Y	N	Y

Notes:
1) Standard errors, in parentheses, are robust to clustering at the county level.
2) N = 15,205 in the "High School" and "Eighth Grade" specifications involving NELS:88, and N = 10,549 in the "Kindergarten" specifications involving ECLS-K.
3) Estimates marked with "*" are significantly different from zero at the five percent level.

Table 10. Overall Religious Enrollment Rates as a Quadratic Function of Religious Market Shares, NELS:88 and ECLS-K

	Kindergarten				*Eighth Grade*				*High School*			
Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
% Catholic	0.716*	0.427*			0.626*	0.064			0.374*	-0.058		
	(0.287)	(0.191)			(0.201)	(0.136)			(0.171)	(0.100)		
% Catholic squared / 100	-0.804				-0.696*				-0.412*			
	(0.428)				(0.214)				(0.181)			
% Evangelical	0.160	0.017			0.245	0.323			0.295	-0.226		
	(0.414)	(0.234)			(0.388)	(0.206)			(0.332)	(0.173)		
% Evangelical squared / 100	-0.152				-0.376				-0.458			
	(0.616)				(0.559)				(0.479)			
% Mainline	1.067*	0.397			1.077*	0.067			0.660	-0.127		
	(0.501)	(0.241)			(0.381)	(0.180)			(0.321)	(0.156)		
% Mainline squared / 100	-1.978				-2.343*				-1.506*			
	(1.015)				(0.830)				(0.641)			
% Other	0.812	0.420			0.620	0.029			0.716	0.001		
	(0.705)	(0.305)			(0.595)	(0.338)			(0.500)	(0.282)		
% Other squared / 100	-1.205				-0.712				-0.870			
	(1.113)				(0.699)				(0.590)			
Sum of Religions			-0.319				-0.181				-0.124	
			(0.111)				(0.113)				(0.096)	
Herfindahl Index / 100		-0.318	0.390*	0.073		0.161	0.132	0.058		0.294	0.129	0.146
		(0.318)	(0.168)	(0.089)		(0.272)	(0.153)	(0.080)		(0.320)	(0.231)	(0.125)
Demographic controls?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Test 1	0.053				0.107				0.103			
Test 2	0.115				0.127				0.139			

Appendix Table 1. Tests of Proposition 1: Natural Logarithm of Enrollment in Different Denominations of Religious Schools

	Elementary		Secondary		Overall	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Catholic school enrollment					
Log(Catholic Members)	0.662*	0.312*	0.531*	0.241*	0.684*	0.516*
	(0.054)	(0.040)	-0.063	(0.099)	(0.054)	(0.085)
Log(Demographic controls)	N	Y	N	Y	N	Y
Adjusted R-Squared	0.853	0.976	0.703	0.915	0.850	0.966
Observations	1,240	1,075	500	421	1,248	458
	Evangelical school enrollment					
Log(Evangelical Members)	0.490*	0.389*	0.659*	0.587*	0.513*	0.505*
	(0.072)	(0.077)	(0.080)	(0.118)	(0.073)	(0.086)
Log(Demographic controls)	N	Y	N	Y	N	Y
Adjusted R-Squared	0.853	0.914	0.719	0.826	0.849	0.904
Observations	1,851	1,192	1,443	835	1,854	899
	Mainline school enrollment					
Log(Mainline Members)	0.079*	0.359*	-0.021*	-0.308	0.110*	0.212*
	(0.140)	(0.403)	(0.277)	(1.190)	(0.151)	(0.537)
Log(Demographic controls)	N	Y	N	Y	N	Y
Adjusted R-Squared	0.539	0.812	0.520	0.526	0.511	0.814
Observations	475	222	215	110	493	129

Notes:

1) Standard errors, in parentheses, are robust to clustering at the state level.

2) Demographic controls include median income, density of population, percent of population at school-age, percent African–Americans in the population, percent Hispanics in the population, population, percent of population that lives in a rural area, average number of people per household and pupil to teacher ratio, as well as their square terms. In addition we also include state fixed effects and the market share of other denominations.

3) Estimates marked with "*" are significantly different from one at the five percent level.

4) Estimation samples include only those counties with positive enrollment levels in the given denomination (because the log of zero is undefined).