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Public Subsidies for Private Schooling: A Comparative Analysis of Argentina and Chile

PATRICK J. McEWAN pmcewan@stanfordalumni.org
Wellesley College, Department of Economics, Wellesley, MA 02481

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Abstract

Argentina and Chile have long-standing policies that award public subsidies to private schools. This article compares the academic outcomes of seventh- and eighth-graders in public and private schools in each country. Three types of private schools are analyzed: Catholic schools that are subsidized by the government, nonreligious schools that are subsidized, and private schools that receive no subsidies. Ultimately, the analyses suggest a mixed portrait of private school effectiveness, in which Catholic schools have the most consistent links to achievement. Nonreligious subsidized schools in Chile, often operated by for-profit corporations, produce outcomes no different from public schools.

Introduction

A common claim is that public schools are inefficient, whether in developed or developing countries (e.g., Hanushek, 1995, 1997). These conclusions are not without controversy (Fuller and Clarke, 1994; Kremer, 1995; Greenwald et al., 1996), but they have reinvigorated a long-standing debate on private alternatives to public schooling. Milton Friedman (1955) was among the first to argue that parents should receive tuition coupons, or vouchers, to attend private schools rather than neighborhood public schools. Throughout the 1990s, there were renewed calls for vouchers, typically accompanied by a strong critique of public schools (e.g., Chubb and Moe, 1990; West, 1997; Hoxby, 1998; Peterson and Hassel, 1998). These voucher proposals vary widely in their scope and design (see Levin, 1991, for a summary). However, they rest on a common supposition: that private schools are relatively more effective than public schools, by virtue of producing greater amounts of desirable outcomes.

Before pursuing these policies, it is reasonable to inquire whether their assumptions find empirical support.[1] This article provides empirical evidence from Argentina and Chile. It attempts to determine whether a given school type—public or private—is relatively more effective at producing outcomes among similar kinds of students. Argentina and Chile provide interesting contexts in which to examine the relative effectiveness of private schools, in part because

both countries allocate extensive public subsidies to private schools.[2] In Argentina, the government funds the salaries of many teachers and principals in private schools. In Chile, the funding is directly tied to student enrollments, and school budgets are immediately penalized when students leave a private school. In many ways, the Chilean plan is similar to Friedman's seminal voucher proposal.

In each country, the private sector currently holds a significant share of the educational market. In Argentina, 21% of primary school children attend private schools, while in Chile that percentage is doubled. Within each country, there is tremendous heterogeneity in the management and financing of private schools. Schools operated by the Catholic Church command an impressive portion of the market in each country, although nonreligious providers are an especially important segment in Chile.

In this article, I use 1997 data from Argentina and Chile to compare the academic outcomes of seventh- and eighth-graders in public and private schools. Three types of private schools are analyzed: Catholic schools that are subsidized by the government, nonreligious schools that are subsidized, and private schools that receive no subsidies. Ultimately, the analyses suggest a mixed portrait of private school effectiveness, in which Catholic schools have the most consistent links to achievement. Subsidized private schools operated by nonreligious organizations in Chile, often for-profit corporations, produce outcomes no different from public schools.

To develop the analysis, the article first describes the institutional framework of private schooling in each country. Then the empirical strategy is outlined that will be used to compare student outcomes, as well as the data that are employed. Next, the main empirical results are described, followed by an exploration of several explanations for the most consistent patterns. The article ends with a summary and conclusion.

Private schooling in Argentina and Chile

This section describes the institutional framework of private schooling in Argentina and Chile, focusing on the mechanisms for public finance of private schooling and the current market share of private schools in each country. It then highlights key differences between the two systems.

Argentina

Institutional framework. At least since the late 1940s, Argentina's government has provided financial subsidies for the payment of teacher salaries in private schools.[3] A pair of 1958 laws, however, laid the foundations for the current system of private school finance. A teacher statute guaranteed that private school teachers would enjoy salaries similar to their counterparts in public schools. A second law established that private schools charging tuition could

receive subsidies covering up to 80% of teacher and principal salaries. Private schools that did not charge tuition could receive up to 100% of salaries.

In subsequent decades, the system was fine-tuned but not dramatically altered. In 1964, for example, a law established the notion of *Planta Orgánica Funcional*. Among other impositions, it established minimum class sizes for subsidized private schools. Its purpose was to curb incentives for private schools to inflate their staff beyond reasonable limits.[4] In addition, the law established a sliding scale for wage subsidies. As before, full subsidies were provided to "free" private schools (although small fees were occasionally allowed). Other private schools were awarded between 30% and 80%, depending on criteria such as the tuition charged by private schools, the socioeconomic condition of students, and the educational "needs" in the community.[5]

On the face of it, the criteria used to allocate private school subsidies are objective. For example, private schools in less favorable socioeconomic conditions are supposed to receive a higher proportion of subsidies. Nevertheless, Morduchowicz et al. (1999) highlight the difficulty in translating these goals into objective and well-targeted subsidies. They argue that, in the best of cases, the subsidy is guided by the good judgment of the local authority. In the worst of cases, the subsidy may be arbitrary. In several case studies, the authors highlight a range of inconsistencies. In some schools, the number of subsidized personnel exceeds the maximum allowed by law (the *Planta Orgánica Funcional*). In others, subsidies are larger than would be permitted by a strict application of the law.

Private school market share. At the beginning of Argentina's efforts to subsidize private schooling in the late 1940s, roughly 8% of primary students attended a private school. This period marked the beginning of steady growth over the next 50 years (Morduchowicz et al., 1999). By 1998, 21% of primary students attended a private school (see Table 1). Of these, roughly 63% (or 13% of total primary enrollments) attended a private school managed by the Catholic Church. The rest attended nonreligious private schools (or perhaps a small minority of other religious schools, although no data are available to substantiate this).

In 1998, 45% of private students attended schools where teacher salaries were fully subsidized by the government. Another 28% attended schools where teacher salaries were partially subsidized. The remaining portion, 27%, attended unsubsidized private schools. There are, regrettably, no data on how subsidies are distributed across either Catholic or nonreligious private schools.[6]

Chile

Institutional framework. At the time of the military coup d'etat in 1973, Chile's education system was one of the most developed in Latin America. A dirigiste Ministry of Education assumed exclusive responsibility for

Table 1. Private school enrollments in Argentina and Chile (primary grades).

	Private enrollments, primary grades (%)
Argentina, 1998	
Public	78.9
Catholic	13.3
Nonreligious	7.8
Total	100
Chile, 1996	
Public	58.5
Catholic subsidized	10.3
Protestant subsidized	1.5
Nonreligious subsidized	21.4
Private nonsubsidized	8.3
Total	100

Sources: Morduchowicz et al. (1999, Tables 3 and 4); McEwan and Carnoy (2000, Table 2).

administering and financing the entire public school system. There were, however, important numbers of private schools, about half of these managed by the Catholic Church (Espinola, 1993). Following a long tradition of public support of private education, many received subsidies from the central government that covered roughly 30% of costs in 1980 (Larranaga, 1995).

In 1980 the military government initiated a sweeping reform. It first transferred responsibility for public school management from the Ministry of Education to local municipalities. At the same time, it altered how public and most private schools were financed. The Ministry of Education began disbursing monthly payments to municipalities based on a fixed subsidy—or voucher, as it is commonly interpreted—multiplied by the number of students enrolled in public schools.[7] Private schools received equivalent per-student payments if they did not charge tuition (although private schools could—and many did—choose not to accept government subsidies or regulations). Thus, payments to public and private schools began fluctuating in direct proportion to student enrollments. The law established a base subsidy, which varies according the level of education and the location of the school.[8]

The military ceded power to a democratic government in 1990. The essential form and function of Chile's system of school finance were maintained. At the same time, new policies and programs were grafted onto the existing system. The national government focused its new policies on improving the quality of primary schools through direct investment, often with aid from international development institutions.[9]

Perhaps the greatest shift in private school finance occurred in 1993, with *financiamento compartido* or "shared financing." Prior to the law, publicly funded schools were not allowed to charge tuition (though many still found creative ways to circumvent this, such as fees for Parent Centers, akin to Parent-Teacher Associations in the United States). The law allowed all private subsidized schools—both elementary and secondary—and public secondary schools to charge limited tuition. Voucher payments were to be reduced on a sliding scale that favored charging at least some tuition.[10]

Private school market share. Chile's 1980 reform sparked a massive redistribution of enrollments across private and public schools (see Table 1 for recent enrollments). Between 1981 and 1996, enrollments in private subsidized schools expanded from 15% to around 33% of the total, most of these gains at the expense of public school enrollments. Within this category, however, there is a great deal of heterogeneity. Currently, about two thirds of private subsidized enrollments (or 21% of total primary enrollments) are in nonreligious schools. The other subsidized private schools are managed by the Catholic Church or a small minority of Protestant churches.

With the advent of "shared financing" in 1993, many subsidized schools opted to receive lower subsidies in exchange for the right to charge tuition. By 1996, 33% of nonreligious subsidized schools and 55% of Catholic subsidized schools chose to accept diminished subsidies.[11]

Throughout the last two decades, a fairly steady percentage of primary students—currently about 8%—has enrolled in private schools that do not accept subsidies and that charge hefty tuition.

Argentina and Chile compared

The Argentina and Chilean governments provide extensive subsidies to private schools. And in each case, their policies appear to have catalyzed substantial growth in private enrollments.[12] Yet each country followed a very different path to this growth. Before proceeding with the empirical analysis, it is worth emphasizing two notable differences.

First, the structure of the funding mechanisms is substantially different. Argentina directly funds the salaries of private school teachers and principals, or a portion thereof, while Chile funds a per-student subsidy. Chile's policy allows private schools greater latitude in choosing how to allocate resources, because the student subsidies may fund personnel or other investments. Consequently, Chilean law may provide greater autonomy to private schools. If the arguments of voucher proponents like Chubb and Moe (1990) are correct, this autonomy should encourage more effective organizations and perhaps improve the effectiveness of subsidized private schools in the Chilean context. The subsequent empirical analyses will suggest that this is not necessarily the case.

Funding mechanisms may affect incentives in other respects. When private subsidized schools lose students in Chile, their budgets are immediately

penalized. This outcome, in turn, may provide immediate incentives to compete. In Argentina, the response may be less immediate. In fact, the case studies of Morduchowicz et al. (1999) imply that the response of private school subsidies to lost enrollments may be sluggish, if any response occurs at all, because some private schools have maintained teaching staffs above the "optimal" suggested by law. In such cases, lost students would not necessarily imply the need to reduce personnel and sacrifice subsidies.

Second, nonreligious subsidized schools in Chile have a substantially larger market share than their counterparts in Argentina (even though both countries have similar enrollments in Catholic subsidized schools). Many of the Chilean schools are operated by for-profit corporations and were created in direct response to the 1980 reform. In this respect, Chile appears to be qualitatively different from Argentina.

There are a number of possible explanations for the greater dynamism of nonreligious subsidized schools in Chile. The most likely explanation is to be found on the supply side of the market, including the relatively more generous subsidies given to private schools, in tandem with fewer constraints placed on wages and personnel decisions in Chilean private schools. In this context, the private school marketplace in Chile was simply more attractive to profit-driven entrepreneurs.

Three categories of private schooling

This article will analyze three categories of private schooling in each country: (1) Catholic subsidized, (2) nonreligious subsidized, and (3) nonsubsidized private schools. The first category includes all schools managed by the Catholic Church that receive at least partial subsidies (including, for example, Argentine schools that receive only a portion of teacher salaries, or Chilean schools that participate in "shared financing"). The second category includes any subsidized schools that are operated by nonreligious organizations, ranging from the for-profit corporations that are prevalent in Chile to non-profit foundations. The final category includes any private school that does not receive subsidies. In both countries, this category includes a mix of religious and nonreligious schools.

Empirical strategy and data

This section outlines the empirical strategy that is used to compare student outcomes in public and private schools. It then describes the data from Argentina and Chile that are used to implement the strategy.

Empirical strategy

The goal is to determine whether a given school type—public or private—is relatively more effective than another at producing academic outcomes among

similar kinds of students. Ideally, one might conduct an experiment where groups of students are randomly assigned to a private school "treatment" and a public school "control."[13] After a specified period, each group's outcomes could be compared to assess whether one school type is more effective than another. Inferences are sound because randomization ensures that the groups of students are fundamentally similar, except for the type of school attended.

Yet students are not randomly assigned across school types in either Argentina or Chile. Families make decisions about where to send their children based on their preferences and constraints. And schools have substantial latitude to select the students who are admitted, presuming that applicants outnumber the available spaces. Thus, a simple comparison of outcomes across school types will tend to confuse the dual effects of schools and their heterogeneous student bodies.

The usual solution of researchers has been to employ statistical methods that compare public and private achievement while controlling for a wide variety of student and family characteristics, such as their socioeconomic status. Following this strategy, I posit that academic achievement in each country is produced by a combination of school and family inputs:

$$O_{ij} = P_j\beta_1 + X_{ij}\beta_2 + \varepsilon_{ij}. \quad (1)$$

Using ordinary least squares, the outcome (O_{ij}) of student i in school j is regressed on two vectors of variables.[14] P_j includes four dummy variables indicating school type: Catholic subsidized, nonreligious subsidized, and nonsubsidized private schools (relative to the omitted category of public schools). X_{ij} includes a series of controls for the socioeconomic status of students, families, and their school peer groups. Unmeasured variables are captured in an error term, ε_{ij}.

The goal is to obtain unbiased estimates of β_1, the marginal effect of private schools relative to the public alternative, ceteris paribus. Whether the estimates are, in fact, unbiased will depend on the completeness of the control variables. For example, if family determinants of outcomes are omitted—and correlated with the likelihood of attending a given school type—then one risks confounding the effects of families and schools. This possibility is explored at greater length in the presentation of the results.

The prior specification omits school and teacher variables that may be correlated with achievement and school type. In doing so, it yields an overall effect that is essentially a "black box." Owing to limited data on school and teacher resources, the empirical analysis cannot go much further. However, later in this article, I shall present various explanations for what lies within the "black box."

Data from Argentina

To implement the empirical strategy in Argentina, I use 1997 data from the *Sistema Nacional de Evaluación de la Calidad*. The data were obtained through

a national sample of seventh-graders that was both stratified and clustered. Within each of the 25 *jurisdicciones* in Argentina (comparable to states), three strata were defined: urban public, urban private, and rural. Then, within strata, individual classrooms were selected at random and every student in the classroom was surveyed. The complex sample design implies that students do not have equal probabilities of being selected for the sample. Thus, the observations of each student should receive different weights. Nonetheless, sample weights were unavailable in the data, and the empirical analyses of this article always use unweighted data.

In addition to assessments of academic achievement in Spanish and mathematics, each student responded to a background survey.[15] In the original sample, there were observations for 37,573 students. Roughly 23% of the observations were excluded due to missing data on the dependent and independent variables, leaving a final sample of 28,860.

Data from Chile

In Chile, I use the 1997 *Sistema de Medición de Calidad de la Educación*, applied to eighth-graders. The Chilean data were taken from a national census, in contrast to the Argentine sample. With the exception of some students in isolated rural schools, occupying a small percentage of enrollments, all eighth-graders participated in Spanish and mathematics assessments. Moreover, their parents responded to an additional survey that provides the independent variables used in the analysis. The original data files include records for 234,819 students. Of these, roughly 32% were dropped due to missing data on dependent and independent variables, yielding a final sample of 160,283.[16]

Dependent variables

In each data set, I define three dependent variables that constitute the measures of student outcomes: SPANISH, MATH, and REPEAT. The first two are continuous measures of academic achievement. While originally expressed as the number of items correct, each variable was standardized to a mean of 0 and a standard deviation of 1. Thus, differences in the mean achievement of public and private students in each country can be interpreted as percentages of a standard deviation.[17] This interpretation will prove helpful in comparing results across countries.

In contrast, REPEAT is a dichotomous measure, equal to 1 if a student has repeated at least one grade and 0 if a student has not repeated any grades. Grade repetition is ubiquitous in Latin American schools and results in enormous costs to the educational system, since students occupy school and teacher resources that could be devoted to other students. The present article will assess whether attendance at a private school lowers the probability that a student will repeat a grade.

When analyzing dichotomous dependent variables such as REPEAT, a common empirical strategy is the use of maximum likelihood techniques such as probit regression. Instead, I have simply applied ordinary least squares regression, equivalent to a linear probability model. The simpler method allows the coefficient estimates to be directly interpreted as marginal probabilities, without distorting any of the main conclusions.[18]

Independent variables

For each country, I constructed a comparable set of independent variables. In doing so, I was guided by previous literature on educational production functions (e.g., Fuller and Clarke, 1994), in addition to the constraints imposed by the Argentine and Chilean data. Tables 2 and 3 provide complete definitions of the independent variables.

Table 2. Variable descriptions, Argentina.

Variable	Description
SPANISH	Number of items correct on Spanish exam, standardized to mean 0 and standard deviation 1.
MATH	Number of items correct on math exam, standardized to mean 0 and standard deviation 1.
REPEAT	1 = student repeated at least one grade, 0 = not
CATHOLIC SUBSIDIZED	1 = student attends Catholic subsidized private school, 0 = not
NON-RELIGIOUS SUBSIDIZED	1 = student attends nonreligious subsidized private school, 0 = not
PRIVATE NON-SUBSIDIZED	1 = student attends private nonsubsidized school, 0 = not
FEMALE	1 = female, 0 = male
MTHSCH	Years of mother's schooling
MTHMISS	1 = mother's schooling is missing, 0 = not
FTHSCH	Years of father's schooling
FTHMISS	1 = father's schooling is missing, 0 = not
COMPUTER	1 = family owns computer, 0 = not
TELEPHONE	1 = family owns telephone, 0 = not
TV	1 = family owns television, 0 = not
BOOKS2	1 = family has 1–9 books, 0 = not
BOOKS3	1 = family has 10–50 books, 0 = not
BOOKS4	1 = family has 51–100 books, 0 = not
BOOKS5	1 = family has more than 100 books, 0 = not
AVMTHSCH	Average schooling of mothers in the classroom
AVFTHSCH	Average schooling of fathers in the classroom

Table 3. Variable descriptions, Chile.

Variable	Description
SPANISH	Number of items correct on Spanish exam, standardized to mean 0 and standard deviation 1.
MATH	Number of items correct on math exam, standardized to mean 0 and standard deviation 1.
REPEAT	1 = student repeated at least one grade, 0 = not
CATHOLIC SUBSIDIZED	1 = student attends Catholic subsidized private school, 0 = not
NON-RELIGIOUS SUBSIDIZED	1 = student attends nonreligious subsidized private school, 0 = not
PRIVATE NON-SUBSIDIZED	1 = student attends private nonsubsidized school, 0 = not
FEMALE	1 = female, 0 = male
MTHSCH	Years of mother's schooling
MTHMISS	1 = mother's schooling is missing, 0 = not
FTHSCH	Years of father's schooling
FTHMISS	1 = father's schooling is missing, 0 = not
INCOME	Monthly family income, divided by 100,000
COMPUTER	1 = family owns computer, 0 = not
TELEPHONE	1 = family owns telephone, 0 = not
TV	1 = family owns television, 0 = not
BOOKS2	1 = family has 6–20 books, 0 = not
BOOKS3	1 = family has 21–35 books, 0 = not
BOOKS4	1 = family has 36–50 books, 0 = not
BOOKS5	1 = family has 51–65 books, 0 = not
BOOKS6	1 = family has 66–80 books, 0 = not
BOOKS7	1 = family has 81–95 books, 0 = not
BOOKS8	1 = family has more than 95 books, 0 = not
AVMTHSCH	Average schooling of mothers in the classroom
AVFTHSCH	Average schooling of fathers in the classroom
AVINCOME	Average monthly household income of families in the classroom, divided by 100,000

The independent variables of greatest interest are three dummy variables indicating attendance at three types of private schools: Catholic subsidized, nonreligious subsidized, and private nonsubsidized. Each is interpreted relative to the excluded category of public schooling. The original data from Argentina and Chile, discussed above, include variables on the public or private status of each school. Nonetheless, I supplemented these data to obtain a finer categorization that properly reflects the heterogeneity of private schools. In Argentina, I used administrative data to determine the religious and financial status of each

private school. In Chile, I used administrative data in concert with the official school directory of the Catholic Church (Barahona and Cabre, 1996).

Numerous variables measure the student's background, socioeconomic status, and the quality of the home environment. These variables include the student's gender, years of parental schooling, and the number of books in the home, the latter expressed as a series of dummy variables. I also include dummy variables to indicate the presence of a television, telephone, and computer. In part, these variables may reflect features of the educational environment in the home, but they also proxy family income and wealth.

Using the somewhat richer Chilean data, I constructed two additional measures of student and family background: a dummy variable indicating whether the student's mother identifies herself as indigenous (or Native American), and a continuous measure of family income. Lastly, I constructed measures of student peer-group characteristics by averaging individual characteristics—including parental schooling and income—over all the students in a given classroom.

In the interpretation of the results, I shall avoid attaching a causal explanation to the independent variables that measure home environments and socioeconomic status. Within this empirical framework, one would be hard pressed to determine whether, in fact, computers "cause" achievement to rise or whether their ownership proxies unobserved family wealth. Even so, this uncertainty is no great impediment to the immediate purpose of this study. These variables serve as general proxies for socioeconomic status, and their inclusion is intended to ameliorate bias in comparisons of public and private achievement (to the extent that is possible with nonexperimental data).

While control variables are similar in both countries, one caveat should be emphasized. The Argentine data on family background were drawn from a student survey and the Chilean data from a parent survey. For some variables (e.g., student gender) there is little reason for concern. However, one might expect that other variables, especially measures of parental education, would be more prone to measurement error in the Argentine student survey.

Descriptive statistics

Tables 4 and 5 report the means and standard deviations for the dependent and independent variables, in the full sample and disaggregated by school type. A cursory examination suggests wide gulfs in achievement and repetition rates across public and private schools when raw differences are uncorrected for the background of families and students. In the next section, I shall review these differences in greater detail.

The means of independent variables suggest that gaps in outcomes may not be entirely due to differences among schools. In general, private students have higher levels of socioeconomic status than public students. The widest gap exists between private nonsubsidized students and public students. For example, mothers of public students have, on average, around nine years of

Table 4. Variable means and standard deviations, Argentina.

		Type of school			
	Entire sample	PUBLIC	CATHOLIC SUBSIDIZED	NON-RELIGIOUS SUBSIDIZED	NON-SUBSIDIZED
SPANISH	0.00	−0.08	0.50	0.81	0.76
	(1.00)	(0.98)	(0.95)	(0.90)	(0.92)
MATH	0.00	−0.08	0.45	0.91	0.73
	(1.00)	(0.98)	(0.99)	(0.97)	(0.98)
REPEAT	0.23	0.25	0.08	0.08	0.06
CATHOLIC SUBSIDIZED	0.10	—	—	—	—
NON-RELIGIOUS SUBSIDIZED	0.01	—	—	—	—
NON-SUBSIDIZED	0.01	—	—	—	—
FEMALE	0.51	0.51	0.52	0.45	0.44
MTHSCH	9.38	9.05	11.37	11.69	13.61
	(4.31)	(4.25)	(4.02)	(3.92)	(3.49)
MTHMISS	0.05	0.05	0.03	0.01	0.00
FTHSCH	9.46	9.13	11.59	11.49	13.22
	(4.38)	(4.33)	(3.99)	(4.12)	(3.71)
FTHMISS	0.05	0.06	0.03	0.03	0.03
COMPUTER	0.18	0.15	0.36	0.45	0.65
TELEPHONE	0.52	0.48	0.79	0.86	0.89
TV	0.94	0.94	0.98	0.98	0.99
BOOKS2	0.25	0.27	0.10	0.07	0.05
BOOKS3	0.37	0.37	0.33	0.32	0.21
BOOKS4	0.17	0.16	0.27	0.21	0.27
BOOKS5	0.15	0.13	0.28	0.38	0.45
AVMTHSCH	9.79	9.49	11.64	11.90	13.65
	(2.08)	(1.89)	(1.89)	(2.51)	(2.33)
AVFTHSCH	9.92	9.61	11.90	11.91	13.58
	(2.14)	(1.96)	(1.85)	(2.41)	(2.15)
N	28,860	25,217	2,860	366	417

Note: Standard deviations are not reported for dummy variables.

education in both countries. In nonsubsidized schools, the average mother's schooling rises to around 13 years. In Argentina and Chile, between 6% and 15% of public-student families own computers, rising to 64%–65% in nonsubsidized private schools. The gaps in socioeconomic status are less pronounced, but still evident, between public and private subsidized schools.

To further examine correlations between the independent variables and the probability of attending a private school, Tables 6 and 7 present the results

Table 5. Variable means and standard deviations, Chile.

		Type of school			
	Entire sample	PUBLIC	CATHOLIC SUBSIDIZED	NON-RELIGIOUS SUBSIDIZED	NON-SUBSIDIZED
SPANISH	0.00	−0.21	0.40	0.01	0.83
	(1.00)	(0.98)	(0.86)	(0.98)	(0.72)
MATH	0.00	−0.20	0.39	−0.05	0.91
	(1.00)	(0.95)	(0.91)	(0.97)	(0.82)
REPEAT	0.24	0.29	0.14	0.23	0.11
CATHOLIC SUBSIDIZED	0.12	—	—	—	—
NON-RELIGIOUS SUBSIDIZED	0.20	—	—	—	—
NON-SUBSIDIZED	0.09	—	—	—	—
FEMALE	0.52	0.51	0.61	0.50	0.50
INDIGENOUS	0.05	0.06	0.03	0.05	0.01
MTHSCH	9.59	8.49	10.94	9.89	14.26
	(3.96)	(3.64)	(3.50)	(3.59)	(3.13)
MTHMISS	0.02	0.02	0.01	0.02	0.01
FTHSCH	9.88	8.69	11.18	10.23	15.17
	(4.35)	(3.98)	(3.88)	(3.87)	(3.55)
FTHMISS	0.03	0.03	0.02	0.03	0.02
INCOME	2.98	1.78	3.02	2.67	11.43
	(4.00)	(1.98)	(2.90)	(2.73)	(6.58)
COMPUTER	0.13	0.06	0.15	0.12	0.64
TELEPHONE	0.56	0.43	0.70	0.69	0.96
TV	0.90	0.87	0.96	0.94	0.99
BOOKS2	0.25	0.32	0.17	0.21	0.03
BOOKS3	0.15	0.15	0.15	0.16	0.06
BOOKS4	0.12	0.11	0.14	0.14	0.10
BOOKS5	0.07	0.06	0.09	0.08	0.08
BOOKS6	0.05	0.04	0.08	0.07	0.08
BOOKS7	0.03	0.03	0.05	0.04	0.06
BOOKS8	0.21	0.13	0.27	0.23	0.58
AVMTHSCH	9.70	8.60	11.04	10.02	14.41
	(2.42)	(1.71)	(1.69)	(1.85)	(1.29)
AVFTHSCH	10.12	8.93	11.37	10.47	15.41
	(2.66)	(1.90)	(1.82)	(1.94)	(1.51)
AVINCOME	2.98	1.78	3.01	2.68	11.42
	(3.19)	(0.83)	(1.42)	(1.57)	(4.42)
N	160,983	94,633	19,512	32,331	14,507

Note: Standard deviations are not reported for dummy variables.

Table 6. Correlates of private school choice, Argentina.

	CATHOLIC SUBSIDIZED	NON-RELIGIOUS SUBSIDIZED	NON-SUBSIDIZED
FEMALE	0.007	−0.001	−0.001
	(0.008)	(0.001)	(0.001)
MTHSCH	0.003[a]	0.0004	0.001[a]
	(0.001)	(0.0003)	(0.0002)
MTHMISS	0.023	−0.002	0.002
	(0.012)	(0.005)	(0.004)
FTHSCH	0.004[a]	−0.000002	0.0005[a]
	(0.001)	(0.0002)	(0.0002)
FTHMISS	0.019	−0.002	0.005
	(0.012)	(0.006)	(0.002)
COMPUTER	0.022[a]	0.005[a]	0.006[a]
	(0.005)	(0.002)	(0.002)
TELEPHONE	0.051[a]	0.009[a]	0.004[a]
	(0.007)	(0.003)	(0.001)
TV	0.028[b]	0.0005	−0.001
	(0.014)	(0.003)	(0.003)
BOOKS2	0.018	−0.0002	−0.004[b]
	(0.013)	(0.008)	(0.002)
BOOKS3	0.053[a]	0.005	−0.003
	(0.015)	(0.008)	(0.002)
BOOKS4	0.077[a]	0.005	−0.001
	(0.016)	(0.008)	(0.002)
BOOKS5	0.079[a]	0.010	0.001
	(0.016)	(0.008)	(0.002)
CONSTANT	−0.348[a]	−0.049[a]	−0.039[a]
	(0.030)	(0.013)	(0.009)
Log-likelihood		−11,913	
N		28,860	

Note: The table presents marginal effects of a multinomial logit regression, calculated at the sample means. Effects are interpreted relative to the category of public schooling. Huber–White standard errors, adjusted for clustering of students within schools, are in parentheses.
[a]Statistically significant at 1%.
[b]Statistically significant at 5%.

of multinomial logit regressions for each country. The regressions provide a convenient means of assessing whether higher levels of a specific variable—holding other variables constant—increase the probability that a student attends a particular type of private school, relative to the public alternative. In a typical multinomial logit, the magnitudes of the coefficient estimates are difficult to interpret because the model is nonlinear. Hence, Tables 6 and 7 present

Table 7. Correlates of private school choice, Chile.

	CATHOLIC SUBSIDIZED	NON-RELIGIOUS SUBSIDIZED	NON-SUBSIDIZED
FEMALE	0.047[a]	−0.014[b]	0.0003
	(0.008)	(0.007)	(0.001)
INDIGENOUS	−0.030[a]	0.042[a]	−0.014[a]
	(0.009)	(0.011)	(0.003)
MTHSCH	0.010[a]	0.002[b]	0.002[a]
	(0.001)	(0.001)	(0.0002)
MTHMISS	0.076[a]	0.009	0.028[a]
	(0.011)	(0.012)	(0.003)
FTHSCH	0.005[a]	0.002[a]	0.002[a]
	(0.001)	(0.001)	(0.0002)
FTHMISS	0.031[a]	0.023[b]	0.023[a]
	(0.009)	(0.010)	(0.003)
INCOME	0.004[a]	0.008[a]	0.004[a]
	(0.001)	(0.002)	(0.0004)
COMPUTER	0.013[a]	0.006	0.012[a]
	(0.005)	(0.007)	(0.002)
TELEPHONE	0.024[a]	0.112[a]	0.017[a]
	(0.006)	(0.009)	(0.002)
TV	0.027[a]	0.012	0.006[a]
	(0.007)	(0.008)	(0.002)
BOOKS2	0.032[a]	0.028[a]	0.006[b]
	(0.006)	(0.006)	(0.003)
BOOKS3	0.062[a]	0.057[a]	0.013[a]
	(0.008)	(0.008)	(0.003)
BOOKS4	0.069[a]	0.073[a]	0.017[a]
	(0.008)	(0.009)	(0.003)
BOOKS5	0.081[a]	0.083[a]	0.018[a]
	(0.009)	(0.010)	(0.003)
BOOKS6	0.083[a]	0.081[a]	0.019[a]
	(0.009)	(0.010)	(0.003)
BOOKS7	0.090[a]	0.076[a]	0.020[a]
	(0.010)	(0.011)	(0.004)
BOOKS8	0.081[a]	0.080[a]	0.019[a]
	(0.009)	(0.010)	(0.004)
CONSTANT	−0.415[a]	−0.303[a]	−0.129[a]
	(0.021)	(0.018)	(0.012)
Log-likelihood		−142,843	
N		160,983	

Note: The table presents marginal effects of a multinomial logit regression, calculated at the sample means. Effects are interpreted relative to the category of public schooling. Huber–White standard errors, adjusted for clustering of students within schools, are in parentheses.
[a]Statistically significant at 1%.
[b]Statistically significant at 5%.

marginal effects evaluated at the sample means of each country, as well as the corresponding standard errors.

In the Argentine sample, ownership of a computer or telephone has a statistically significant link to attendance at all three types of private schools. As mentioned above, these variables may serve as proxies for family income and wealth. Parental schooling is correlated with attendance at Catholic subsidized and nonsubsidized private schools. Despite their statistical significance, the magnitudes of the marginal effects are not particularly large. In Chile, most measures of socioeconomic status have statistically significant links to the probability of attending a private school, including parental schooling, income, ownership of various articles, and books in the home. Moreover, the magnitudes of the Chilean effects are typically larger. The pattern of correlations implies that substantial caution is warranted when making simple comparisons of outcomes across public and private schools. Such comparisons will bundle together the effects of schools and their heterogeneous students on outcomes.

Regrettably, the prior analyses are unsuited for making strong inferences about whether specific variables have "caused" students and families to choose private schools. In the case of mother's education, for example, it is possible that greater schooling allows parents to better interpret information on private schooling options. Alternatively, more schooling may increase parental "preferences" for private schooling. In either case, more parental schooling increases the demand for private schooling.

Yet there are also supply explanations. Private schools may be more inclined to locate in neighborhoods where parents are highly educated, perhaps because schools perceive their children as less costly to educate. Alternatively, private schools may explicitly select children with more educated parents from applicants to the school. Both sets of explanations, demand-side and supply-side, are consistent with positive correlations between parental schooling and private school attendance.

Empirical results

Raw differences in outcomes

The odd-numbered columns of Tables 8 and 9 report coefficient estimates for private school dummy variables, absent controls for other independent variables. Thus, coefficients provide estimates of the raw difference in outcomes between each school type and the public alternative. The Spanish and mathematics achievement of Catholic subsidized students in both countries is, on average, 0.5–0.6 standard deviations higher than public students. The gap is even larger—0.8–1 standard deviations—between private nonsubsidized and public students. There is less consistency across countries for nonreligious subsidized schools. In Chile, the raw difference in achievement is considerably smaller than in Argentina.

Table 8. Correlates of student outcomes, Argentina.

	Dependent variable					
	SPANISH		MATH		REPEAT	
	(1)	(2)	(3)	(4)	(5)	(6)
CATHOLIC SUBSIDIZED	0.586[a] (0.049)	0.174[a] (0.043)	0.527[a] (0.061)	0.069 (0.048)	−0.170[a] (0.012)	−0.037[a] (0.009)
NON-RELIGIOUS SUBSIDIZED	0.889[a] (0.153)	0.291[b] (0.121)	0.985[a] (0.177)	0.267[b] (0.126)	−0.175[a] (0.030)	0.010 (0.032)
NON-SUBSIDIZED	0.842[a] (0.090)	0.114 (0.078)	0.807[a] (0.126)	−0.029 (0.122)	−0.196[a] (0.017)	0.027 (0.022)
FEMALE	—	0.259[a] (0.014)	—	−0.017 (0.013)	—	−0.047[a] (0.005)
MTHSCH	—	0.004[b] (0.002)	—	0.003[b] (0.002)	—	−0.005[a] (0.001)
MTHMISS	—	−0.029 (0.030)	—	−0.043 (0.030)	—	0.029 (0.015)
FTHSCH	—	0.009[a] (0.002)	—	0.006[a] (0.002)	—	−0.010[a] (0.001)
FTHMISS	—	−0.100[a] (0.029)	—	−0.104[a] (0.029)	—	−0.072[a] (0.016)
COMPUTER	—	0.085[a] (0.019)	—	0.168[a] (0.019)	—	−0.010 (0.006)
TELEPHONE	—	0.054[a] (0.015)	—	0.087[a] (0.015)	—	−0.048[a] (0.006)
TV	—	−0.021 (0.028)	—	−0.038 (0.031)	—	−0.044[a] (0.013)
BOOKS2	—	0.112[a] (0.029)	—	0.078[a] (0.029)	—	−0.064[a] (0.014)
BOOKS3	—	0.283[a] (0.031)	—	0.229[a] (0.031)	—	−0.149[a] (0.014)
BOOKS4	—	0.391[a] (0.033)	—	0.312[a] (0.033)	—	−0.160[a] (0.015)
BOOKS5	—	0.409[a] (0.035)	—	0.350[a] (0.035)	—	−0.143[a] (0.015)
AVMTHSCH	—	0.031[b] (0.014)	—	0.042[a] (0.015)	—	−0.002 (0.004)
AVFTHSCH	—	0.064[a] (0.014)	—	0.068[a] (0.015)	—	−0.023[a] (0.004)
CONSTANT	−0.081[a] (0.017)	−1.213[a] (0.116)	−0.076[a] (0.019)	−1.126[a] (0.131)	0.251[a] (0.005)	0.835[a] (0.029)
R^2	0.048	0.203	0.043	0.230	0.019	0.139

Note: The *N* for all regressions is 28,860. Huber–White standard errors, adjusted for clustering of students within schools, are in parentheses. Regressions in even columns also include dummy variables for the *jurisdicción* where the school is located.

[a]Statistically significant at 1%.

[b]Statistically significant at 5%.

Table 9. Correlates of student outcomes, Chile.

	Dependent variable					
	SPANISH		MATH		REPEAT	
	(1)	(2)	(3)	(4)	(5)	(6)
CATHOLIC SUBSIDIZED	0.611[a] (0.027)	0.147[a] (0.023)	0.589[a] (0.033)	0.192[a] (0.034)	−0.147[a] (0.006)	−0.053[a] (0.006)
NON-RELIGIOUS SUBSIDIZED	0.217[a] (0.025)	−0.011 (0.021)	0.145[a] (0.030)	−0.035 (0.030)	−0.051[a] (0.007)	−0.002 (0.006)
NON-SUBSIDIZED	1.037[a] (0.021)	0.046 (0.050)	1.105[a] (0.028)	0.033 (0.074)	−0.173[a] (0.006)	0.013 (0.012)
FEMALE	—	0.193[a] (0.008)	—	−0.035[a] (0.012)	—	−0.054[a] (0.003)
INDIGENOUS	—	−0.119[a] (0.013)	—	−0.079[a] (0.013)	—	0.021[a] (0.006)
MTHSCH	—	0.023[a] (0.001)	—	0.018[a] (0.001)	—	−0.012[a] (0.000)
MTHMISS	—	0.091[a] (0.020)	—	0.053[a] (0.020)	—	−0.018 (0.011)
FTHSCH	—	0.012[a] (0.001)	—	0.009[a] (0.001)	—	−0.004[a] (0.000)
FTHMISS	—	0.033[b] (0.016)	—	−0.025 (0.016)	—	0.007 (0.008)
INCOME	—	−0.007[a] (0.001)	—	−0.004[a] (0.001)	—	0.005[a] (0.000)
COMPUTER	—	0.030[a] (0.009)	—	0.057[a] (0.010)	—	−0.010[a] (0.003)
TELEPHONE	—	−0.020[a] (0.007)	—	−0.026[a] (0.007)	—	0.008[a] (0.003)
TV	—	0.034[a] (0.010)	—	−0.032[a] (0.010)	—	−0.009 (0.005)
BOOKS2	—	0.134[a] (0.009)	—	0.091[a] (0.009)	—	−0.047[a] (0.004)
BOOKS3	—	0.226[a] (0.010)	—	0.153[a] (0.011)	—	−0.072[a] (0.005)
BOOKS4	—	0.284[a] (0.011)	—	0.203[a] (0.011)	—	−0.083[a] (0.005)
BOOKS5	—	0.332[a] (0.012)	—	0.252[a] (0.012)	—	−0.091[a] (0.006)
BOOKS6	—	0.340[a] (0.013)	—	0.240[a] (0.014)	—	−0.098[a] (0.006)
BOOKS7	—	0.379[a] (0.014)	—	0.284[a] (0.016)	—	−0.109[a] (0.007)

(*Continued on next page.*)

Table 9. (*Continued*).

	Dependent variable					
	Spanish		Math		Repeat	
	(1)	(2)	(3)	(4)	(5)	(6)
BOOKS8	—	0.417[a]	—	0.344[a]	—	−0.102[a]
		(0.011)		(0.011)		(0.005)
AVMTHSCH	—	0.115[a]	—	0.135[a]	—	−0.033[a]
		(0.011)		(0.015)		(0.004)
AVFTHSCH	—	0.005	—	−0.024[b]	—	0.018[a]
		(0.009)		(0.012)		(0.003)
AVINCOME	—	0.001	—	0.024[a]	—	−0.003[a]
		(0.004)		(0.006)		(0.001)
CONSTANT	−0.211[a]	−1.945[a]	−0.200[a]	−1.631[a]	0.286[a]	0.638[a]
	(0.014)	(0.039)	(0.016)	(0.053)	(0.003)	(0.012)
R^2	0.107	0.238	0.116	0.221	0.021	0.065

Note: The *N* for all regressions is 160,983. Huber–White standard errors, adjusted for clustering of students within schools, are in parentheses. Regressions in even columns also include dummy variables for the region where the school is located.
[a]Statistically significant at 1%.
[b]Statistically significant at 5%.

In Argentina, attending a private school is associated with a lower probability of repeating a grade, by 0.17–0.20. These magnitudes are similar in Chile, with the exception once again of students in nonreligious subsidized schools, who are only 0.05 less likely to repeat a grade.

Coefficients on control variables

The even-numbered columns present coefficient estimates from regressions that control for a full range of independent variables. Before evaluating how these controls alter the private school coefficients, let us consider several other coefficient estimates. There is a pronounced gender gap in Spanish achievement, favoring girls, that is surprisingly consistent across countries: 0.26 in Argentina and 0.19 in Chile. Girls also have a lower probability of repeating a grade, by 0.05. The gender gap is reversed in mathematics achievement, though considerably smaller in magnitude.

In general, the various measures of socioeconomic status have their predicted effects on outcomes. Increasing parental schooling, for example, is associated with higher achievement and a lower probability of grade repetition. In both countries, the number of books in the home is a strong predictor of student outcomes, though its causal significance is unclear. Also striking is the importance of peer-group characteristics in the determination of outcomes. All else equal, individual achievement rises tends to rise when classmates have highly educated parents.

Coefficients on private school variables

The coefficients on private school dummy variables are substantially modified once other variables are held constant. Three main conclusions emerge from the regressions in Tables 8 and 9. First, the results are fairly consistent in suggesting that Catholic subsidized schools in both countries lead to modest improvement in outcomes, relative to public schools. In Argentina, the coefficient on Catholic schools is 0.17 for SPANISH, though statistically insignificant for MATH. Catholic school attendance lowers the probability of grade repetition by 0.04. In Chile, the results are strikingly consistent. The SPANISH and MATH coefficients are 0.15 and 0.19, respectively, while Catholic school attendance lowers the probability of grade repetition by 0.05.

Second, there are sharply varying patterns of results for nonreligious subsidized schools. In Chile, none of the coefficients is statistically different from zero (these results are consistent with the prior empirical research cited above). In Argentina, these schools have positive and statistically significant effects of almost 0.3 standard deviations, but no effects on grade repetition.

Third, none of the coefficients on nonsubsidized private schools is statistically significant, in either country. This finding suggests that the entirety of differences in outcomes is due to differences in the socioeconomic background of students. It should be noted, however, that the Chilean findings are not entirely consistent with prior research. Using earlier SIMCE data, McEwan and Carnoy (2000) find large and statistically significant effects. However, they used data that were aggregated to the school level, with less detailed controls for socioeconomic status. Thus, their results may reflect unmeasured characteristics of students. McEwan (2001), using the same data as the present article, find positive and statistically significant effects. McEwan's paper estimated separate equations for public and private schools and used the coefficient estimates to predict achievement of a typical student in each school. Thus, the Chilean results, at least for nonsubsidized schools, are sensitive to the empirical method.

The discussion in later sections will focus on interpreting the pattern of results for subsidized schools, whether Catholic or nonreligious.[19] From a policy standpoint, the effects of nonsubsidized private schools are less informative. In Chile, for example, this category of schooling has maintained a quite steady share of enrollments during the reform process. Indeed, any further expansion of private schooling that is spurred by government subsidies must occur through the subsidized categories of schooling.

Evidence of selection bias

It is possible that estimates of private school coefficients are biased by the exclusion of family or student variables, typically referred to as selection bias.[20] Bias exists if unobserved variables are correlated with both student outcomes and with the likelihood that students attend a private school. In Chile, at least,

there is some evidence in the direction of bias. Parry's (1996) random survey shows that 15% of public and 63% of private voucher schools in Santiago use one of several methods to select students for admission, including entrance exams, interviews, and minimum grade requirements. Similarly, Gauri's (1998) random survey of Santiago households shows that 18% of public school students took an exam in order to enroll in their present school. For private voucher and private nonvoucher schools, the figures were 37% and 82%, respectively. Thus, private schools are more likely to exercise selectivity in their admissions policies.

If private schools select their students based on characteristics that are unobserved to researchers but still correlated positively with achievement, as seems likely, then estimates of private school coefficients are probably biased upwards. Parry (1996) includes a variable measuring school selection—positively correlated with a private school dummy—in achievement regressions similar to ours. The selection variable's coefficient is strongly positive, while the coefficient on a private school dummy is statistically insignificant. Although the act of selection does not directly increase student performance, it may proxy unobserved characteristics of students who attend schools that select.

In a separate paper, the 1997 data from Chile were used to compare public and private achievement, specifically focusing on corrections for selection bias (McEwan, 2001). The analysis produced no evidence that selection bias favors public schools.[21] Thus, the available evidence is suggestive that the estimates of private school coefficients in the present article, at least for Chile, are an upper bound to private school effects.

Discussion

This section will focus on two puzzles. First, what can explain the pattern of positive results for Catholic subsidized schools across countries? Second, what can explain the inconsistent pattern of results for nonreligious subsidized schools across countries, especially the Chilean results that indicate no differences?

Catholic subsidized schools

In both countries, the evidence suggests that Catholic schools have fairly consistent, though modest, effects on outcomes. The following paragraphs explore several explanations for these results. In the absence of more comprehensive research, however, the explanations are best considered hypotheses.

First, Catholic schools may use more resources than public schools. In prior research on Chile, McEwan and Carnoy (2000) present data suggesting that Catholic schools are more costly than public schools. In part, this is because they obtain private resources, from parents and the Church, over and above the revenues from government subsidies.[22] If these resources are used to raise academic achievement, then the observed differences in achievement between

private and public school achievement are simply resource based. There is no evidence concerning the resources used in Argentine Catholic schools.

Second, Catholic schools may use a different allocation of resources than public schools, perhaps emphasizing a more effective set of school policies. In the U.S., for example, Catholic secondary schools may promote a more challenging climate than public schools by emphasizing a common academic core for all students (Witte, 1992, 1996).[23] In general, however, there is little evidence on patterns of resource allocation within Catholic schools in Argentina or Chile and on how these compare to public schools.

Third, Catholic schools may have unique objectives and missions, rooted in their religious orientation. In their work on U.S. Catholic schools, Bryk et al. (1993) refer to this as a distinctive "communal organization." Compared to their public counterparts, U.S. Catholic schools provide more opportunities for face-to-face interactions among adults and students and give teachers greater responsibility for working with students outside the classroom. Moreover, they promote "a set of shared beliefs about what students should learn, about proper norms of instruction, and about how people should relate to one another" (Bryk et al., 1993, p. 299). There is little evidence on the organizational structure of Catholic schools in Argentina and Chile. If Catholic schools do possess a more effective organization, then the consistent effects observed in each country are not contingent upon private status as much as *Catholic status*.

Fourth, private schools may permit a more decentralized and autonomous organization that allows for greater effectiveness than public schools (Chubb and Moe, 1990). In contrast, public schools may suffer from an overly rigid and bureaucratic structure that leaves little room for innovation and stifles effectiveness. According to this view, Catholic school effectiveness stems mainly from operating in the private sector—and the autonomy it brings—rather than the unique organizational features of religious schooling. To some extent, this view is at odds with two pieces of evidence from Argentina and Chile. First, it cannot explain why the results should differ across Catholic and nonreligious schools *within* Chile, particularly when each type of school is subject to a similar set of regulations. These regulations presumably allow a similar degree of autonomy to each school type, implying that they should be relatively similar in their effectiveness. However, this is not the case. Second, it cannot explain why Catholic schools are similarly effective in both Argentina and Chile. As noted above, Catholic subsidized schools in Argentina operate within a more rigid set of regulations than those in Chile, providing less autonomy. Hence, this view would predict that Argentine Catholic schools would be *less* effective than their Chilean counterparts, which is not observed in the data.

Nonreligious subsidized schools

The results for nonreligious subsidized schools differ substantially across countries. In Argentina, there are moderate effects on achievement, but not

in Chile. There are two potential explanations for this pattern of results. The first explanation lies in differences between the nonsubsidized private schools in each country, while the second lies in differences between the students who attend these schools.

As observed above, the market share of nonreligious subsidized schools in Chile is notably larger in Chile than in Argentina. In large part, the growth in market share in Chile was precipitated by the emergence of for-profit schools after the 1980 reform. In other research, McEwan and Carnoy (2000) suggest that nonreligious schools—dominated by for-profit operations in Chile—are more likely to engage in cost-cutting behavior than public or even other private schools. For example, they offer less instruction time than other private schools and are more likely to employ part-time and moonlighting teachers. While perhaps cutting costs, these resource allocation decisions may lower the effectiveness of these schools if instructional time and teacher characteristics are related to achievement. A similar pattern of effectiveness may not be observed in Argentina because nonreligious private schools are less bent on maximizing profits (and may include other outcomes, such as student achievement, in their objective functions). These hypotheses are mostly speculative, however, given the lack of data about school operations in each country.

While the objectives of nonreligious schools may be different across Argentina and Chile, it is also the case that these schools enroll different kinds of students. In Chile, the socioeconomic status of students in nonreligious private schools is higher than that of public students, but the difference is not as large as that of Argentina (see Tables 4 and 5). Given the massive expansion of nonreligious schools in Chile, this outcome is perhaps unsurprising. As Chilean private schools expanded, they dipped further into public school enrollments, often attracting an increasingly disadvantaged group of students (that is, nonetheless, more advantaged than students who remain in public schools). It is possible that these students are simply more difficult to educate, or require additional resources to endow with a given set of educational outcomes. Chilean law, however, does not systematically adjust the level of subsidy for student traits, at least *within* municipalities. At the margin, the effectiveness of Chilean private schools may have declined (or fallen to parity with public schools) because these schools began educating a more challenging and diverse group of students, but without more resources. If this explanation holds, then a similar pattern of declining effectiveness should be observed in Argentina as nonreligious schools expand their share of enrollments.

Conclusions

There is tremendous interest in the potential impact of large-scale voucher plans. Nonetheless, there is little empirical evidence that can be used to make strong predictions about the effect of policies (McEwan, 2000). While there is a vast body of research comparing outcomes in public and Catholic schools

in the U.S., the latter are typically unsubsidized. Hence, they may provide poor indications of the relative effectiveness of private schools that would arise under a voucher plan or another large-scale attempt to subsidize private schools.

The governments of Argentina and Chile did, in fact, use public subsidies to encourage private enrollments, although each country structured their policies differently. Argentina subsidized the salaries of personnel in private schools, while Chile subsidized the level of student enrollments in private schools. Assessing the relative effectiveness of private and public schools in these countries may assist in judging the impact of their policies, while providing clues about the potential impact of policies in other countries.

The results are mixed and provide few unambiguous answers about the effects of subsidies. In both countries, Catholic subsidized schools are somewhat more effective than public schools in producing student outcomes, although these results are probably an upper bound to the true effects. There are several potential explanations for these effects. At least in part, they may be due to the unique missions, policies, and resources that are characteristic of the Catholic sector (although empirical research to substantiate this is sparse). The effects may be less attributable to the "private" status of Catholic schools, if only because other types of private schools do not consistently duplicate their results, even when endowed with similar resources.

In Chile, unlike Argentina, there are few differences in outcomes between public and nonreligious subsidized schools. The diminished effectiveness of nonreligious private schools in Chile may be due to their different objectives—placing greater emphasis on securing a margin of profit—or their different students. Any country that substantially expands its private sector by providing extensive subsidies must recognize that new private schools will emerge with a range of objectives. Moreover, expanding private schools will enroll a wider range of students that may require different technologies or resources to educate.

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Notes

1. In the U.S., there is a substantial body of empirical evidence that tests this assertion by comparing the relative effectiveness of public and private schools in producing outcomes such as achievement and attainment (for reviews of this literature, see Levin, 1998; McEwan, 2000). The

evidence on the comparative costs—necessary to compare efficiency—is substantially weaker. In developing countries, there is also a burgeoning literature, partially reviewed by Riddell (1993). There are more recent studies on Chile (McEwan and Carnoy, 2000; McEwan, 2001), India (Kingdon, 1996; Bashir, 1997), Indonesia (Bedi and Garg, 2000), and Vietnam (Glewwe and Patrinos, 1999).

2. The countries are similar in other respects. In 1997, UNESCO and the Latin American Ministries of Education implemented a cross-national survey of academic achievement in the third and fourth grades. On average, Argentine students scored somewhat higher than Chilean students in language and mathematics, but the differences were never more than 20% of a standard deviation (Willms and Somers, in press). In contrast, Cuban students scored more than 1.5 standard deviations higher than each country.
3. The following discussion of private schooling in Argentina is drawn from the comprehensive work of Morduchowicz et al. (1999).
4. As Morduchowicz et al. (1999) observe, the law essentially prescribed a technology of educational production for private schools. This provides an ironic counterpoint to current debates over vouchers and private schooling, which frequently emphasize the autonomy of private schools as their key strength (Chubb and Moe, 1990). Yet public subsidies often bring additional regulation that limits autonomy, as the Argentine case exemplifies.
5. In a sweeping 1991 law, the Argentine government transferred all public educational services to the provinces (roughly 10 years after Chile's massive decentralization). At the same time, it decentralized legal responsibility for the administration of private school subsidies. In the last nine years, however, there remain substantial similarities in each of the provincial laws, given their base in the 1991 law and prior experience.
6. Further below, the reader will notice that empirical analyses of student outcomes *do* establish which Catholic and nonreligious schools receive subsidies. Nonetheless, these data cannot be used to calculate the proportion of students that attend each school type. This is because the Argentine sample design was complex, requiring sampling weights for each observation to account for their unequal probabilities of selection into the sample. However, sampling weights were not available.
7. Strictly speaking, the "voucher" is not a coupon given to individual families and then turned over to schools. Rather, it is a direct subsidy to school supply (and is referred to as a *subvención* in the Chilean vernacular). Though the physical mechanism of payment is different, the two policies may yield similar results in practice by directly linking school revenues to the number of enrolled students.
8. Chilean law specifies a factor by which the base subsidy is adjusted for students at every grade level. Furthermore, selected municipalities receive "zone assignments" to compensate for high poverty or isolation. It should be noted, however, that adjustments are largely ad hoc and may not reflect true variation in educational costs. Since 1987, rural schools within municipalities have received upward adjustments. See Parry (1997) for further details.
9. See Cox (1997) for additional details on the post-1990 reforms.
10. Discounts to vouchers are applied progressively. If the tuition charge is less than half the level of the current voucher level, no discount is applied. Tuition charges between one half and one voucher incur a 10% deduction. Charges between one and two vouchers incur a 20% deduction. Cox (1997) provides additional details. Ninety-three percent of schools that opted to participate in shared financing in 1994 had either a 0% or a 10% deduction (Aedo, 1996).
11. Author's calculations with data from the Ministry of Education.
12. Further research would be required to convincingly rule out other potential explanations for private school growth, and thus establish a causal link. Nonetheless, it is telling that private school growth was sustained in both countries during the 1980s, even while family incomes (and demand for private education) declined.
13. In fact, several randomized experiments have been conducted in the U.S. cities of Dayton, New York, and Washington (e.g., Peterson, et al., 1999). See McEwan (2000) for a review of the results.

14. Because of the clustering of students within schools, a straightforward application of ordinary least squares regression would tend to underestimate the standard errors. Thus, all regressions present Huber–White standard errors that are adjusted for the clustering of students within schools.
15. Surveys were also given to teachers and principals, but these data were unavailable.
16. These exclusions include the small number of students, numbering around 1%, that attend private schools managed by an array of Protestant or nondenominational churches.
17. There is no unambiguous definition of what constitutes a small or large difference. In a standard "bell" curve, one standard deviation above and below the mean contains about 68% of the total observations. Two standard deviations above and below the mean contain roughly 95%. Thus, if an individual begins with a test score that is extremely low (relative to most individuals), an increase of four standard deviations would allow her to leapfrog the vast majority of individuals. Of course, magnitudes are rarely, if ever, this large. In this study, and most others, effects are usually some fraction of a standard deviation.
18. Probit estimates and their corresponding marginal effects were calculated for comparison and were not substantially different.
19. As a previous section noted, the Chilean sample excludes a small number of students who attend subsidized Protestant schools, largely because the Argentine data do not allow such schools to be readily identified (and a comparable category to be constructed). For some evidence on the effectiveness of these schools, see McEwan and Carnoy (2001) and McEwan (2001).
20. See Goldberger and Cain (1982) or Murnane et al. (1985) for general discussions.
21. As an exclusion restriction, the paper assumed that the density of private schools in a student's municipality is correlated with the likelihood of choosing a private school but is not correlated with achievement. The paper reports empirical evidence to bolster this assumption.
22. It should be noted, however, that public schools can also receive additional revenues from their municipalities.
23. Other authors document that Catholic students take more academic courses than public students and are more likely to participate in academic rather than vocational tracks (Coleman et al., 1982; Coleman and Hoffer, 1987; Bryk et al., 1993; Gamoran, 1996). Bryk et al. (1993) argue that Catholic high schools directly encourage all students to pursue a common academic core, regardless of background or college plans.

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Patrick J. McEwan is an Assistant Professor of Economics at Wellesley College.