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LONG-TERM TRENDS IN PRIVATE SCHOOL ENROLLMENTS BY FAMILY INCOME

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ABSTRACT

We use data from multiple national surveys to describe trends in private elementary school enrollment by family income from 1968-2013. We note several important trends. First, the private school enrollment rate of middle-income families declined substantially over the last five decades, while that of high-income families remained quite stable. Second, there are notable differences in private school enrollment trends by race/ethnicity, urbanicity, and region of the country. Although racial/ethnic differences in private school enrollment are largely explained by income differences, the urban/suburban and regional differences in private school enrollment patterns are large even among families with similar incomes. In particular, the 90-50 income percentile difference in private school enrollment rates in 2013 is more than three times as large in cities as in the suburbs, and these gaps are larger in the South and West than in the Northeast and Midwest. Factors contributing to these patterns may include trends in income inequality, private school costs and availability, and the perceived relative quality of local schooling options.

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Long-Term Trends in Private School Enrollments by Family Income

Introduction

Over the last four decades, inequality in family incomes in the United States has increased; so have gaps in educational outcomes between children from low-income and high-income families. A number of recent papers have examined mechanisms through which increases in family income inequality may have contributed causally to increases in income-based gaps in educational outcomes. This paper contributes to this literature by reporting the results of research examining trends in private school enrollment rates by children from median- and high-income families.

Background and Context

During the first three decades after World War II, family incomes in the United States increased at approximately the same rate at all percentiles of the income distribution. Since the early-1970s, however, inequality in family incomes in the United States has increased markedly. This pattern is shown in Figure 1, which displays pre-tax income trends net of inflation for families with school-aged children at different points in the income distribution.[1] The real income in 2015 of families at the 95th percentile of the income distribution was 78 percent higher than it was in 1973, and for families at the 90th percentile it was 65 percent higher. In sharp contrast, the real income in 2015 of families at the 50th percentile of the distribution was only 21 percent higher than its 1973 level, and that of families at the 20th percentile of the distribution was 8 percent lower in 2015 than in 1973.

<Figure 1 about here>

Many factors contributed to the growth in family income inequality, including

technological changes that favored highly educated workers, the decline in the percentage of American workers belonging to unions, the decline in the real value of the minimum wage, and changes in the composition of American families.[2] Of particular relevance to this paper is the substantial increase in education-related wage differentials for both men and women (Autor, 2014). One consequence is that reducing income-based gaps in educational outcomes is critical to reversing growth in income inequality in the U.S.

Many federal and state public policies have attempted to improve educational outcomes for children from economically disadvantaged families. These include school finance reforms in many states, federal support for compensatory education, especially through Title 1 of the Elementary and Secondary Education Act, and support to low-income families through programs such as the Earned Income Tax Credit and food stamps. Implementation of these policies has improved educational outcomes for children from low-income families.[3] Nonetheless, income-based inequality in educational outcomes, measured either in terms of test scores or as years of completed education, has increased over the last several decades. For example, Reardon (2011) has demonstrated that gaps in mathematics and reading test scores between young children from low- and high-income families have grown over the last four decades.[4] The reason is not that the scores of low-income students are lower today than they were several decades ago. Indeed, they are somewhat higher. However, the scores of children from high-income families have increased more. Since the reading and mathematics scores of elementary and high school students are strong predictors of their subsequent success in post-secondary education, it is not surprising that income-based gaps in four-year college completion rates have also increased in recent decades (Bailey & Dynarski, 2011; Ziol-Guest & Lee, 2016).[5]

Why did income-based gaps in educational outcomes grow during the decades that

inequality in family incomes increased? One reason is that high-income families invested increasingly large amounts of money in preparing their children to succeed in formal education. Between 1972 and 2010, the annual gap in spending per child under the age of 6 (in 2015 $) between families whose incomes were in the top decile and those with incomes in the bottom quintile increased from $1,900 to $7,000 (Kornrich, 2016).

A second, related reason is that affluent families increasingly chose to live in neighborhoods with very expensive housing and consequently residential segregation by income increased over the last several decades (Reardon & Bischoff, 2011). Owens (2016) has shown that, between 1990 and 2010, this pattern was driven entirely by increases in residential segregation by income among households with children. As Chetty and his colleagues (2014) have shown, residential segregation by income in itself contributes to increases in inequality of educational outcomes by providing very different neighborhood environments for children from high- and low-income families.

Of particular importance, increasing residential segregation by income among families with school-aged children has resulted in increased segregation of low-income students in different public schools from those attended by children from higher-income families (Altonji & Mansfield, 2011; Owens, Reardon, & Jencks, 2016). As Duncan and Murnane (2014) explain, increases in school segregation by income contribute to inequality in educational outcomes through at least three mechanisms: peer effects, student mobility effects, and teacher quality effects.

One other mechanism through which increases in family income inequality may contribute to income-based inequality in educational outcomes concerns private school enrollments. Parents send their children to private elementary schools for many reasons. In 2007,

31 percent reported that they did so to obtain a better academic program than that offered by available public schools. Thirty-six percent reported that they wanted their child's school to provide instruction in a particular religion or value system. Eight percent reported that they wanted a small school, and four percent reported that they wanted a safer environment or better discipline than available public schools provided.[6]

The effects of growing income inequality on patterns of private school enrollment are unclear. As families have become more aware of the remarkably high recent labor market payoffs to educational attainments, and as private school tuitions have risen, private schooling may be one more way that high-income families seek to give their children an advantage in preparing for post-secondary education. With increasing wealth and income, relatively affluent families are increasingly able to afford the high tuitions that most nonsectarian and some religious private schools charge. They may also increasingly want to substitute payment of private school tuitions for the time they would otherwise spend in monitoring their child's experiences in public schools.

On the other hand, increasing residential and school segregation by income may obviate the need to seek educational advantage through private schooling. In most states, the size of the local per-student property tax base is a strong predictor of school district spending. Buying into suburban communities with high housing prices typically provides high-quality public schools and a variety of real or perceived amenities associated with having affluent neighbors. Since interest on mortgage payments is deductible from income in computing federal income tax liability, while private school tuitions are not, residential moves may have financial advantages over sending children to private schools.

There are three groups of families for which increasing income inequality may have had

an especially large impact on private school enrollment rates. The first are black and Hispanic families. To the extent that discrimination in housing markets reduces the ability of affluent black and Hispanic parents to purchase housing in neighborhoods with high-quality public schools, they may increasingly send their children to private schools. Reardon and Bischoff (2011) show that the increase in residential segregation by income was greater among black families than among white families over the last three decades. Nonetheless, affluent black and Hispanic families still live in much lower-income neighborhoods than equally affluent white families (Pattillo, 2013; Reardon, Fox, & Townsend, 2015; Sharkey, 2014). This may lead a larger percentage of affluent black and Hispanic families to choose private schools for their children than equally affluent white families.

The second group are families living in cities. Many urban public schools struggle as they serve increasingly low-income student populations. Affluent families that chose to live in cities may find private schools an increasingly attractive educational option for their children.

The third are families living in the South. School districts in most southern states are geographically large. Consequently, it is more difficult for affluent families to purchase high-quality public schooling for their child by moving to a neighborhood with high housing prices than it is in parts of the country in which school districts are geographically small.

Given that less than 10 percent of American children attend a private elementary or secondary school, why should we care if increases in family income inequality have resulted in growing gaps by family income in private school enrollment rates? One reason is that if the private schools affluent families choose for their children provide a better education than the schools available to children from lower-income families, these choices pass on economic advantage to the next generation, and undercut the potential for intergenerational economic

mobility. Even if the instruction in the private schools that affluent parents choose is not better than that which public schools provide, the opportunity to build relationships with children from other affluent, well-connected families may confer long-term economic advantage.

Another reason to care about trends in private school enrollments by family income is that well-educated affluent parents that send their children to private schools may be less interested in devoting their time and their political and social capital to advocating for better public schools.[7]

Finally, the mix of private schools in the United States has changed dramatically over the last half century. These changes, which we describe below, may have altered the role of private schools in educating children from different parts of the family income distribution.

In this paper, we report the results of our research on whether private school enrollment decisions are a mechanism through which growing income inequality has contributed to increasing school segregation by income. We address the following three research questions:

RQ1: National trends: How have national patterns of private elementary school enrollment rates changed over the last 50 years for families from different parts of the family income distribution?

RQ2: National trends by private school type: How do trends in private elementary school enrollment rates differ by income for different types of private schools?

RQ3: Subpopulation trends: How do trends in private elementary school enrollment rates by income differ among subpopulations of families defined by race/ethnicity, by whether they live in cities or suburbs, and by region of the country?

Research Design

Datasets

The ideal dataset for answering our research questions would provide detailed information on the family incomes, demographic characteristics, residential locations, and elementary schooling choices of large representative samples of American children for every year over the last five decades. For children who attended a private school, the dataset would indicate whether the school was Catholic, affiliated with another religion, or nonsectarian. It would also indicate the annual "sticker price" (published tuition and fees) each private school charged, the net annual cost that individual families paid, and the average amount the school spent each year in educating each student.[8]

Unfortunately, no such ideal dataset exists. This led us to use 73 nationally representative datasets, each of which contains information useful in addressing some of our questions. In describing the years for which particular datasets provide information on private elementary school enrollments, we use the calendar year pertaining to the beginning of the school year. We also define the elementary grades as one through 8. The datasets include:

- 46 October Current Population Surveys (CPS), including education supplements, each providing information on a nationally representative sample of American households for one of the years from 1968-2013;[9]
- 4 IPUMS datasets, each providing information on a nationally representative sample of households from one of the decennial Censuses of Population from 1970-2000;
- 8 National Household Education Surveys (NHES), each of which provides information on a nationally representative sample of children enrolled in U.S schools in a particular year, between 1992 and 2011;
- 3 NCES longitudinal datasets, each of which tracks over time a nationally representative sample of children in elementary school;

- 12 Private School Universe Surveys (PSS), each of which provides information on almost all private elementary and secondary schools in operation in the U.S. during a particular year, from 1989 to 2011.[10]

Appendix A provides information on the characteristics of these datasets.

Samples

The CPS and Census survey households. Since our research questions concern the elementary schooling choices of families, we created samples from these datasets that included all children enrolled in any grade from 1-8 in a public or private school.[11] The NCES longitudinal datasets are samples of children enrolled in school. We included all of the children in these datasets in our analytical samples. The NHES datasets are samples of children, including children who are home-schooled. To retain comparability with other datasets used in this study, we constructed analytic samples of NHES participants enrolled in either public or private elementary schools.

The unit of observation in each of the 12 PSS datasets is a private school. We used this dataset to track trends in the number of private schools in operation in the U.S. and in the percentage of American children enrolled in particular types of private school. We compared estimates of enrollment trends based on data from the PSS to those derived from responses to household surveys. Since 1995, trends in private school enrollments estimated from these data sources have been very similar.[12] Since the PSS does not provide information on the family incomes of enrolled students, we did not use it directly to address our three research questions.

Procedures

Preparing the many samples for analysis involved several steps. One was to identify and correct errors in the data (especially common in the early years of the CPS datasets). A second

was to create standard definitions for all variables. This was challenging because the questions about demographics, family income, and schooling choices for children varied among datasets and across years for the same survey. One example concerns racial and ethnic classifications. Prior to the 1980s, individuals could identify their race only as white, black, or other. By the late 2000s, there were 25 racial self-identity categories.

Another step in data preparation was dealing with missing data on family income. We used multiple imputation with 20 imputed datasets to fill in values of family income for the 5 to 30 percent of respondents who did not complete the relevant survey question.[13]

Measures

The variables used in our analyses included type of school attended, family income percentile, child race/ethnicity, and indicators of residential location.

School type.

In the datasets that provide the requisite information (NHES, all NCES longitudinal datasets, and the 1994 and 1997 CPS), we coded school type as public or as one of three types of private school: Catholic, other religious, or nonsectarian. Some datasets (CPS 1979, 1985, 1988, and 1991; Census 1970 and 1980) only distinguished church-related private schools (either Catholic or non-Catholic) from nonsectarian private schools. Others (CPS and Census in other years) only distinguished private schools from public schools.

Unfortunately, the datasets that provide information on family incomes do not provide information on trends over time and location in the distribution of private schools. However, the PSS does provide this information. The PSS also allows us to distinguish conservative Christian schools from other schools in the non-Catholic religion-affiliated elementary schools, a distinction relevant in interpreting the evidence we report in the next section.[14] Table 1 provides descriptive statistics on the national distribution of private elementary schools and students in

1989 and 2011. Table 2 provides information on the distribution of each type of private school and enrolled students by region, locale type, and year.

<Tables 1 and 2 about here>

In 1989, one-third of the nation's 23,500 private elementary schools were Catholic. These schools, almost half of which were located in cities, tended to be relatively large, with an average of 31 students per grade. In 1989, they served 56 percent of the nation's private elementary school students. Twenty-two years later, only one-quarter of the 23,715 private elementary schools in the United States were Catholic, and they served only 43 percent of private elementary school students. The decline in the number of students attending Catholic elementary schools in Northeastern cities was particularly great, with enrollment falling from 282,746 in 1989 to 101,320 in 2011.

In 1989, half of the private elementary schools in the U.S. were associated with a religion other than Catholicism. One-third of these were conservative Christian schools. Both conservative Christian and other religion-affiliated elementary schools tended to be small, averaging 12 to 13 students per grade. Together they served one-third of the private elementary school student population.

Over the next 22 years, the number of private elementary schools that were neither conservative Christian nor Catholic remained quite steady. In contrast, the number of conservative Christian schools increased by 11 percent, with growth concentrated in the South and in rural areas. In 2011, almost half the students attending conservative Christian elementary schools lived in the South, and almost one-third lived in rural areas.

In 1989, 16 percent of private elementary schools were nonsectarian and these schools served 10 percent of private elementary school students in the U.S. Over the next 22 years, the

number of nonsectarian private elementary schools grew by almost half. In 2011, they served 17 percent of the students enrolled in private elementary schools.

Family income percentile. Some surveys, such as the Census, asked respondents to report the individual income for each family member and estimate family income from the sum of the reported individual incomes. Others asked parents to report into which of 10-18 pre-specified ranges their family income fell. To obtain a metric that was common across years in constructing trends in private school enrollment rates for children in elementary school, we used the method described in the online appendix to Reardon (2011) and in Appendix B of Reardon, Fox, & Townsend (2015) to convert ordinal income categories into percentiles of the national distribution of incomes for families with children between the ages of 5 and 21 who were enrolled in grades one to eight.

Our original plan was to report trends in private school enrollments by family income percentile from 1968 to 2015. However, as we explain in Appendix B, CPS-based estimates of private school enrollment rates by family income for the years 2014 and 2015 are inconsistent with those from the larger American Community Survey. For that reason, we ended our CPS-based estimates with the year 2013.

Family race/ethnicity. We classified children in our analytic samples as belonging to one of four mutually exclusive racial/ethnic groups: non-Hispanic white (henceforth white), non-Hispanic black (henceforth black), Hispanic, or other. In our Findings section below, we describe trends in the private school enrollment rates of children from different racial/ethnic groups whose families are in the top, middle, or bottom of the U.S. family income distribution, not the income distribution of families of a particular race/ethnicity. This is important to keep in mind because the income distributions of black and Hispanic families lie to the left of the income

distribution for white families. For example, in 1969, 2 percent of black children and 4 percent of Hispanic children in elementary school lived in families with incomes that were in the top 10 percent of the national distribution of incomes of families with children in elementary school. The comparable figures for 2013 are 3 percent of black children and 4 percent of Hispanic children. At the other end of the family income spectrum, in 1969, 50 percent of black children and 34 percent of Hispanic students in elementary school lived in families in the bottom 20 percent of the national income distribution for all families with children in elementary school. In 2013, the comparable figures are 36 percent of Black students and 28 percent of Hispanic students.

Region. We classified children as living in one of four regions: Northeast, Midwest, South, and West. Over the half century in which we examined private school enrollment patterns, the geographic distribution of American elementary school students changed, with the South and West gaining at the expense of the Northeast and Midwest. In 1969, 23 percent lived in the Northeast; 28 percent lived in the Midwest; 32 percent in the South; and 17 percent in the West. The comparable percentages for the year 2013 are 16, 22, 38, and 24.

City/Suburb/Rural. Between 1969 and 2013 the distribution of U.S. elementary school students among three types of locales, cities, suburbs, and rural areas, changed markedly, with suburbs gaining at the expense of cities and rural areas. In 1969, 30 percent lived in cities, 41 percent lived in suburbs, and 28 percent lived in rural areas. The comparable figures for 2013 are 22, 60, and 18 percent.

Data-Analytic Plan

We estimate the private school enrollment rate, conditional on a family's position in the income distribution as follows. Let P_i indicate the income percentile (scaled from 0 to 1) of

family i in the national income distribution of families with children of a given age range (i.e., among families with children of elementary school age). Let Y_i be a binary variable indicating whether child i is enrolled in private school. We fit polynomial logit models of order K of the form:

$$g(P_i) = \ln\left[\frac{Pr(Y_i = 1)}{Pr(Y_i = 0)}\right] = \sum_{k=0}^{K} \beta_k (P_i)^k. \tag{1}$$

The parameter estimates from this model allow us to estimate the function $f(P)$ describing the proportion of students of income percentile P who are enrolled in private school:

$$\hat{f}(P) = \left[1 + e^{\hat{g}(P)}\right]^{-1} = \left[1 + e^{\sum_{k=0}^{K} \hat{\beta}_k (P)^k}\right]^{-1}. \tag{2}$$

From this, we compute an estimate of the proportion of students at specific income percentiles ($P = 0.20, 0.50, 0.90,$ and 0.95). We compute the standard error of $\hat{f}(P)$ via the Delta method:

$$se\left(\hat{f}(P)\right) \approx \sqrt{\left[\hat{f}'\left(g(P)\right)\right]^2 \cdot Var\left(\hat{g}(P)\right)} = \hat{f}(P)\left[1 - \hat{f}(P)\right] \cdot se\left(\hat{g}(P)\right). \tag{3}$$

We choose K, the order of the polynomial, based on visual inspection of the fit of $\hat{f}(P)$ to the observed data. In most cases, this yields $K = 2$. To estimate the proportion of students enrolled in different types of private schools, we fit polynomial multinomial logit models rather than simple logit models. To estimate private school enrollment rates by subpopulations (race/ethnicity, region, and urban/suburban location), we fit model (1) on the subpopulation data.

In describing the answers to our research questions in the next section, we make extensive use of plots displaying trends in estimated private school enrollment over time. To reduce the influence of year-to-year variation stemming from modest sample sizes, we plot three-year moving averages of private school enrollment rates and we base hypothesis tests on the averaged values. Two exceptions concern trends in enrollment rates and median tuition paid, by family income percentile, for each of three types of private schools. Since we rely on information from several data sources in estimating these trends and do not have data for every year, we fit meta-regression models through the available data points. The advantage of meta-regression over ordinary least squares is that it does not assume homoscedastic error terms and makes use of the estimated variances of the individual residuals. These models estimate the enrollment rate or median tuition as a function of a school year (and in one case, its square), family income percentile, and the interactions among these variables. We base hypothesis tests on the coefficients of the estimated models, reporting p values in parentheses. To illustrate the goodness of fit of the meta-regression models, we also include the data points in the graphs. To facilitate exposition, we omit the word "estimated" in describing private school enrollment rates even though all are estimates generated by the analytical methods described above.

In addressing some questions, we report evidence from the 1968-69 school year to the 2013-14 school year (henceforth, 1968 to 2013). To make clear the time period for which we have evidence bearing on each question, we use the same horizontal scale representing time for all graphs. In some cases, such as trends in rates of enrollment in particular kinds of private schools by family income, the graphs illustrate that we have no evidence prior to 1987 or after 2011. To remove the effects of inflation on purchasing power, we express all family incomes and private school tuitions in 2015 $.

Our graphs show trend lines in estimated private elementary school enrollment rates for children whose families are at one of three points on the family income distribution: the 20th, 50th, and 90th percentiles. We refer to these as low-, median-, and high-income families respectively. We pay particular attention to changes in the size of the gap in private school enrollment rates between families at the 90th and 50th income percentiles (henceforth, the "90-50 gap"). We do this because, as Figure 1 illustrates, the growth in inequality in incomes among families with children of school age since the early-1980s has been overwhelmingly in the top half of the distribution. For example, among families with school-aged children, the 90th percentile income in 1979 ($122,098) was 2.06 times as high as the 50th percentile income ($59,153). In 2015, the comparable 90th percentile income ($190,900) was 2.65 times as large as the 50th percentile income ($72,102).[15]

The most striking patterns we report are changes over time in the size of 90-50 gaps in private school enrollment rates. The p-values reported in parentheses illustrate the results of tests of null hypotheses specifying that the 90-50 gaps were the same size in different years.

Findings

RQ1: National trends.

The percentage of American elementary school students attending private elementary schools increased from 10.1 percent in 1948 to more than 15 percent in 1958. The percentage remained close to 15 through the mid-1960s, but then fell back to 10 percent by the mid-1970s. The private elementary school enrollment rate remained between 9 and 11.4 percent for the rest of the 20th century. After 1999, the rate declined slowly but steadily, from 11 percent in 1999 to 9 percent in 2015.[16]

Figure 2 displays trends in private school enrollment rates over the period from 1968 to

2013 for all U.S. children enrolled in grades one to eight whose family incomes were at particular points in the national distribution. The figure illustrates the strong positive role of income in predicting private school enrollment rates. For example, in 1968, 18 percent of elementary-school-aged children living in high-income families attended a private school, while the corresponding percentages for children from median- and low-income families are 12 and 7 respectively. This pattern is no surprise because, in the absence of scholarships, families must pay tuitions to send a child to a private school, but not to a public school.[17]

<Figure 2 about here>

Figure 2 also illustrates that the private elementary school enrollment rate of children from median-income families declined by 3 percentage points between 1968 and 1990 and remained between 9 and 10 percent during the 1990s. In contrast, after falling slightly during the early 1970s, the private elementary school enrollment rate of children from high-income families increased modestly during the last quarter of the 20th century, and was slightly higher in the year 2000 than it had been in 1970. As a result, the 90-50 gap in private elementary school enrollment rates grew from 5.3 percentage points in 1968 to 9 percentage points in the year 2000 ($p<0.001$). During this period, the private elementary school enrollment rate for students whose family income was at the 20th percentile was very low, declining slowly from 7 percent in 1968 to 5 percent in the year 2000.

During the first thirteen years of the 21st century, private elementary school enrollment rates for children from both median-income and high-income families declined by about three percentage points, and the 90-50 gap remained between 9 and 10 percentage points. To gain greater insight into trends in the schooling decisions of families from different parts of the income distribution, we now to turn to enrollment trends by private school type.

RQ2: National trends by private school type.

In 1965, 89 percent of American children who attended a private elementary school were enrolled in a Catholic school; in 2011, the comparable figure was 43 percent. In contrast, the percentage of private elementary school students who attended a non-Catholic religious elementary or secondary school increased from 8 percent in 1965 to 40 percent in 2011. During this same period, the percentage of private elementary school students enrolled in nonsectarian schools increased from 4 to 17 percent.[18] We now turn to enrollment trends by family income for the three mutually exclusive categories of private elementary schools that can be differentiated in national data, albeit in two cases beginning only in 1987.

The left panel of Figure 3 displays trends in rates of enrollment in private nonsectarian elementary schools, by family income, from 1969 to 2011. Only a small percentage of the nation's elementary school students attend these schools, and a growing percentage who do come from relatively affluent families. In 1969, one percent of students from median-income families attended a private nonsectarian school, and the enrollment rate for children from middle-income families remained between one and two percent through 2011, the last year for which we have the relevant data.

<Figure 3 about here>

In 1969, the enrollment rate in private nonsectarian elementary schools for children from 90th percentile income families was only 2 percent, and consequently the 90-50 enrollment rate gap in these schools was only one percentage point. However, the enrollment rate in private nonsectarian elementary schools for children from high-income families increased slowly but steadily, reaching 6 percent in 2011. Consequently, the 90-50 gap in enrollment rates in private nonsectarian elementary schools in 2011 was almost five percentage points, more than three

times the size of the comparable gap in 1969 ($p<0.001$).

The middle panel of Figure 3 displays trends in enrollment rates in Catholic elementary schools, by family income, over the period from 1987 to 2011. Catholic school enrollment rates for students from families in the bottom half of the family-income distribution fell slowly but steadily over the 25-year period. The enrollment rate for middle-income families in 2011 was 3 percent, half the comparable enrollment rate in 1987.

In contrast, the Catholic school enrollment rate for high-income families declined by only 1 percentage point over the 25-year period, from 11 to 10 percent. As a result, the 90-50 gap in enrollment rates grew from 4 to 7 percentage points. Unfortunately, as a result of having only 11 data points to estimate Catholic school enrollment rate trends at each family income percentile, the slope differences displayed in Figure 3 are only suggestive; we cannot reject the null hypothesis that the 90-50 gap in 2011 is the same size as the 90-50 gap in 1987 ($p=0.19$).

The right panel of Figure 3 displays trends in enrollment rates in private other religious elementary schools, by family income, between 1987 and 2011. The trends are quite different from those for the other two groups of private schools. Over the period 1987 to 2011, the enrollment rate in other religious elementary schools of children from median-income families increased from 3 to 4 percent. In contrast, the enrollment rate in these schools for children from high-income families declined from 6 to 5 percent. As a result, the 90-50 gap in enrollment rates in non-Catholic religious elementary schools in 2011 (2 percentage points) was half the size of the comparable gap in 1987. As with the Catholic school enrollment trends, these patterns are only suggestive. Due to a lack of power, we cannot reject the null hypothesis that the 90-50 gaps are the same size in the two years ($p=0.14$).

In summary, the relatively stable private elementary school enrollment rate for children from high-income percentile families displayed in Figure 2 masks a shift from religious to non-sectarian schools from 1970-2010. The declining private school enrollment rates for children from middle-income and low-income families displayed in Figure 2 are due to a decline in Catholic school enrollment rates for these groups. These declines were somewhat offset by increases in the enrollment rates of children from these groups in other religious private schools.

RQ3: Trends for subgroups of families.

Race/ethnicity

In 1959, enrollment rates in private elementary schools for white, Hispanic, and black students were 16, 13, and 3 percent respectively. Over the next half century, the private elementary school enrollment rate of white students declined slowly, with 12 percent enrolled in private elementary schools in 2013. During this same period, the comparable enrollment rate of Hispanic students declined quite rapidly, while that of black students increased slightly. In 2013, 5 percent of black children and 3 percent of Hispanic children of elementary-school-age were enrolled in a private school.

The left panel of Figure 4 displays trends in rates of enrollment in any type of private elementary school for black students whose families were at different points on the national family income distribution. Until very recently, the trends were very similar to those for white students. Private school enrollment rates for black students from low- and median-income families were low and quite stable throughout the period from 1968 to 2013. In contrast, the private school enrollment rate for black students from high-income families experienced an upward secular trend between 1968 and 2007, increasing from 12 to 22 percent during this period. The net effect was that the 90-50 gap in the private elementary school enrollment rate of

black students in 2007, 15 percentage points, was twice as large as the comparable gap in 1968 ($p<0.01$). Over the subsequent six years, however, the private school enrollment rate of black children from high-income families fell by 10 percentage points, resulting in a 90-50 enrollment rate gap in 2013 that was slightly smaller than the comparable gap in 1968. At least part of the explanation for this dramatic recent decline in the private elementary school enrollment rate for children from high-income black families lies in relatively long-lasting income and wealth shocks from the Great Recession.[19]

<Figure 4 about here>

The right panel of Figure 4 displays trends in private school enrollment rates, by income, from 1969 to 2013 for Hispanic children. While the estimates for high-income Hispanic families are noisy due to small sample sizes, the figure illustrates several patterns. In 1969, the private school enrollment rate of Hispanic children from median-income families was 15 percent. The rate fell quite steadily over the next 45 years, reaching a low of 3 percent in 2013. Throughout this period, the private school enrollment rate for Hispanic children from low-income families was quite low and falling, from 7 percent in 1969 to 2 percent in 2013.

The private elementary school enrollment rate of Hispanic children from high-income families also fell during the last 45 years, but much more slowly (and more erratically through the late 1990s). The enrollment rate in 2013, 14 percent, was 4 percentage points lower than the comparable rate in 1969. A consequence of these enrollment rate trends is that the 90-50 gap in the private school enrollment rate of Hispanic children grew substantially, from 3 percentage points in 1969 to 11 percentage points in 2013 ($p<0.001$).

One question that the panels of Figure 4 prompt is whether private school enrollment rates for black and Hispanic students from high-income families differ from those of non-

Hispanic white students from equally high-income families. To examine this, we plotted private school enrollment rates for these three groups in Figure 5. While the trends for high-income black and Hispanic students are noisy due to small sample sizes, the pattern is quite clear. Before the mid-1970s, the private school enrollment rate for black children from high-income families was considerably lower than the comparable enrollment rates for white and Hispanic children from high-income families. However, since then, the private school enrollment rates for black, Hispanic, and white children from high-income families have tracked each other quite closely. The one exception is the recent quite precipitous decline in the private school enrollment rate of black children from high-income families.

<Figure 5 about here>

Urban/Suburban

In 1968, 18 percent of children living in cities and 13 percent of those living in suburbs attended a private elementary school. Over the next half century, both percentages declined, as did the difference between the private elementary school enrollment rates of urban and suburban children. In 2013, the respective enrollment percentages were 10 and 8.

The left panel of Figure 6 displays trends in private elementary school enrollment rates, by income percentile, for families living in cities. The pattern is a more vivid version of that displayed in Figure 2 for all American elementary school students. The private school enrollment rate for children from median-income families declined quite steadily from 23 percent in 1978 to 7 percent in 2013. This decline is linked to the closing of many urban Catholic schools over this time period. However, it is not clear how much this is due to changes in the demand for urban Catholic schools (stemming from changes in the religious and racial demographics of cities) and how much is due to changes in the ability of the Catholic Church to maintain urban schools with

the same relatively low tuition rates that parishes had provided historically.

<Figure 6 about here>

The private elementary school enrollment rate for children from high-income urban families varied somewhat between 1968 and 2013, climbing during the early 1970s and late 1990s and falling during the first decade of the 21st century. However, the long-run secular trend is one of stability, with the 26 percent enrollment rate in 2013 equal to the comparable rate in 1968. The net result is that, because of the decline in the enrollment rate of children from 50th income percentile families the 90-50 gap in private school enrollment rates for children living in cities increased from 5 percentage points in 1968 to 19 points in 2013 ($p<0.01$).

The right panel of Figure 6 displays trends in private elementary school enrollment rates by income in suburban communities. The trends are muted versions of those for urban families. The private school enrollment rate for children from median-income suburban families declined quite steadily, from 13 percent in 1978 to 6 percent in 2013. During this period, the private school enrollment rate for children from high-income suburban families varied from year to year, but the rate in 2013, 13 percent, was only slightly lower than the 1978 rate of 15 percent. As a result, the 90-50 gap in private school enrollment rates for families living in suburbs in 2013 (7 points) was more than three times the gap of 2 points present in 1978 ($p<0.001$).

Region

In 1968, private elementary school enrollment rates were considerably higher in the Northeast and Midwest than in the South and West. In 2013, they were still higher, but the differences were much smaller. The reason is that private school enrollment rates in the Northeast and Midwest plummeted while those in the South and Midwest held quite steady. The respective enrollment rates by region were 20, 15, 6, and 8 percent in 1968 and 10, 11, 7, and 7

percent in 2013.

The four panels of Figure 7 show trends in private school enrollment rates, by income, for students living in each of four regions. The trends in the Northeast and Midwest are similar, reflecting the large but declining role of Catholic schools in these regions. In 1968, when more than 20 percent of children from median-income and high-income families in the Northeast attended private elementary schools, the vast majority were in Catholic schools. Over the next 45 years, the percentage of children from both high- and median-income families in the Northeast attending private elementary schools declined steadily. As a result, the 90-50 gap in private school enrollments in the Northeast and Midwest remained relatively small, with 2013 values of 5 and 6 percentage points respectively.

<Figure 7 about here>

Trends in private elementary school enrollment rates in the South and West were quite different from those in the other two regions. The private school enrollment rates of median-income families in the South and West in 1968 were 6 and 7 percent respectively, much lower than the comparable rates in the other two regions. Over the rest of the 20th century, these enrollment rates remained quite stable, before falling slightly during the first years of the 21st century. In 2013, 5 percent of children from median-income families in the South and 4 percent of those living in the West attended private elementary schools.

Private-school enrollment rates for children from high-income families in the South and West were 13 and 12 percent respectively in 1968, much lower than the comparable rates for high-income families in the other two regions. However, in contrast to the patterns in the Northeast and Midwest, private elementary school enrollment rates for high-income families in the West and especially in the South increased over the next half century. The 2013 enrollment

rates were 19 percent in the South and 16 percent in the West. The net result of these trends was that in 2013, the 90-50 gaps in private school enrollment rate in the South and West were 14 and 11 percentage points respectively, considerably higher than 90-50 gaps in the other two regions ($p<0.01$).

Another difference between the regions was in the composition of private school enrollments. In 2011 (the last year for which we have private school enrollment rates by region and school type), 58 percent of children living in the South and enrolled in private elementary schools attended non-Catholic religious schools. The comparable percentages for students in the other three regions ranged from 43 to 48. In contrast, only 17 percent of private elementary school students in the South and 21 percent of those living in the West attended Catholic schools, while 41 percent of those living in the Midwest and 30 percent of those living in the Northeast did so. Only 11 percent of private elementary school students living in the Midwest attended nonsectarian schools, while the comparable percentages for private elementary school students living in the South, Northeast, and West are 26, 27, and 33 respectively.[20]

Explaining the Patterns

We have described several striking patterns:

1. The gap between the private elementary school enrollment rates of children from high- and median-income families rates grew substantially between 1968 and 2013, especially during the last two decades of the 20th century. It grew largely because the private school enrollment rate of middle-income families declined considerably during that time period.
2. The growth in the 90-50 income gap among families of private nonsectarian elementary school students has been particularly large and is almost entirely due to a

substantial increase in the enrollment rate of children from high-income families.

3. Catholic elementary school enrollment rates have shown a substantial long-term decline, especially among children from low- and middle-income families. This accounts for much of the growth in the 90-50 gap in private school enrollment rates.
4. Conditional on family income, private school enrollment rates are much higher among families living in cities than among those living in suburbs, and the 90-50 gap grew more among urban families.
5. Private elementary school enrollment rates are lower for black and Hispanic families than for white families, but differences in income account for most enrollment rate differences.
6. Private school enrollment trends are quite different in the South and West than in the Northeast and Midwest. The growth in the 90-50 private school enrollment rate gap has been much greater in the South and West.

We frame our explanations for these patterns in terms of a simple economic model of families. We assume that parents seek to maximize their family's welfare, subject to the constraints they face. Quality of their children's education, as they define it, is one element of welfare. Relevant constraints include their family income and the cost and perceived quality of the public and private schools available to them. The cost of public schools depends on the price of housing in different communities. The cost of private schools is the net tuition and fees the parents would be charged.

Between 1979 and 1999, the gap between the private elementary school enrollment rates of children from high- and median-income families rates increased from 5.5 to 8.1 percentage points. We used data from the 1980 and 2000 Censuses to estimate what would have happened to

this gap if the ratio of the 90th percentile family income to the 50th percentile family income had not changed over this period. We found that the gap would not have grown. In 1979, the median income of families with school-aged children was $60,289 (in 2015 $). In that year, the 90th percentile family income was almost exactly twice as high as the 50th. In 1999, the real income of median-income families was 14.1 percent higher than it had been 20 years earlier. If the 90/50 income ratio had been the same in 1999 as in 1979, the 90th percentile income would have been $137,580. This corresponds to the 84th percentile of the income distribution of families with school-aged children in that year. The estimated school enrollment rate for families at the 84th income percentile in 1999 was 0.154, which is 0.051 points higher than the private school enrollment rate of 50th income percentile families in that year, yielding a gap nearly identical to the 5.5 percentage point 90-50 gap in 1979. Thus, the increase between 1979 and 1999 in the ratio of the resources of high- and median-income families plays a key role in accounting for the growth in the 90-50 gap in private school enrollment rates.

The decline in the number of Catholic schools and the increasing cost of those that remain also contributed to the decline in the percentage of families sending their children to private elementary schools, especially among those of modest means. Between 1970 and 2010, the number of Catholic elementary schools in the United States declined 37 percent and the number of students attending these schools fell 60 percent. In part, this was because inflation-adjusted tuition in Catholic elementary schools increased 570 percent (from $873 to $5,858).[21] During this same period, the median real income of families with school-aged children increased only 23 percent, and even that of 90th-income percentile families with children increased only 65 percent.

One factor contributing to the increasing cost and declining supply of Catholic schools is

the decline in the number of clergy and members of religious orders who provided low-cost teaching services to Catholic schools. Between 1970 and 2016, the percentage of the staff of Catholic elementary schools who were clergy or members of religious orders fell from 48 to less than 3. Another contributing factor was the financial cost to Catholic dioceses of settling sexual abuse cases, especially during the first decade of the 21st century. These settlements reduced the ability of many dioceses to subsidize their schools, a long-standing practice that had allowed parishes to keep tuitions well below average per-student operating cost and to offer substantial scholarships to students from low-income families.[22] These trends in the cost and availability of Catholic schools help explain why Catholic schools increasingly serve students from relatively high-income families. They also may explain why the private school enrollment rates of median-income families in the Northeast and Midwest, where Catholic schools have historically been the dominant supplier of private school education, fell so rapidly over the last 45 years.

While tuitions at Catholic schools have increased especially rapidly in recent decades, tuitions in other types of private schools also increased more rapidly than the median income of families with children. Measured in 2015 dollars, the average tuition in nonsectarian private elementary schools rose from $4,120 in 1979 to $22,611 in 2011.[23] Given the high average tuitions in nonsectarian private elementary schools, it is not surprising that enrollment in these schools rose faster among students from high-income families than among those from low-income families, or that the 90-50 enrollment gap increased substantially.

Tuitions have also increased substantially in non-Catholic religious elementary schools. In 1993, average tuition (in $2015) in these schools was $3,896. In 2011, it was $9,134. Since the average income of high-income families increased by much more than that of median-income or low-income families during this period, it is surprising that 90-50 enrollment gap did

not increase between 1987 and 2011. We return to this puzzle below, when we discuss differences across regions.

Another factor relevant to explaining trends in private school enrollments is the perceived quality of the public schools with which private schools compete. A consequence of the increase in residential segregation by income over the last several decades, especially among families with school-aged children, is that urban public schools increasingly serve low-income student populations (Owens, 2016; Owens, Reardon, and Jencks, 2016). Average mathematics and reading scores are considerably lower for students attending urban public schools than for those attending suburban public schools.[24] Student discipline problems are more frequent.[25] Throughout the 1980s and early 1990s (the only period for which we have consistently coded data), urban parents with children of school age rated their local public schools as lower quality than suburban parents did. For example, in 1992, 37 percent of urban parents gave their local schools a grade of A or B, while 50 percent of suburban parents did so (Phi Delta Kappan Poll, 1992). This may explain why high-income parents who choose to live in cities are more likely than those living in suburbs to conclude that urban public schools do not provide the high quality education they want for their children and can afford to pay for.[26]

Differences across regions in the composition of private school enrollments help to explain differences in private school enrollment trends. Historically, Catholic school enrollment rates in the South and West were much lower than those in the Northeast and Midwest. Consequently, private school enrollment rates in the South and West were less affected by the declining availability and increasing cost of Catholic elementary schools.

During the 1970s, efforts by the courts to desegregate public schools in the South resulted in white flight to private schools (Rossell, 1983). This contributed to the increase in the private

school enrollment rate in the South during that decade, especially among white and high-income families. Reardon and Yun (2003) show that the private school enrollment rate of white children living in predominantly black counties in the South remained high throughout the last three decades of the 20th century.

Differences in the distribution of religious beliefs across regions, especially the disproportionate number of conservative Christians in the South, also played a role in the changing composition of private schools. In the wake of Supreme Court decisions banning prayer in schools, many conservative Christians felt that public schools did not reflect their values (Cooper, 1984). This may explain why the percentage of median-income families living in the South who sent their children to non-Catholic religious elementary schools increased over the past several decades despite the marked increase in tuitions at these schools. Interestingly, the percentage of high-income families in the South who sent their children to other religious elementary schools declined over this same period, and the 90-50 gap in enrollment rates in other religious elementary schools declined ($p<0.02$). However, high-income Southern families increasingly sent their children to Catholic schools and nonsectarian private schools. This explains why 90-50 gaps in enrollment rates in these types of private schools increased in the South between 1987 and 2011 (respectively, $p<0.05$ and $p<0.01$).[27]

Implications of the Trends

Relative to residential mobility patterns, trends in private school enrollments play only a modest role in explaining increases in school segregation by income. The reason is that the percentage of American children attending private elementary schools has declined from 15 to less than 9 percent in recent decades. However, this role is still not inconsequential. Over the last three decades, Catholic schools and nonsectarian private schools have increasingly served

students from high-income families. These trends, especially among urban families and those living in the South and West, are one of several mechanisms through which increases in family income inequality have contributed to increases in school segregation by income.

It is more difficult to judge whether trends in private school enrollment rates by family income have contributed to increases in gaps in educational outcomes by family income. If average per student expenditure is an indicator of instructional quality, this may be the case. The reason is that the 90-50 enrollment rate gap has increased the most in nonsectarian elementary schools, which are more than twice as expensive as religious schools (Baker, 2009).

It is also the case that median-income parents who enrolled their child in a particular type of private elementary school paid less than high-income parents who did so. For example, the median tuition paid by a 50th income percentile family that sent a child to a nonsectarian private school in 2001, the latest year for which we have the relevant data, was $2,100 less (in 2015 $) than that paid by high-income families.[28] Part of the difference may reflect scholarship aid to median-income families. However, it also reflects differences between the high-priced private schools that children from affluent families attend and the lower-priced, and perhaps less effective private schools that students from lower-income families attend. Indeed, Braun, Jenkins, and Grigg (2006) and Lubienski and Lubienski (2014) document that differences in the effectiveness of private schools within each private school type are much greater than differences between the average effectiveness of each type of school. We know of no evidence about whether the more expensive private schools are more effective than the less expensive ones. Certainly, the school choices of affluent families indicate that they think they are.

The limited available evidence on the average effectiveness of different types of private schools does not support a clear inference about whether trends in private school enrollments by

family income have increased or decreased the size of income-related gaps in student achievement. Using data from the 2003 National Assessment of Educational Progress, Braun, Jenkins, and Grigg (2006) and Lubienski and Lubienski (2014) find that, net of family background influences, the average mathematics and reading achievement of children enrolled in conservative Christian elementary schools was approximately one-half a standard deviation lower than that of demographically similar children enrolled in public schools. This is consistent with the very low average per student expenditure in these schools (Baker, 2009) and the weak average academic qualifications of their teaching staffs (Lubienski & Lubienski, 2014). Unfortunately, there is no systematic evidence on the reading and mathematics achievement, net of family background influences, for the 63 percent of children enrolled in non-Catholic religious private schools that are not conservative Christian schools.[29]

Enrollment of students from high-income families in other religious private schools declined in recent decades, while that of students from middle-income and low-income families increased. The low average reading and mathematics achievement of children enrolled in conservative Christian academies suggests that these enrollment trends may have contributed to the increase in the reading and math test score gap between children from low- and high-income families, although the effects would likely be very modest, given the small proportion of students in such schools.

On the other hand, trends in Catholic elementary school enrollments may have reduced income-related gaps in test scores. Using data from the period 1998-2004, Reardon, Cheadle, and Robinson (2009) report that, by fifth grade, Catholic school students are 3–4 months behind public school students in mathematics achievement (but not in reading skills).[30] Using NAEP data from 2003, Braun, Jenkins, and Grigg (2006) and Lubienski and Lubienski (2014) report

similar patterns. In recent decades, the percentage of children from low- and medium-income families who attend Catholic elementary schools has fallen rapidly while the percentage attending public schools has risen. If the change in the distribution of low- and middle-income students reflected movement from Catholic schools of average effectiveness to public schools of average effectiveness, this would have resulted in improved mathematics achievement for students from low- and middle-income families. However, we have no way to judge whether this assumption holds. Nor do we know if the relative performances of Catholic and public elementary schools has changed in the last dozen years.

One final implication of the trends we document in this paper is that a larger percentage of the students in urban public schools come from families in the bottom half of the income distribution than was the case a half century ago. This stems in large part from the movement of high-income families to the suburbs. However, changes in the schooling choices of urban families also have contributed to this pattern. More than one-quarter of students from high-income families living in cities sent their children to private schools in 2013, about the same percentage that did so in 1968. In contrast, only 7 percent of students from median-income urban families and 4 percent of those from low-income families attended private schools in 2013, down from 21 and 10 percent respectively in 1968. A consequence of these patterns is that both urban public schools and urban private schools have less socioeconomic diversity today than they had several decades ago.

We conclude by reminding the reader of the dramatic changes that have taken place in the distribution of private elementary school enrollments in the U.S. over the last 45 years. One illustration is that non-Catholic religious elementary schools today serve more students whose family incomes are in the bottom half of the distribution than Catholic elementary schools do.

Another is the substantial increase in recent decades in the percentage of students from high-income families who attend private nonsectarian private schools. Much less is known about these groups of private schools than is known about Catholic schools, which historically were the dominant supplier of private school services in the U.S. and the subject of a great deal of research.

The key trends we document in this paper have, together, troubling implications for the segregation of low-income students. As a result of growing residential segregation by income, low-income families are increasingly concentrated in urban areas. In such places, one quarter of high-income families enroll their children in private schools; but a much smaller—and declining—proportion of middle- and low-income families in urban areas do so. This is, in part, a result of rising tuition and reduced availability of Catholic schools, which in the past enrolled many middle and low-income students in urban areas. Higher income families, however, increasingly live either in the suburbs or enroll their children in private schools. Moreover, the private schools their children attend are more likely to be expensive nonsectarian schools than was the case four decades ago. Together these trends indicate an increasingly polarized pattern of school enrollment. As a result, American schools—both public and private—are increasingly segregated by income.

Notes

[1] In constructing the family income percentile distribution, equal weight was given to each child of school-age. We did not adjust incomes for non-cash benefits such as food stamps and the Earned Income Tax Credit.

[2] See Duncan and Murnane (2011 and 2014) for discussions of the factors contributing to growth in family income inequality.

[3] See, for example, Cascio, Gordon, and Reber (2013), Dahl and Lochner (2012), Hoynes, Schanzenbach, and Almond (2016), Jackson, Johnson, and Persico (2016), and Lafortune, Rothstein, and Schanzenbach (2016).

[4] Nielsen (2015) found no increases in the size of achievement gaps between cohorts of the National Longitudinal Surveys of Youth (NLSY) who were teenagers in 1979 and in 1997. Several differences between the Reardon (2011) and Nielsen (2015) studies help to explain the differences in results. First, the NLSY samples of youth are smaller than those included in the many datasets Reardon included in his study, rendering the NLSY-based results relatively imprecise. Second, they cover a smaller timespan than that covered by the multiple datasets Reardon used in his study. Third, the timespan covered by the cohorts Nielsen studied does not include the time period for which Reardon found the largest increase in the size of income-related achievement gaps.

[5] Chetty and his colleagues (2014) find that the gap in college enrollment rates between youth from high- and low-income families did not change for cohorts born between 1971 and 1993. Their data do not allow them to examine trends in college graduation rates. Ziol-Guest and Lee (2016) replicate Chetty et al.'s findings on college enrollment rates, but show that the gap in college graduation rates has increased over the last several decades. The four-year college

graduation rates reported by Bailey and Dynarski (2011) are for 25-year-olds. See Kearney and Levine (2016) for evidence that high levels of income inequality contribute to relatively low levels of high school completion for youths, especially boys, from low-income families.

[6] Authors' tabulations of data from the 2007 NHES.

[7] Another possibility is that affluent parents who send their children to private schools may be less likely to vote in favor of the taxes needed to fund high quality public education. We know of no evidence that directly addresses this hypothesis. However, Boustan et al. (2013) and Corcoran and Evans (2010) find that rising income inequality is associated with increases in spending on public education. They point out that this is consistent with a median voter model in which rising income inequality reduces the median voter's tax share.

[8] As Baker (2009) points out, many private schools spend more per student each year than the tuition and fees they charge, making up the difference from returns on endowments or from annual voluntary donations.

[9] We explain in Appendix B why we did not use information from the October CPS for 2014 and 2015 in our analyses.

[10] We also prepared analytic samples from the 15 American Community Survey (ACS) datasets, each of which provides information on a nationally representative sample of U.S. households from one of the years from 2001-2015. However, with one exception described in Appendix B, we did not use ACS data in our analyses. The reason is that the ACS does not distinguish students attending private schools from those that are home-schooled. Since 2008, one response option to the ACS question about whether a child has been in school during the last three months has been "Yes, private school, private college, home school." Prior to 2008, the relevant option was "Yes, private school, private college." It is not clear how parents who home-schooled their

children would have responded to the prompt before 2008.

[11] For reasons of parsimony, we do not include in this paper evidence on trends in private school enrollment rates for secondary school students. These trends are quite similar to those for elementary school students, with the following qualifications. The percentage of high school students attending private schools has been consistently lower than that of elementary school students, but the difference has declined from four percentage points to one over the last half century. The 90-50 gap in private school enrollment rates grew less among high school students than among elementary school students. Finally, point estimates indicate that trends by family income in enrollment rates in particular types of private schools are somewhat different at the high school level than at the elementary school level. However, the differences are primarily due to the small amount of data available to estimate these trends.

[12] The estimates of private school enrollments from the first administrations of the PSS (1989, 1991, and 1993) were considerably higher than higher than CPS-based estimates. Williams (1987) explains that surveys of private schools conducted by the U.S. Department of Education during the 1970s and early 1980s also produced estimates higher than those obtained from the CPS (a household survey).

[13] In all of the datasets with missing values of family income (CPS, ECLS, and NELS), respondents were asked to specify into which pre-specified income range their family income fell. We used ordered logistic regression analysis to impute the bin in which each missing family income value belonged. The predictors used in the imputation process included parental educational attainments, parental occupations, parental ages, family structure, state of residence, and race/ethnicity.

[14] The U.S. Department of Education classifies conservative Christian schools as those that have

membership in at least one of four associations: Accelerated Christian Education, American Association of Christian Schools, Association of Christian Schools International, or Oral Roberts University Education Fellowship (Kena et al., 2016, p. 83).

[15] Had we chosen to report private school enrollment trends for 95th income percentile families instead of those for 90th income percentile families, the patterns we describe would have been even more striking. We chose to report the 90th income percentile trends because they are less sensitive to limitations in the family-income data and assumptions about the functional form of our estimating equations than the 95th income percentile trends are. These are the same reasons that led us to report enrollment trends for 20th income percentile families rather than 10th percentile income families.

[16] Estimates of private school enrollment rates for the years prior to 1968 were taken from Bruno, 1982, Table 1, p. 20. The authors estimated rates for subsequent years from October Current Population Survey data. In all of the statistics we report in this paper on the percentages of American elementary school students enrolled in private school, the denominator is the combined total number of students enrolled in either private or public schools. Excluded from the denominator is the number of students of elementary-school age who are home-schooled. We do this because there is no reliable estimate of the number of children who are home-schooled prior to the first administration of the National Household Education Survey (NHES) in 1995 that specifically asks whether children are home-schooled. Data from the NHES indicate that the percentage of children of elementary school age who are home schooled increased from 2.4 percent in 2000 to 3.0 percent in 2006. (Due to a change between 2006 and 2011 in the method of administering the NHES, the estimate of the home schooling rate from the 2011 survey is not comparable with those from earlier administrations of the NHES.

[17] Families do pay for high-quality public schools by paying premiums for housing in relevance attendance zones.

[18] The authors calculated the distribution of student enrollments in different categories of private schools in 1965 using information in *Statistics of Nonpublic Elementary and Secondary Schools 1965-66* (1968), Tables 7a and 8a, pp. 24 and 26. Authors' calculations of data from the 2011 PSS provided the analogous information for 2011.

[19] McKernan et al. (2013).

[20] The estimates of the composition of private school enrollments by region came from authors' calculations of data from the 2011 PSS.

[21] Dale McDonald, PBVM, PhD, the Director of Public Policy and Educational Research for the National Catholic Educational Association, provided these figures.

[22] See Baker (2009) for an informative discussion of the difference between private school tuitions and per-student operating cost.

[23] Bruno (1982), Table 7, page 27 provides the mean tuition in 1979 in current dollars. The tuition figure for 2011 came from Snyder and Dillow (2015), Table 205.50, pp. 118-119. Retrieved on May 4, 2017 from: https://nces.ed.gov/pubs2015/2015011.pdf.

[24] Blagg, 2016.

[25] Snyder, De Brey, and Dillow, *Digest of Education Statistics 2015* (2016), Table 230.10.

[26] Another factor that may have contributed to the decline in the private school enrollment rate of children from median-income and low-income urban families after the mid-1990s is the increasing availability of charter schools in many cities. These are public schools that provide families with another schooling option free of tuition payments. We know of only one study that examines the causal impact of greater charter school availability on private school enrollment

rates. Using data from Michigan, Chakrabarti and Roy (2016) do not find evidence supporting the substitution hypothesis.

[27] Authors' analyses of data from those CPS and NCES datasets containing information on enrollment in particular types of private schools by family income and region.

[28] NCES datasets and CPS datasets for certain years provide information on the net tuitions families paid for a particular type of private school. We estimated the tuition differences by family income that we report by carrying out the following steps. We estimated the median tuition paid by families in each income bin by type of private school. We then fit meta-regressions of median tuition by year and income as described in the research design section. Epple, Figlio, and Romano (2004) document similar patterns.

[29] Authors' calculations of data from the 2011 PSS.

[30] In contrast, several studies (for example, Coleman, Hoffer, and Kilgore, 1982 Evans and Schwab, 1995; Neal, 1997) find that Catholic high schools located in cities are more effective than urban public schools in enabling students to graduate and to enroll in college.

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Tables

TABLE 1

Distribution of Private Elementary Schools and Students by School Type and Year

	Catholic		Conservative Christian		Other religion-oriented		Nonsectarian	
	1989	2011	1989	2011	1989	2011	1989	2011
Number of schools	7883	5842	3852	4302	8079	8085	3686	5486
% of all private elementary schools	34	25	16	18	34	34	16	23
Number of students (000)	1769	1170	358	402	698	681	325	461
Average enrollment per grade	31	28	13	13	12	12	15	13
% of all private elementary school students	56	43	11	15	22	25	10	17

Note. Data come from the 1989 and 2011 PSS. PSS = Private School Universe Survey.

TABLE 2

Distribution of Private Elementary Schools and Enrolled Students by School Type and Year

	Catholic		Conservative Christian		Other religion-oriented		Nonsectarian	
	1989	2011	1989	2011	1989	2011	1989	2011
Schools								
% in NE	32	25	11	11	19	22	19	25
% in Midwest	37	38	27	21	34	35	11	13
% in South	18	21	33	47	29	30	39	34
% in West	13	16	29	22	18	14	32	28
% in cities	47	39	31	24	33	26	38	38
% in suburbs	32	38	31	32	25	24	32	40
% in rural areas	21	23	38	43	42	50	30	22
Students								
% in NE	33	24	10	8	23	27	19	23
% in Midwest	35	35	22	18	28	24	12	11
% in South	19	24	36	48	31	36	47	41
% in West	13	17	32	26	19	14	22	26
% in cities	52	43	43	31	45	40	46	46
% in suburbs	33	43	36	39	32	33	32	36
% in rural areas	15	14	21	30	23	27	22	18

Note. Data come from the 1989 and 2011 PSS. PSS = Private School Universe Survey.

Figures

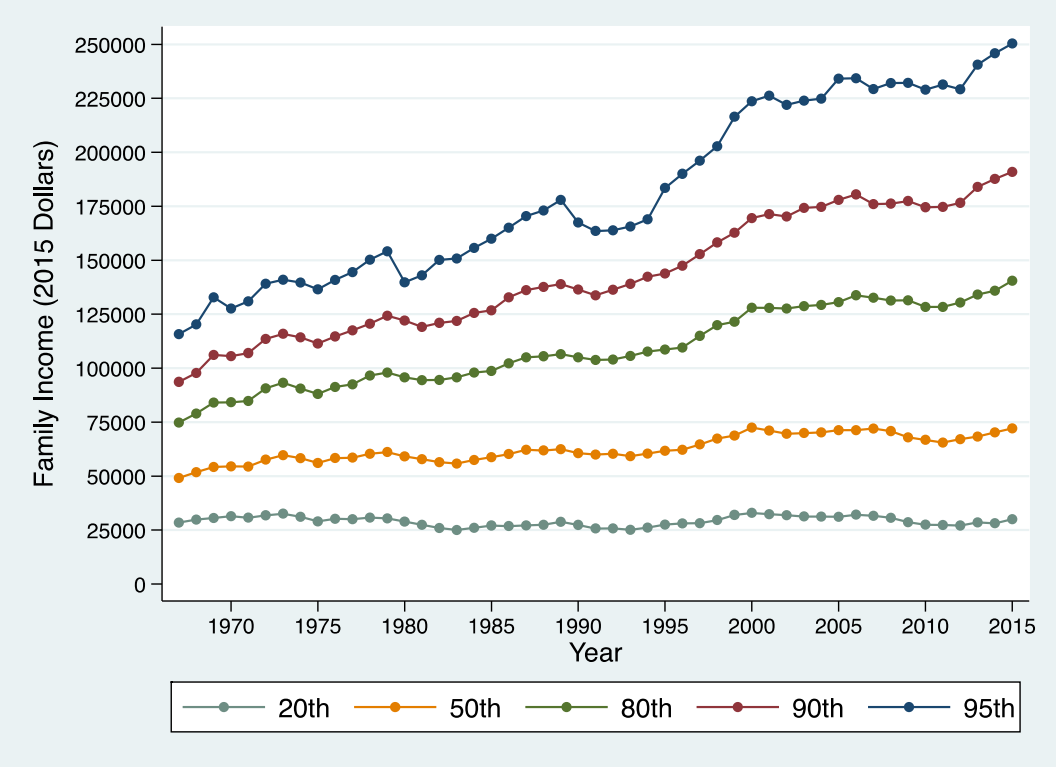

Figure 1. Trends in real family income by income percentile in 2015 dollars.

Note. Data come from the U.S. Census and Current Population Survey. Real income is calculated by adjusting the original values using the Personal Consumption Expenditures (PCE) implicit price deflator, obtained from the Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org).

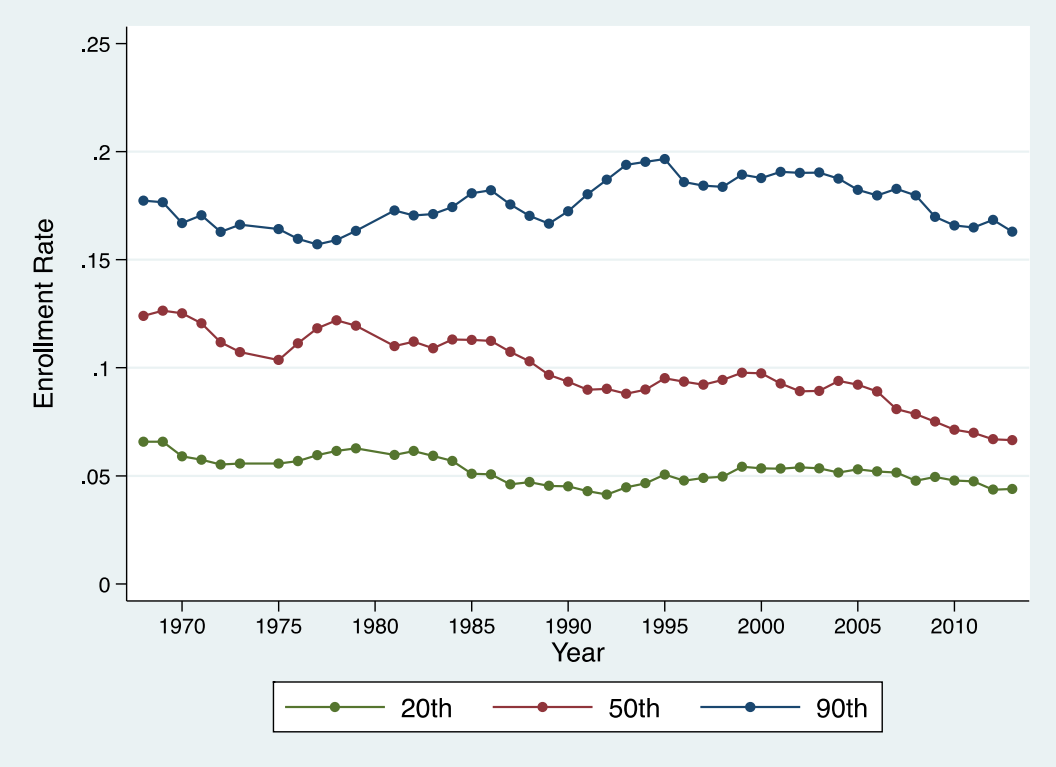

Figure 2. Estimated total private school enrollment by family income percentile over time.

Note. Data come from the U.S. Census and the Current Population Survey.

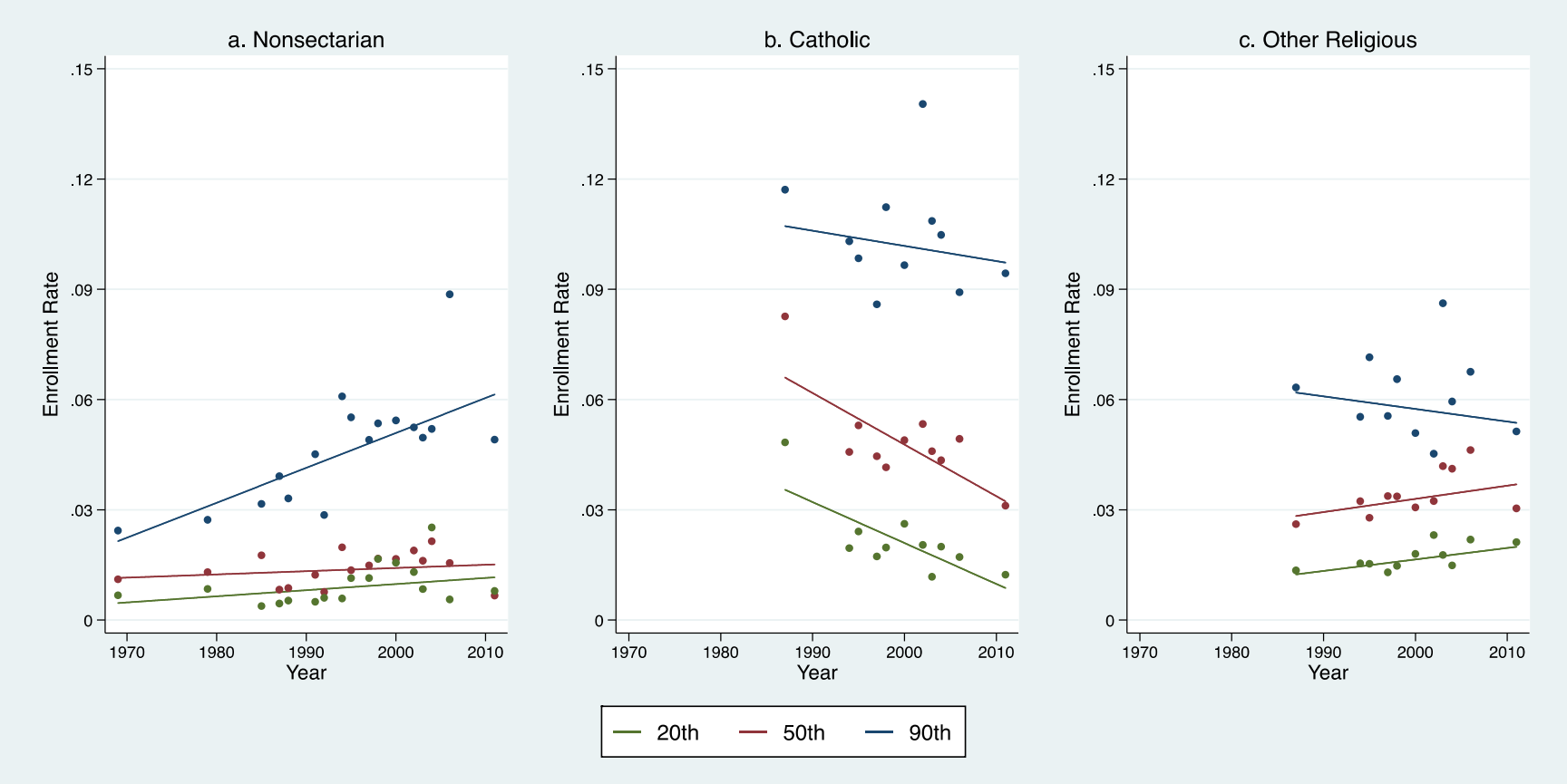

Figure 3. Estimated elementary private school enrollment by family income percentile over time for (a) nonsectarian schools, (b) Catholic schools, and (c) other Religious schools.

Note. Solid lines represent fitted metaregression line. Data come from U.S. Census, CPS, NHES, NELS88, and ECLS.

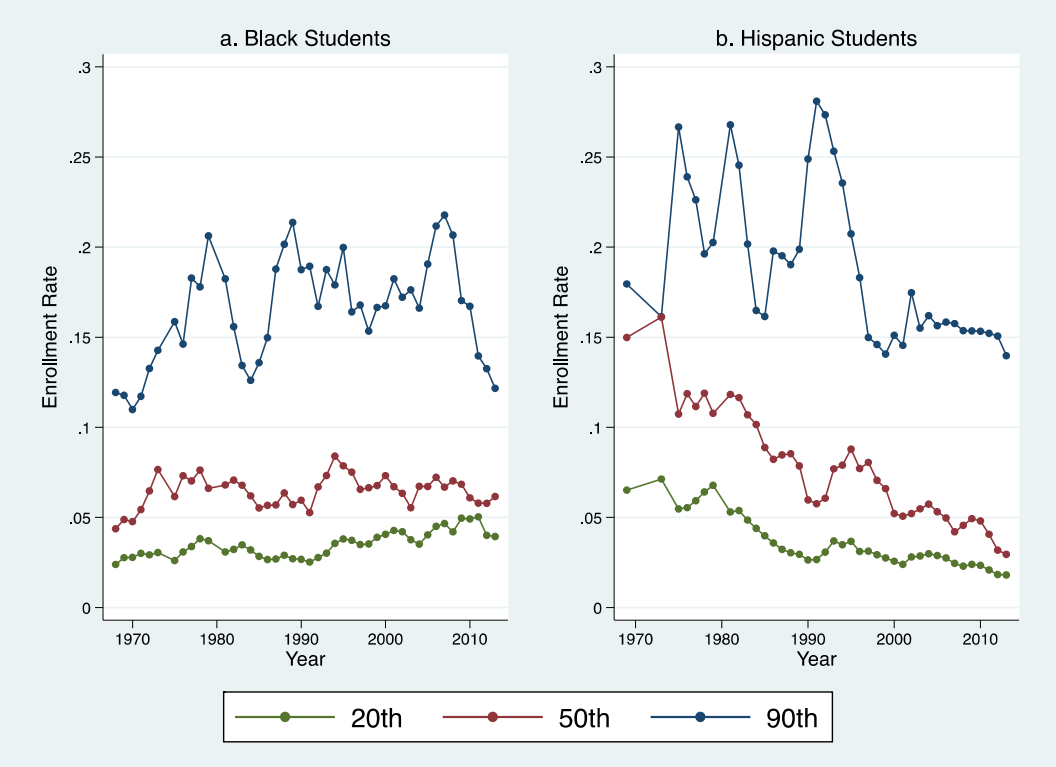

Figure 4. Estimated elementary private school enrollment by family income percentile over time for (a) Black and (b) Hispanic students.

Note. Data come from the U.S. Census and the Current Population Survey.

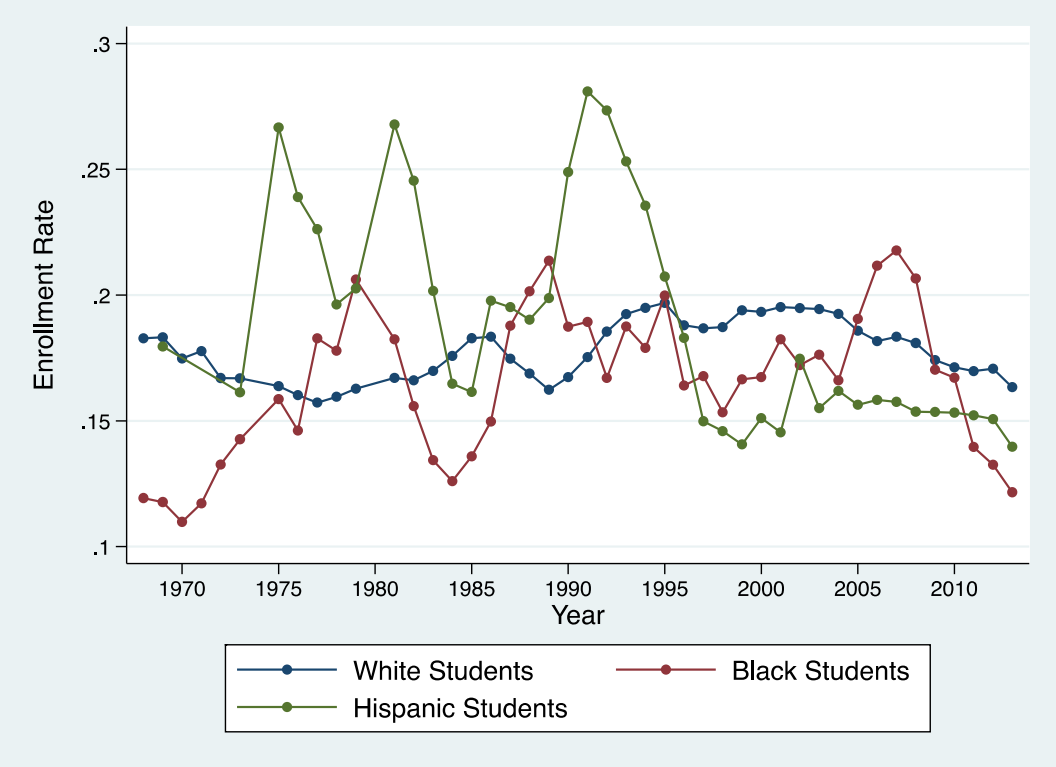

Figure 5. Estimated elementary private school enrollment rates over time for students from families at the 90th percentile rank of the income distribution by race.

Note. Data come from the U.S. Census and the Current Population Survey.

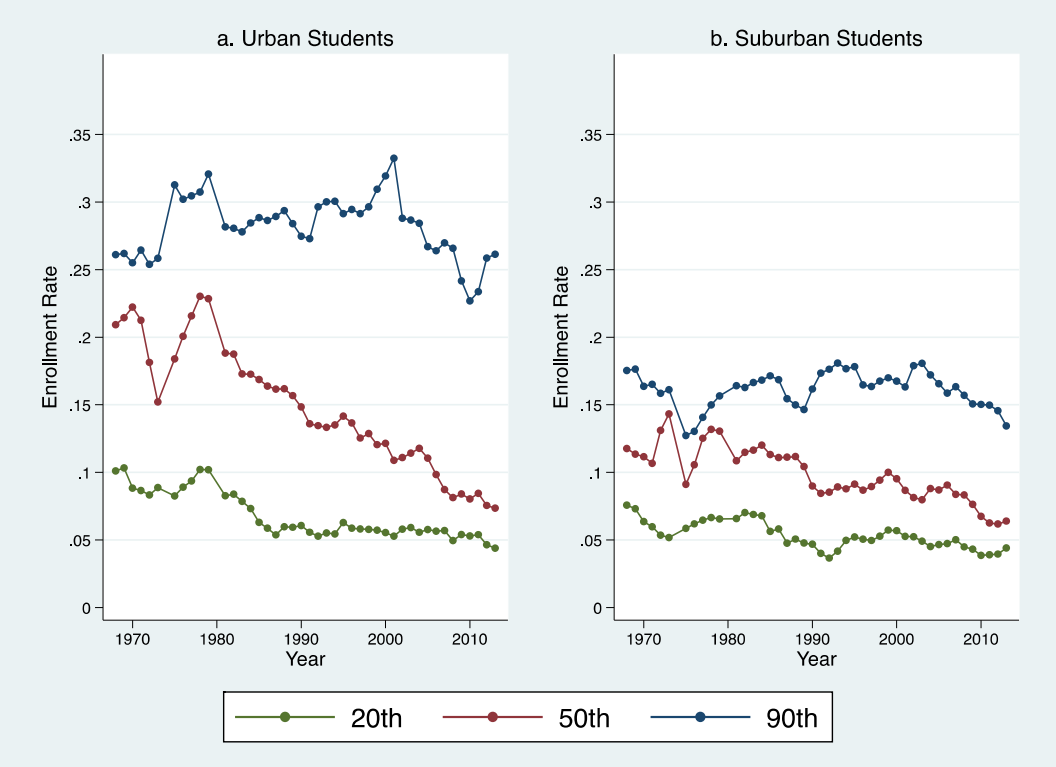

Figure 6. Estimated elementary private school enrollment by family income percentile over time for (a) children in urban areas and (b) children in suburban areas.

Note. Data come from the U.S. Census and the Current Population Survey.

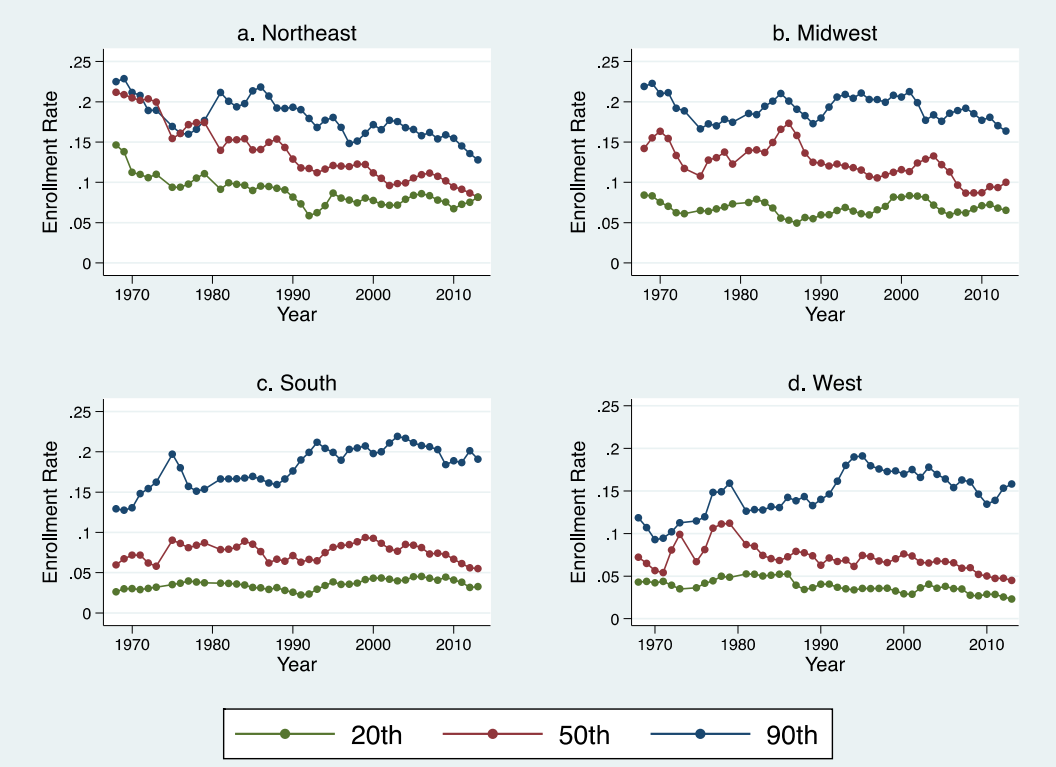

Figure 7. Estimated elementary private school enrollment by family income percentile over time for children in the (a) Northeast, (b) Midwest, (c) South, and (d) West.

Note. Data come from the U.S. Census and the Current Population Survey.

Appendix A

TABLE A.1
Key Characteristics of the Datasets

Dataset	School Years (Fall)	Grade Levels	Elementary Unweighted Sample Size (000)	Elementary Weighted Sample Size (000)	Income Measure	Private School Measure
U.S. Census	1959, 1969, 1979, 1989, 1999	1st – 8th	319 (1989) 1,672 (1999)	30,786 (1989) 33,114 (1999)	Continuous	Public or private; some years distinguish religious and nonsectarian
October Current Population Survey (CPS)	1968 – 2013	1st – 8th	28 (1986) 69 (2007)	27,1183 (1986) 32,079 (2007)	Categorical	Public or private; some years distinguish religious, Catholic, other religious, and nonsectarian
National Household Education Survey (NHES)	1992, 1995, 1998, 2000, 2002, 2004, 2006, 2011	1st – 8th	3[1] (1992) 11 (1995)	10,993[3] (1992) 31,365 (1995)	Categorical	Public or private (categorized as religious, Catholic, other religious, and nonsectarian)
Early Childhood Longitudinal Study (ECLS) Kindergarten Class of 1998-99	1999, 2001, 2003	1st, 3rd, 5th	16 (1999) 11 (2003)	3,656 (1999) 3,903 (2003)	Categorical	Public or private (categorized as religious, Catholic, other religious, and nonsectarian)
National Education Longitudinal	1987	8th	25	3,008	Categorical	Public or private (categorized as religious, Catholic, other religious, and nonsectarian)

Study of 1988 (NELS)						
Private School Universe Survey (PSS)	1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011	1st – 8th	18 schools (1989) 2,845 students (1989) 20 schools (2011) 2,445 students (2011)	23 schools (1989) 3,151 students (1989) 24 schools (2011) 2,714 students (2011)	N/A	Private, categorized as Catholic, conservative Christian, other religious, and nonsectarian

Note. For datasets with multiple samples, listed sample sizes reflect the smallest and largest unweighted samples. [1] Students in grades 6 – 8.

Appendix B

Our original intent was to include data from the 2014 and 2015 October CPS administrations in our analyses of trends in private school enrollments. However, we found that the trends in private school enrollment rates by income for these two years differed from those in previous years in unexpected ways. This led us to compare the CPS-based estimates with those obtained from the much larger ACS for the years 2001-2015. We found that the CPS-based trends track closely the ACS-based trends for the years 2001-2013. However, they do not do so for 2014 and 2015. Moreover, the CPS-based estimates of private school enrollment rates by income for these two years are inconsistent with trends in real income by income percentile. In contrast, the ACS-based estimates are consistent. For this reason, we did not include the CPS-based estimates of private school enrollment rates for 2014 and 2015 in our analyses. One hypothesis to explain the puzzling CPS-based estimates for these years is that they reflect an increase in the severity of long-standing problems with income-reporting in the CPS (Meyer, Mok, and Sullivan, 2015).