



Is there “white flight” into private schools? New evidence from High School and Beyond

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ARTICLE INFO

Article history:

Received 27 March 2007

Accepted 9 July 2008

JEL classification:

I20

Keywords:

School choice

Privatization

Demand for schooling

ABSTRACT

In the U.S., white parents may choose to send their children to private schools in response to the local concentration of minority schoolchildren, commonly referred to as “white flight”. This paper contributes to the existing literature by providing new evidence on white flight from the data set High School and Beyond (HSB). I find that a one-percentage-point increase in the county (metropolitan area, or MA) level minority share of school-age population increases the private schooling probability of white students by 0.2 (0.27) percentage points. White flight appears to be more sensitive to the concentration of black schoolchildren than to any other minority concentration. White families also appear to respond more strongly to the concentration of poor minorities than to non-poor minorities. Results also suggest substantial variation in the rate of white flight across different areas of the country. Finally, when minority shares are measured at the county level, there is some evidence of increasing rate of white flight from the local concentration of black schoolchildren as the black share increases.

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1. Introduction

One important factor that may influence the private school attendance decisions of white students in the U.S. and has strong policy implications is the possible aversion of white families to the concentration of minority schoolchildren in local public schools. White parents may choose to send their children to private schools in response to minority concentration, commonly referred to as “white flight”. The growing recognition of white flight brings about the fears that its existence may threaten the long-run efficacy of integration policies and lead to virtual resegregation of schools in the U.S. Clotfelter (1976) examines the role of school racial composition in the demand for private schooling by whites. Using a sample of U.S. metropolitan areas (MAs) in 1960 and 1970, he finds that an increase in the proportion of minorities in public schools of 10% is associated

with increases in the proportion of whites in private schools of 1–8%. Evidence on white flight can also be found in Conlon and Kimenyi (1991), Lankford and Wyckoff (1992), Lankford, Lee, and Wyckoff (1995), Clotfelter (2001) and Fairlie and Resch (2002).¹

This paper contributes to the existing literature by providing new evidence on white flight from the data set High School and Beyond (HSB). The HSB sample allows me to examine white flight for high school sophomores and seniors in 1980. A recent study on white flight by Fairlie and Resch (2002) focuses on high school sophomores in 1990 sampled in the National Education Longitudinal Study (NELS), another survey conducted by the National Center for Education Statistics (NCES), a decade after the HSB survey. Similar to the NELS sample, the HSB sample has an

¹ Relatedly, Fairlie (2002) finds some evidence of Latino flight into private schools from the concentration of black schoolchildren. Betts and Fairlie (2003) report some empirical evidence on the hypothesis that native-born American families respond to inflows of immigrants by sending their children to private schools.

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advantage over many national data sets because it includes information on many very useful individual level characteristics, such as religious affiliation and cognitive test score which can be used as a proxy for cognitive ability. Because the NCES conducted the HSB and NELS surveys in a consistent way and intended to allow researchers to make comparisons of U.S. high school students over a decade, it is quite interesting to study the variability in responses of white families to minority concentration over time. An increase in the rate of white flight over the decade may indicate deepened aversion of white parents to minority concentration, whereas a fall may suggest the opposite.

Using the HSB sample, this paper supports the white flight hypothesis by finding that a one-percentage-point increase in the county (MA) level minority share of school-age population increases the white private schooling probability by 0.2 (0.27) percentage points. White flight appears to be more sensitive to the concentration of black schoolchildren than to any other minority concentration. For example, a one-standard-deviation increase in the county (MA) level black share of school-age population increases the white private schooling probability by 7.2 (8.1) percentage points. White families also appear to respond more strongly to the concentration of poor minorities than to non-poor minorities.

Some studies in the private schooling literature use national data sets, such as the first sample in Clotfelter (1976), Lankford et al. (1995), Figlio and Stone (2001), Clotfelter (2001) and Fairlie and Resch (2002), but there are also many studies restricting their attention on a specific state. For example, the second sample in Clotfelter (1976) focuses on Mississippi around 1970, Conlon and Kimenyi (1991) focus on Mississippi in 1980, Lankford and Wyckoff (1992) on New York state in 1980, and Buddin, Cordes, and Kirby (1998) on California in 1990. Using California data, Buddin et al. (1998) find that private schooling rates of all students are rather insensitive to the percentage of minorities in public schools. In contrast, Lankford and Wyckoff (1992) find from New York state data that parents are more likely to send their children to private elementary schools when black students make up a larger proportion of the public school population, although they find the opposite effect for private high school enrollments. Therefore, the effect of minority concentration on private schooling may vary over time or across areas.

The hypothesis is that white parents in some areas of the country may have less deep aversion to minority concentration than in other areas. It is possible that the variation in the rate of white flight across studies may reflect in part the geographical heterogeneity in responses of white families to minority concentration. To capture such heterogeneity, I estimate an additional set of probit regressions, allowing for minority share interacted with region dummies. The results indicate substantial variability in the rate of white flight across different regions. In particular, white flight appears less prominent in the West region but is more pronounced in the Northeast/South/Midwest regions.

Clotfelter (1976, 2001) pays special attention to the question of whether there is a threshold or “tipping” point in white flight from public to private schools in response to minority concentration. As a robustness check, I allow

for nonlinearity in minority shares of school-age population for various ethnicity groups. Because Fairlie and Resch (2002) are concerned about the arbitrariness in creating the thresholds, I use two different forms of nonlinearity for minority shares, a fourth order polynomial and a semiparametric specification. Results using different nonlinear specifications produce similar results and suggest that, when minority shares are measured at the county level, there is some evidence of increasing rate of white flight from black concentration as the black share increases. The next section describes the HSB sample. Section 3 discusses empirical results and examines white flight, white flight from different minority groups and the geographical heterogeneity and nonlinearity in white flight. The final section concludes.

2. Data

High School and Beyond is a national survey of U.S. high school sophomores and seniors in 1980 and is administered by the National Center for Education Statistics. To study whether white flight exists, it is natural to restrict the sample to include only white, non-Hispanic students. To check the robustness of my results, I employ two different measures of school and community characteristics, those at the county level and those at the metropolitan area level. I report descriptive statistics of the dependent and explanatory variables in Table 1. The first (second) sample uses county (MA) level school and community characteristics and includes 27,011 (20,170) individuals from 504 counties (166 MAs).

Except for school and community characteristics, all variables are measured at the individual level. For example, descriptive statistics of the dependent variable suggest that 11% of whites in the HSB sample are in private schools in 1980. Fairlie and Resch (2002) report from the National Education Longitudinal Study a private schooling rate of 11.2% for white sophomores in 1990. The HSB sample allows me to examine white flight for students in 1980, a decade before the NELS sample. It is quite interesting to study the variability in responses of white families to minority concentration over time by comparing results from the HSB and NELS samples. An increase in the rate of white flight over time may indicate a deepened aversion of white parents to minority concentration, whereas a fall may suggest the opposite.

Like the NELS sample, the HSB sample has an advantage over many national data sets because it includes information on several very useful individual level characteristics, such as religious affiliation and cognitive test score which can be used as a proxy for cognitive ability. After collecting the individual level characteristics, I append school and community characteristics at the county or MA level to individual level variables. The public school student-to-teacher ratio variable is from the Common Core of Data (CCD) which provides information on the public school universe between 1980 and 1981. The private school student-to-teacher ratio is from the Universe of Private Schools, another NCES administered survey in 1980. Both of the public and private school student-to-teacher ratio variables are available at the county and MA levels, but

Table 1

Descriptive statistics of the dependent and explanatory variables, with school and community characteristics measured at the county or metropolitan area (MA) level.

Dependent and explanatory variables	County level ^a		MA level ^b	
	Mean	S.D.	Mean	S.D.
Private school attendance	0.107	0.31	0.138	0.345
Female	0.514	0.5	0.511	0.5
Age	16.4	1.14	16.4	1.14
Religion ^c				
Baptist	0.172	0.377	0.147	0.354
Methodist	0.0978	0.297	0.0764	0.266
Lutheran	0.0789	0.27	0.0695	0.254
Other Christian	0.194	0.396	0.195	0.396
Catholic	0.344	0.475	0.391	0.488
Jewish	0.0209	0.143	0.0325	0.177
Other religion	0.0365	0.188	0.0343	0.182
Father's education ^d				
High school graduation only	0.257	0.437	0.235	0.424
Postsecondary vocational school	0.0812	0.273	0.0819	0.274
Some college	0.11	0.312	0.116	0.32
Graduation from college	0.217	0.412	0.246	0.431
Mother's education				
High school graduation only	0.409	0.492	0.399	0.49
Postsecondary vocational school	0.0855	0.28	0.0844	0.278
Some college	0.13	0.336	0.136	0.342
Graduation from college	0.141	0.348	0.157	0.363
Family income ^e				
\$7,000–\$11,999	0.0927	0.29	0.0801	0.271
\$12,000–\$15,999	0.166	0.372	0.15	0.357
\$16,000–\$19,999	0.2	0.4	0.194	0.396
\$20,000–\$24,999	0.196	0.397	0.199	0.399
\$25,000–\$37,999	0.168	0.374	0.185	0.388
\$38,000 or more	0.138	0.345	0.159	0.366
Cognitive test score	0	1	0	1
Public school student-to-teacher ratio	18.8	2.89	19.2	2.71
Private school student-to-teacher ratio	17.8	3.44	18.1	2.18
Public school expend./pupil (\$1,000)	2.51	0.51	2.57	0.513
Serious crime rate (%)	5.26	2.3	6.38	1.44
Poverty rate (%)	12.8	6.27	13.3	3.81
Minority share (%)	17.7	16.5	24.5	14.1

^a The first sample uses the county level school and community characteristics.

^b The second sample uses the MA level school and community characteristics.

^c For religion, the excluded group is no religion.

^d The excluded group for parental education is less than high school graduation.

^e For family income, the excluded group is less than \$7000.

the public school expenditure per pupil variable is available only at the state level and is from the 1983 to 1984 Digest of Education Statistics.

The measures of community characteristics, including serious crime rate, poverty rate and minority share, are available at the county and MA levels. The serious crime rate is from the 1994 USA Counties CDROM which records the number of serious crimes known to the police and the FBI population in 1980. Both of the poverty rate of school-age population and minority share of school-age population are from the Census of Population and Housing, 1980: Summary Tape File 3C (Census STF 3C). Due to restrictions in the Census STF 3C files, the poverty rate of school-age population is defined as the percentage of households with a child between 6 and 17 and below the poverty line in 1979.

The minority share of school-age population is defined as the percentage of minorities (blacks, American Indians,

Asians and Hispanics) in kindergarten, elementary and high schools. An alternative measure is to consider only minorities in high schools because the HSB sample includes only high school sophomores and seniors. But white families may not distinguish between high school and elementary school students when they consider the local minority share of school-age population. My results are also robust to this alternative measure of minority share. In addition, white parents may react differently to different minority groups and people at different income levels. To look at these issues, I divide the minority share by ethnicity (black, American Indian, Asian and Hispanic), by poverty level (poor and non-poor), or by ethnicity and poverty level. The descriptive statistics of these minority share variables are in Table 2. Due to restrictions in the Census STF 3C files, minority shares by poverty level and minority shares by ethnicity and poverty level are calculated

Table 2

Descriptive statistics of minority shares by ethnicity, by poverty level, or by ethnicity and poverty level, measured at the county or MA level.

Minority share (%)	County level ^a		MA level ^b	
	Mean	S.D.	Mean	S.D.
By ethnicity				
Black share	10.5	13.1	14.6	9.89
American Indian share	0.66	1.84	0.543	0.782
Asian share	1.26	3.3	1.78	3.74
Hispanic share	5.31	8.58	7.57	9.65
By poverty level^c				
Poor minority share	3.43	4	4.82	3.07
Non-poor minority share	10.3	9.72	14.4	9.01
By ethnicity and poverty level				
Poor black share	2.33	3.58	3.19	2.62
Poor American Indian share	0.121	0.382	0.0984	0.16
Poor Asian share	0.148	0.321	0.224	0.359
Poor Hispanic share	0.835	1.62	1.31	1.82
Non-poor black share	5.72	7.03	8.17	5.56
Non-poor American Indian share	0.385	0.905	0.34	0.427
Non-poor Asian share	0.998	2.8	1.44	3.22
Non-poor Hispanic share	3.19	5.2	4.5	5.93

^a The first sample uses the county level school and community characteristics.

^b The second sample uses the MA level school and community characteristics.

^c Due to restrictions in the Census STF 3C files, minority shares by poverty level or minority shares by ethnicity and poverty level are calculated from the entire population, instead of from the school-age population.

from the entire population, instead of from the school-age population.

A complication arises, however, in the use of school and community characteristics because HSB does not release the residential locations of sampled individuals to the public. Previous attempts of identifying the locations of HSB sampled individuals include Hanushek and Taylor (1990), Rivkin (1991), Ganderton (1992), Grogger (1996a,b) and Li

(2006, 2007). Following these attempts, I use the NCES-published local labor market conditions for HSB schools between 1980 and 1982. This additional data set does not identify the actual locations of sampled individuals, but it includes demographic information at the county level for each individual in the HSB sample. Publicly available demographic information at the county level is used to match to this data set, which helps to identify the location of each individual at the county level. After the identification of each individual's county, the individual's metropolitan area is determined by using the 1980 county-based definitions of MAs.

3. Empirical results

Before looking into the issue of white flight, it is of interest to compare the private schooling rate of different ethnic groups, as this may shed some light on white flight. According to the HSB sample, 11% of white students attend private schools in 1980, but only 5.8% of minority students attend private schools. The private schooling rates of black, American Indian, Asian and Hispanic students are 3.4%, 4.2%, 10% and 8.7%, respectively. Therefore, in response to minority concentration, white parents may send their children to private schools which have lower concentration of minority schoolchildren. I also examine the percentage of students from schools with a given minority share. Fairlie and Resch (2002) note that white students from private schools are more likely to be in schools with low concentration of minority schoolchildren.

In Fig. 1, I plot the percentage of students enrolled in schools with a given minority share for four types of students (public school students, white public school students, private school students and white private school students). I divide the school minority share into eight categories (0% to 91–100%). According to the figure, 11% (13%) of public (private) school students are in schools with the lowest minority share (0%) and 4.9% (1.1%) are in schools

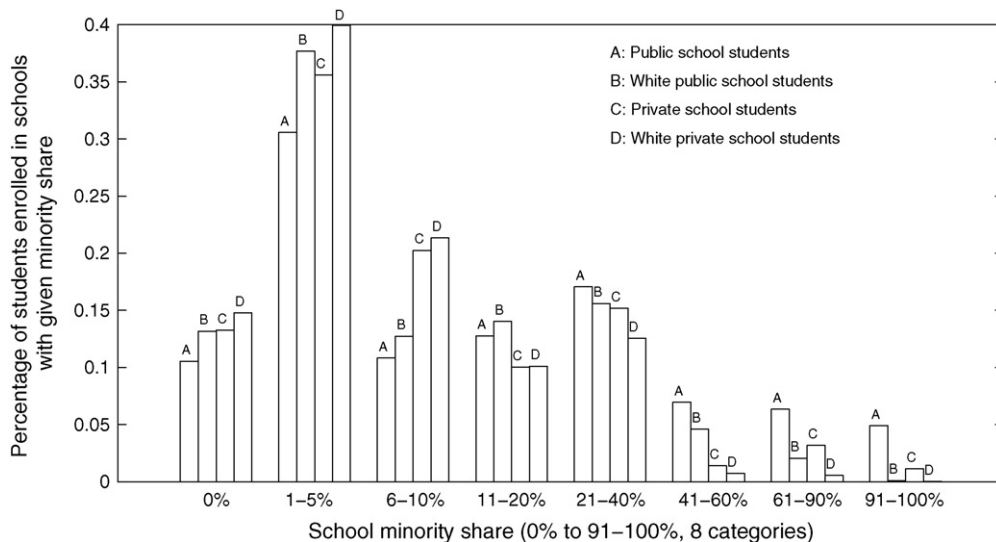


Fig. 1. Percentage of (four different types of) students enrolled in schools with a given minority share (0% to 91–100%, eight categories).

Table 3

Probit regression of white private school attendance, with school and community characteristics at the county level.

Explanatory variable ^a	Coefficient estimate ^b	S.E. ^c	Marginal effect ^d	Percentage change ^e
Female	0.123**	0.0295	1.26	11.8
Age	-0.0338**	0.0129	-0.346	-3.22
Religion				
Baptist	-0.177	0.095	-1.81	-16.9
Methodist	-0.324**	0.108	-3.32	-30.9
Lutheran	-0.149	0.109	-1.52	-14.2
Other Christian	0.0869	0.0853	0.89	8.28
Catholic	0.75**	0.0818	7.68	71.4
Jewish	-0.0345	0.119	-0.354	-3.29
Other religion	0.156	0.125	1.59	14.8
Father's education				
High school graduation only	0.0931	0.0556	0.953	8.87
Postsecondary vocational school	0.157*	0.0679	1.61	15
Some college	0.111	0.0653	1.13	10.5
Graduation from college	0.285**	0.0604	2.91	27.1
Mother's education				
High school graduation only	0.133*	0.0576	1.36	12.6
Postsecondary vocational school	0.196**	0.0747	2.01	18.7
Some college	0.317**	0.0658	3.25	30.2
Graduation from college	0.464**	0.0664	4.75	44.3
Family income				
\$7,000–\$11,999	-0.0125	0.115	-0.128	-1.19
\$12,000–\$15,999	0.15	0.107	1.54	14.3
\$16,000–\$19,999	0.13	0.105	1.33	12.4
\$20,000–\$24,999	0.192	0.107	1.97	18.3
\$25,000–\$37,999	0.159	0.106	1.63	15.2
\$38,000 or more	0.43**	0.106	4.4	41
Cognitive test score				
Public school student-to-teacher ratio	0.0808**	0.016	0.827	7.7
Private school student-to-teacher ratio	-0.0344*	0.0142	-0.352	-3.28
Public school expend./pupil (\$1,000)	0.0279**	0.00917	0.286	2.66
Serious crime rate (%)	-0.567**	0.0827	-5.81	-54
Poverty rate (%)	0.0605**	0.0144	0.619	5.76
Minority share (%)	-0.0275**	0.00622	-0.281	-2.62
Minority share (%)	0.0192**	0.00254	0.197	1.83

^a The regression also includes a constant, region dummies and indicators for missing parental education and cognitive test score. The mean of the dependent variable is 0.107 and the sample size is 27,011.

^b Coefficient estimates significantly different from 0 at the 5% (1%) level are indicated by * (**).

^c Standard errors are adjusted for clustering at the county level.

^d Marginal effect (%) calculates the *percentage point change* in white private schooling probability in response to a one-unit increase in a variable.

^e *Percentage change* (%) divides the marginal effect by the average white private schooling rate.

with the highest minority share (91–100%). Therefore, private schools have less minority concentration than public schools. The minority concentration is even lower in private schools attended by whites. As the figure shows, 13% (15%) of white public (private) school students are in schools with a 0% minority share and 0.1% (0.03%) are in schools with a 91–100% minority share.

3.1. Does white flight exist?

To test white flight, I estimate a probit regression of private school attendance of white students. Let y_i denote the binary outcome of private school attendance of white student i and z_i the latent variable associated with y_i . Define $y_i = 1$ ($z_i > 0$) if student i attends private schools and $y_i = 0$ ($z_i \leq 0$) otherwise. I specify a probit regression $z_i = x_i\beta + \epsilon_i$ where x_i is a $1 \times k$ vector of explanatory variables (including a constant, gender, age, religion, parental education, family income, cognitive test score, public and private school characteristics, serious crime rate, poverty rate, minority share,

region dummies and indicators for missing parental education and cognitive test score)² and ϵ_i is the disturbance term following the normal distribution.³ In Table 3 (Table 4), I report estimation results from the probit regression of white private school attendance with school and com-

² Ideally, one would also include in the regression an individual's distance to a private school as in Fairlie and Resch (2002). It is not clear how the omission of this variable will affect the estimates of other regressors. Unfortunately, information such as an individual's distance to a private school is not available in HSB.

³ To account for oversampling in the HSB sample, including the oversampling of private school students and oversampling of schools in minority areas, similar to Manski and Lerman (1977) and Fairlie and Resch (2002), I weight each observation's contribution to the log-likelihood function by Q_i/H_i , where H_i is observation i 's weight in the sample without accounting for HSB weights and Q_i is observation i 's weight in the sample accounting for HSB weights. Specifically, $H_i = 1/n$ with n denoting the sample size and this indicates that each observation has the same weight in absence of oversampling, and $Q_i = w_i / \sum_{i=1}^n w_i$ with w_i denoting the HSB weight associated with observation i .

Table 4

Probit regression of white private school attendance, with school and community characteristics at the metropolitan area (MA) level.

Explanatory variable ^a	Coefficient estimate ^b	S.E. ^c	Marginal effect ^d	Percentage change ^e
Female	0.101**	0.026	1.23	8.9
Age	-0.0401**	0.0115	-0.489	-3.54
Religion				
Baptist	-0.318**	0.0919	-3.88	-28.1
Methodist	-0.415**	0.099	-5.06	-36.6
Lutheran	-0.162	0.0952	-1.98	-14.3
Other Christian	0.0417	0.0751	0.509	3.68
Catholic	0.752**	0.07	9.17	66.3
Jewish	0.106	0.0947	1.3	9.37
Other religion	-0.0729	0.111	-0.89	-6.43
Father's education				
High school graduation only	0.0882	0.0497	1.08	7.78
Postsecondary vocational school	0.137*	0.0609	1.67	12.1
Some college	0.0877	0.0569	1.07	7.74
Graduation from college	0.241**	0.0525	2.94	21.2
Mother's education				
High school graduation only	0.104*	0.0528	1.27	9.15
Postsecondary vocational school	0.21**	0.0664	2.56	18.5
Some college	0.271**	0.0607	3.3	23.9
Graduation from college	0.428**	0.0607	5.22	37.7
Family income				
\$7,000–\$11,999	0.0527	0.104	0.643	4.65
\$12,000–\$15,999	0.115	0.0975	1.4	10.1
\$16,000–\$19,999	0.118	0.0966	1.44	10.4
\$20,000–\$24,999	0.164	0.0948	2	14.4
\$25,000–\$37,999	0.147	0.0948	1.79	13
\$38,000 or more	0.337**	0.0959	4.11	29.7
Cognitive test score	0.0784**	0.014	0.956	6.91
Public school student-to-teacher ratio	0.013	0.0233	0.159	1.15
Private school student-to-teacher ratio	0.0709**	0.021	0.865	6.25
Public school expend./pupil (\$1,000)	-0.237**	0.0667	-2.9	-20.9
Serious crime rate (%)	-0.0782*	0.0321	-0.954	-6.9
Poverty rate (%)	-0.102**	0.0143	-1.24	-8.98
Minority share (%)	0.0219**	0.00421	0.268	1.94

^a The regression also includes a constant, region dummies and indicators for missing parental education and cognitive test score. The mean of the dependent variable is 0.138 and the sample size is 20,170.

^b Coefficient estimates significantly different from 0 at the 5% (1%) level are indicated by * (**).

^c Standard errors are adjusted for clustering at the MA level.

^d Marginal effect (%) calculates the *percentage point change* in white private schooling probability in response to a one-unit increase in a variable.

^e *Percentage change* (%) divides the marginal effect by the average white private schooling rate.

community characteristics at the county (MA) level. For each coefficient, I report the estimate, standard error, marginal effect (*percentage point change* in white private schooling probability from a one-unit increase in a variable), and *percentage change* (marginal effect divided by the average white private schooling rate).

Most coefficient estimates have their expected signs and are statistically significant. For example, with county level school and community characteristics, white Catholics are 7.7 percentage points more likely than non-religious persons to attend private schools. White students with father/mother graduating from college are 2.9/4.8 percentage points more likely to attend private schools than those with parents not graduating from high school. Individuals with family income of at least \$38,000 are 4.4 percentage points more likely to attend private schools than those with family income less than \$7,000. Whites with a cognitive test score one-standard-deviation above the average are 0.83 percentage point more likely to attend private schools. In theory, better public schools (such as those with

lower pupil-to-teacher ratios and higher expenditure per student) attract more students and prevent them from fleeing to private schools. However, empirical studies in school quality literature often find mixed evidence on the effects of class size and school spending. With county (MA) level measures, I find that a \$1000 increase in public school expenditure per pupil is associated with a reduction in white private schooling probability of 5.8 (2.9) percentage points. But, for student-to-teacher ratios, I do not find a school quality effect with the expected sign.

For community characteristics, parents from areas where crimes are more common may prefer private schools for discipline and safety reasons (Betts & Fairlie, 2003; Figlio & Stone, 2001). I find that a one-percentage-point increase in the county serious crime rate is linked to a 0.62 percentage point increase in the white private schooling probability. But the sign of the effect is reversed when I use MA level measures. Local concentration of poor or minority schoolchildren may also trigger flight to private schools. Different from my prior expectation, the results

Table 5

Probit regressions of white private school attendance, with county level minority shares by ethnicity, by poverty level, by ethnicity and poverty level, or interacted with region dummies.

Minority share ^a	Coefficient estimate ^b	S.E. ^c	Marginal effect ^d	Percentage change ^e
By ethnicity				
Black share	0.0573**	0.00372	7.17	66.7
American Indian share	-0.0809*	0.0411	-1.43	-13.3
Asian share	-0.215**	0.0277	-6.79	-63.2
Hispanic share	0.00162	0.0042	0.133	1.24
By poverty level				
Poor minority share	0.222**	0.022	8.86	82.4
Non-poor minority share	-0.0264**	0.00576	-2.56	-23.8
By ethnicity and poverty level				
Poor black share	0.24**	0.0229	8.33	77.5
Poor American Indian share	1.52**	0.299	5.62	52.3
Poor Asian share	1.59**	0.327	4.95	46
Poor Hispanic share	-0.0448	0.0502	-0.704	-6.55
Non-poor black share	0.0192*	0.00763	1.31	12.2
Non-poor American Indian share	-0.999**	0.195	-8.77	-81.6
Non-poor Asian share	-0.529**	0.0621	-14.4	-134
Non-poor Hispanic share	0.0495**	0.0156	2.5	23.2
Interacted with region dummies				
Northeast × minority share	0.022**	0.00505	3.74	34.9
South × minority share	0.0391**	0.00388	6.65	61.9
Midwest × minority share	0.0629**	0.00506	10.7	99.6
West × minority share	-0.0208**	0.00451	-3.53	-32.9

^a These regressions also include variables included in Table 3, but only estimates related to minority shares are reported to save space. The mean of the dependent variable is 0.107 and the sample size is 27,011.

^b Coefficient estimates significantly different from 0 at the 5% (1%) level are indicated by * (**).

^c Standard errors are adjusted for clustering at the county level.

^d Marginal effect (%) calculates the percentage point change in white private schooling probability in response to a *one-standard-deviation* increase in a minority share variable.

^e *Percentage change* (%) divides the marginal effect by the average white private schooling rate.

do not show a positive relationship between poverty rate of school-age population and private school attendance. For the main hypothesis of white flight, as expected, a one-percentage-point increase in the county (MA) level minority share increases the white private schooling probability by 0.2 (0.27) percentage points.⁴

The above results on white flight is robust to measures of school and community characteristics at different geographical levels. Between the choices of county and MA level measures, county level measures represent areas that are more homogeneous and are less likely to suffer from aggregation biases (Fairlie & Resch, 2002). But county level measures may face a problem because families choose residences and schools at the same time. Regarding local minority concentration, white parents may move to areas with lower minority concentration or send their children to private schools in the local area. If parents choose to move, the private schooling rate in the origin area increases and that in the destination area decreases, creating a potential upward bias in the estimated effect of minority concentration on private schooling. The MA level measures have an advantage in this regard because they cover broader ranges of areas and suffer less from the above selection

bias. Throughout the paper, I report estimation results using these two different measures.

3.2. Are whites fleeing from specific minority groups?

White parents may respond differently to different minority groups or people at different income levels. Using the NELS data, Fairlie and Resch (2002) find some evidence of white flight from black schoolchildren but not from Asian or Hispanic concentration. The hypothesis is that white families may have deeper aversion to some minority groups than to others. To look at this issue, I report in Tables 5 and 6 estimation results from additional probit regressions. I first divide the minority share into black, American Indian, Asian and Hispanic shares. In each probit regression, I always include variables included in Tables 3 and 4, but to save space, I only report coefficient estimates related to minority shares. Since the minority group is now divided into several smaller groups, some minority shares are much smaller than the others. To ease comparisons, I calculate the marginal effect from a *one-standard-deviation* (instead of a one-percentage-point) increase in a minority share.

The results show that white flight appears to be more sensitive to black concentration than to any other minority concentration. A one-standard-deviation increase in the county (MA) level black share of school-age population increases the white private schooling probability by 7.2

⁴ From the NELS data, Fairlie and Resch (2002) find that an increase of ten percentage points in county minority share increases the white private schooling probability by 1.3 (1.5) percentage points for eighth-graders (tenth-graders).

Table 6

Probit regressions of white private school attendance, with MA level minority shares by ethnicity, by poverty level, by ethnicity and poverty level, or interacted with region dummies.

Minority share ^a	Coefficient estimate ^b	S.E. ^c	Marginal effect ^d	Percentage change ^e
By ethnicity				
Black share	0.0631**	0.00702	8.1	58.5
American Indian share	0.073	0.0425	0.741	5.36
Asian share	-0.0267	0.0211	-1.29	-9.35
Hispanic share	0.0242**	0.00599	3.03	21.9
By poverty level				
Poor minority share	0.185**	0.0407	7.01	50.6
Non-poor minority share	-0.00249	0.00817	-0.277	-2
By ethnicity and poverty level				
Poor black share	0.0828	0.0639	2.84	20.6
Poor American Indian share	4.12**	0.591	8.65	62.6
Poor Asian share	-1.35**	0.469	-6.37	-46
Poor Hispanic share	-0.0665	0.0836	-1.59	-11.5
Non-poor black share	0.101**	0.022	7.33	53
Non-poor American Indian share	-1.12**	0.216	-6.25	-45.2
Non-poor Asian share	0.109*	0.0543	4.6	33.2
Non-poor Hispanic share	0.0798**	0.0253	6.2	44.8
Interacted with region dummies				
Northeast × minority share	0.0845**	0.0111	16.3	118
South × minority share	0.0353**	0.00712	6.79	49.1
Midwest × minority share	0.0618**	0.00982	11.9	86
West × minority share	0.00487	0.0053	0.937	6.77

^a These regressions also include variables included in Table 4, but only estimates related to minority shares are reported to save space. The mean of the dependent variable is 0.138 and the sample size is 20,170.

^b Coefficient estimates significantly different from 0 at the 5% (1%) level are indicated by * (**).

^c Standard errors are adjusted for clustering at the MA level.

^d Marginal effect (%) calculates the percentage point change in white private schooling probability in response to a one-standard-deviation increase in a minority share variable.

^e Percentage change (%) divides the marginal effect by the average white private schooling rate.

(8.1) percentage points.⁵ In contrast, an increase in the American Indian or Asian share is not associated with any statistically significant increase in the white private schooling rate. White families also appear to react less strongly to Hispanic concentration than to black concentration. A one-standard-deviation increase in the MA level Hispanic share raises the white private schooling probability by 3 percentage points, and the result is not statistically significant when I use county level measures. Next, I estimate a set of probit regressions using poor and non-poor minority shares. A one-standard-deviation increase in the county (MA) level poor minority share increases the white private schooling probability by 8.9 (7) percentage points.⁶ In contrast, the county or MA level non-poor minority share is not positively related to white private school attendance.

I also estimate a set of probit regressions using poor and non-poor black, American Indian, Asian and Hispanic shares. A one-standard-deviation increase in the county level poor (non-poor) black share increases the white private schooling probability by 8.3 (1.3) percentage points.⁷

⁵ Fairlie and Resch (2002) report from the NELS data that an increase of one-standard-deviation in the county level black share increases the white private schooling rate by 3.1–3.2 percentage points.

⁶ Fairlie and Resch (2002) find from the NELS data that a one-standard-deviation increase in the county level poor minority share increases the white private schooling probability by 4.4–4.8 percentage points.

⁷ From the NELS data, Fairlie and Resch (2002) find that the white private schooling probability increases by 5.1–5.3 percentage points from a one-standard-deviation increase in the county level poor black share.

In comparison, a one-standard-deviation increase in the county level poor American Indian (Asian) share increases the white private schooling probability by 5.6 (5) percentage points, and there is not any positive relationship between the county level non-poor American Indian or Asian share and white private school attendance. In summary, at the county level, white parents respond more strongly to the poor black concentration than to any other poor or non-poor minority concentration. However, when I use MA level measures, white parents do not respond strongly to the poor black concentration.

3.3. Is there geographical heterogeneity in white flight?

Throughout the paper, I always include a set of region dummies in each regression, although I did not report their coefficient estimates to save space. I include them to capture differences across regions in white private school attendance that cannot be explained by other covariates. Naturally, one would expect white parents in different areas respond differently to minority concentration. To examine this issue, I estimate an additional set of probit regressions, allowing for interactions between region dummies and minority share. According to Tables 5 and 6, there is substantial variation in the extent of white flight between different regions. A one-standard-deviation increase in the county (MA) level minority share in the Northeast/South/Midwest region increases the white private schooling probability by 3.7/6.7/11 (16/6.8/12) percent-

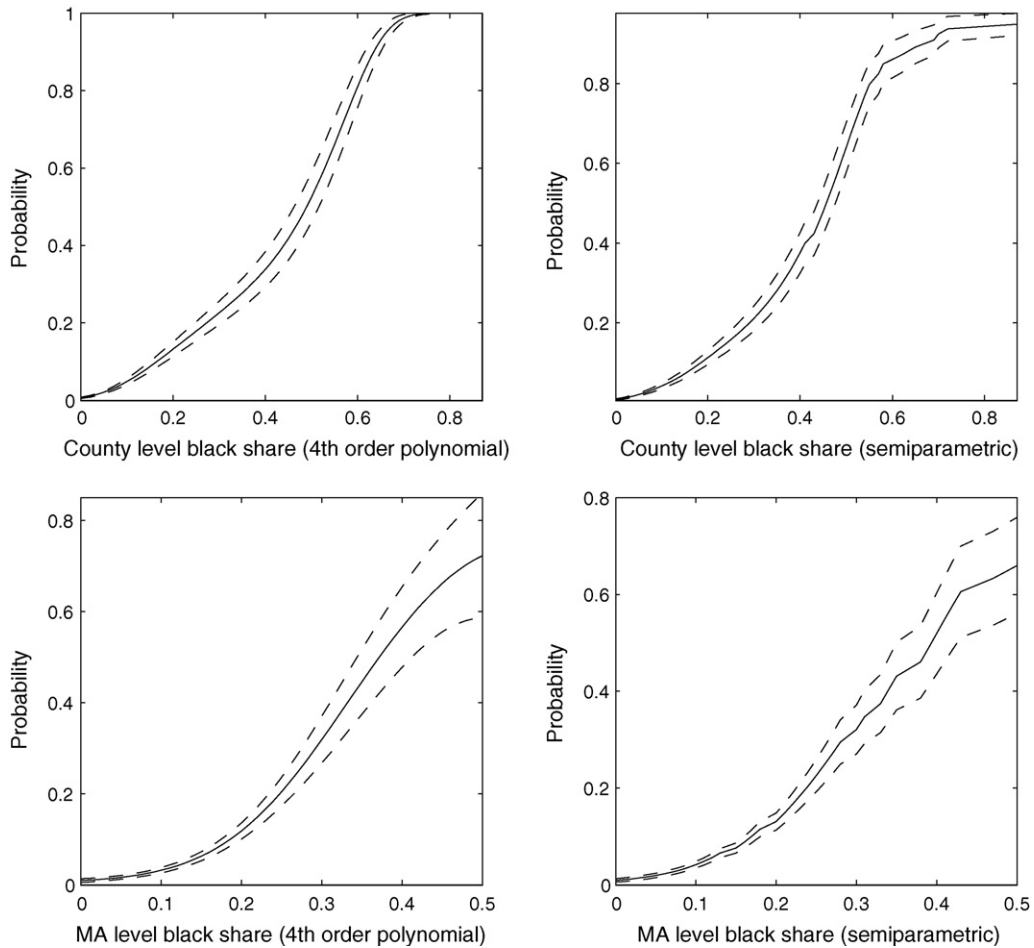


Fig. 2. White private schooling probability as a (4th order polynomial or semiparametric) function of (county or MA level) black share, with plus and minus one-standard-deviation (dashed lines).

age points, but in the West region, white private school attendance is not positively related to minority share in a statistically significant way.⁸

The above finding may help to reconcile some debates in the literature regarding whether white flight exists. Many studies on white flight or private schooling focus on a specific geographical area. For example, Buddin et al. (1998) merge 1990 individual level census data with information about California schools. They find that private schooling rates of all students are rather insensitive to the percentage of minorities in public schools. Interestingly, my results here also show that white flight appears less prominent in the West region. In contrast, white flight is more pronounced in the Northeast/South/Midwest regions. In the literature, there is also more evidence on white flight in these areas. For example, using a sample of counties in Mississippi around 1970, Clotfelter (1976) finds that an increase in the proportion of minorities in public schools is associated with an increase in the proportion of whites in private

schools. Conlon and Kimenyi (1991) examine Mississippi counties in 1980 and show that, when there are many poor blacks in a county, wealthy white families send their children to private schools. Lankford and Wyckoff (1992) combine 1980 individual-level census data with supplementary information on New York state schools. They find that parents are less likely to send their children to public elementary schools when black students make up a larger proportion of the public school population, although they find the opposite effect for private high school enrollments.

3.4. Is there nonlinearity in white flight?

Clotfelter (1976, 2001) raises an interesting question: Is there a threshold or “tipping” point in white flight?⁹

⁸ Tests show that the marginal effects across four regions are significantly different from each other at the 5% level.

⁹ Recently, Card, Mas, and Rothstein (2008) test for the “tipping point” in the dynamics of neighborhood racial composition. They find strong evidence that white population flows exhibit tipping-like behavior in most U.S. cities, with a distribution of tipping points ranging from 5% to 20% minority share.

To check this issue, I estimate an additional set of regressions and specify minority shares nonlinearly. Because white parents may react differently to different minority groups, I divide the minority share into black, American Indian, Asian and Hispanic shares and impose nonlinearity on each of them. Fairlie and Resch (2002) are concerned about the arbitrariness in creating threshold points. Therefore, I estimate probit regressions with two forms of nonlinearity, a fourth order polynomial and a semiparametric specification. The semiparametric approach follows Koop and Poirier (2004) and allows for changes in the slope of the function relating minority share to white private school attendance. In Fig. 2, I plot the white private schooling probability as a function of the black share of school-age population at the county or MA level. The left graphs use a fourth-order polynomial and the right ones use a semiparametric specification.

I impose nonlinearity on each minority share (black, American Indian, Asian and Hispanic shares). But to save space, I only present results on white flight from black concentration. Flight from black concentration is of particular interest because white families may react most strongly to it. The fourth order polynomial and the semiparametric specification produce similar results, indicating that a polynomial specification is quite reasonable. Due to the availability of minority shares in the data, the county level black share changes between 0% and 87% (top graphs) and the MA level black share changes between 0% and 50% (bottom ones). Interestingly, when I use county level measures, there is some evidence of increasing rate of white flight when the black share increases. With a fourth-order polynomial (semiparametric) specification, as the black share increases from 0% to 60%, with a 10% increment, the white private schooling probability increases by 4.2, 8.4, 9.4, 11, 19 and 29 (3.4, 7.1, 9.9, 16, 26 and 22) percentage points. There is not much evidence of increasing rate of white flight as the black share exceeds 60%, partly because the white private schooling rate is censored to be less than one. With MA level measures, there is less evidence of increasing rate of white flight. When I use the fourth-order polynomial (semiparametric) specification, as the black share increases from 0% to 50%, with a 10% increment, the white private schooling probability increases by 2.3, 8.6, 20, 25 and 16 (3.2, 8.9, 19, 20 and 14) percentage points.

4. Conclusion

This paper contributes to the existing literature by providing new evidence on white flight from High School and Beyond. I find that a one-percentage-point increase in the county (MA) level minority share of school-age population increases the white private schooling probability by 0.2 (0.27) percentage points. White flight appears to be more sensitive to the concentration of black schoolchildren than to any other minority concentration. For example, a one-standard-deviation increase in the county (MA) level black share of school-age population increases the white private schooling probability by 7.2 (8.1) percentage points.

White families also appear to respond more strongly to the concentration of poor minorities than to non-poor minorities.

Another hypothesis is that white parents in some areas of the country may have less deep aversion to minority concentration than the other areas. To capture such heterogeneity, I estimate an additional set of probit regressions, allowing for minority share interacted with region dummies. Results indicate substantial variability in the rate of white flight across different regions. In particular, white flight appears less prominent in the West region and is more pronounced in the Northeast/South/West regions. Clotfelter (1976, 2001) pays special attention to the question of whether there is a threshold or “tipping” point in white flight from public to private schools in response to minority concentration. As a robustness check, I allow for nonlinearity on different minority shares. Results from different nonlinear specifications produce similar results and suggest that, when minority shares are measured at the county level, there is some evidence of increasing rate of white flight from black concentration as the black share increases.

References

- Betts, J. R., & Fairlie, R. W. (2003). Does immigration induce “native flight” from public schools into private schools? *Journal of Public Economics*, 87(5–6), 987–1012.
- Buddin, R. J., Cordes, J. J., & Kirby, S. N. (1998). School choice in California: Who chooses private schools? *Journal of Urban Economics*, 44(1), 110–134.
- Card, D., Mas, A., & Rothstein, J. (2008). Tipping and the dynamics of segregation. *Quarterly Journal of Economics*, 123(1), 177–218.
- Clotfelter, C. T. (1976). School desegregation, “tipping”, and private school enrollment. *Journal of Human Resources*, 11(1), 28–50.
- Clotfelter, C. T. (2001). Are whites still fleeing? Racial patterns and enrollment shifts in urban public schools, 1987–1996. *Journal of Policy Analysis and Management*, 20(2), 199–221.
- Conlon, J. R., & Kimenyi, M. S. (1991). Attitudes towards race and poverty in the demand for private education: The case of Mississippi. *Review of Black Political Economy*, 20(2), 5–22.
- Fairlie, R. W. (2002). Private schools and “latino flight” from black schoolchildren. *Demography*, 39(4), 655–674.
- Fairlie, R. W., & Resch, A. M. (2002). Is there “White Flight” into private schools? Evidence from the National Educational Longitudinal Survey. *Review of Economics and Statistics*, 84(1), 21–33.
- Figlio, D. N., & Stone, J. A. (2001). Can public policy affect private school cream skimming? *Journal of Urban Economics*, 49(2), 240–266.
- Ganderton, P. T. (1992). The effect of subsidies in kind on the choice of college. *Journal of Public Economics*, 48, 269–292.
- Grogger, J. (1996a). Does school quality explain the recent black/white wage trend? *Journal of Labor Economics*, 14(2), 231–253.
- Grogger, J. (1996b). School expenditures and post-schooling earnings: Evidence from High School and Beyond. *Review of Economics and Statistics*, 78(4), 628–637.
- Hanushek, E. A., & Taylor, L. L. (1990). Alternative assessments of the performance of schools: Measurement of state variation in achievement. *Journal of Human Resources*, 25(2), 179–201.
- Koop, G., & Poirier, D. J. (2004). Bayesian variants of some classical semiparametric regression techniques. *Journal of Econometrics*, 123(2), 259–282.
- Lankford, H., Lee, E. S., & Wyckoff, J. H. (1995). An analysis of elementary and secondary school choice. *Journal of Urban Economics*, 38(2), 236–251.
- Lankford, H., & Wyckoff, J. (1992). Primary and secondary school choice among public and religious alternatives. *Economics of Education Review*, 11(4), 317–337.

- Li, M. (2006). High school completion and future youth unemployment: New evidence from High School and Beyond. *Journal of Applied Econometrics*, 21(1), 23–53.
- Li, M. (2007). Bayesian proportional hazard analysis of the timing of high school dropout decisions. *Econometric Reviews*, 26(5), 529–556.
- Manski, C. F., & Lerman, S. R. (1977). The estimation of choice probabilities from choice based samples. *Econometrica*, 45(8), 1977–1988.
- Rivkin, S. G. (1991). *Schooling and employment in the 1980's: Who succeeds?* Ph.D. dissertation, UCLA Department of Economics.