

Online Appendix to:

**Do Vouchers Lead to Sorting under Random Private School
Selection? Evidence from the Milwaukee Voucher Program**

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**Table A1: Analyzing How Choice Households Learnt About the Choice Program:
Role of Income**

	Low Income (1)	Middle Income (2)	Upper Middle Income (3)	High Income (4)
% Newspapers	17.84	23.39	28.20 ^{†††}	25.29 [†]
% Community Center	9.19	4.63	8.52 [†]	6.32
% Television or Radio	18.38	21.59	24.59	21.26
% Friends or Relatives	48.11	56.04 [†]	48.20	47.70
% Private Schools	17.84	16.20	20.98	18.97
% Church	3.78	3.08	4.26	4.02

[†], ^{††}, ^{†††}: column (2), (3), or (4) statistically different from column (1) at 10, 5, and 1 percent level.

Table A2: Application Stage: Comparing Samples with Non-Missing Versus Missing Data for Additional Variables

	Whole Sample	Sample with Data on First Set Addl. Vars.	Sample with Missing Data on First Set of Addl. Vars.	Sample with Data on Complete Set of Addl. Vars.	Sample with Missing Data on Complete Set of Addl. Vars.
	(1)	(2)	(3)	(4)	(5)
Mother's Education	1.170 (0.806)	1.119 (0.812)	1.211 (0.790)	1.119 (0.807)	1.132 (0.800)
Proportions in Groups:					
Less than High School	0.254 (0.435)	0.276 (0.447)	0.248 (0.413)	0.273 (0.446)	0.231 (0.421)
High School Graduate	0.322 (0.468)	0.328 (0.470)	0.314 (0.464)	0.335 (0.472)	0.307 (0.462)
More than High School	0.424 (0.494)	0.396 (0.489)	0.449 (0.499)	0.392 (0.489)	0.452 (0.499)
Household Income	1.433 (0.982)	1.490 (1.004)	1.442 (0.939)	1.427 (0.999)	1.418 (0.949)
Proportions in Groups:					
Low Income	0.188 (0.391)	0.186 (0.389)	0.192 (0.394)	0.172 (0.378)	0.207 (0.406)
Middle Income	0.361 (0.481)	0.332 (0.471)	0.410 ^{††} (0.492)	0.329 (0.470)	0.401 [†] (0.490)
Upper Middle Income	0.280 (0.449)	0.290 (0.454)	0.262 (0.440)	0.297 (0.457)	0.258 (0.438)
High Income	0.171 (0.377)	0.192 (0.394)	0.176 (0.343)	0.191 (0.401)	0.184 (0.341)
Observations	1638	1013	625	905	733

†, ††, †††: column (2), (3), (4), or (5) statistically different from column (1) at 10, 5, and 1 percent level.

Table A3: Enrollment Stage: Comparing Samples with Non-Missing Versus Missing Data for Additional Variables

	Whole Sample	Sample with Data on First Set Addl. Vars.	Sample with Missing Data on First Set of Addl. Vars.	Sample with Data on Complete Set of Addl. Vars.	Sample with Missing Data on Complete Set of Addl. Vars.
	(1)	(2)	(3)	(4)	(5)
Mother's Education	1.390 (0.737)	1.444 (0.739)	1.373 (0.737)	1.454 (0.732)	1.370 (0.739)
Proportions in Groups					
Less than High School	0.153 (0.360)	0.148 (0.356)	0.154 (0.361)	0.142 (0.350)	0.156 (0.363)
High School Graduate	0.305 (0.461)	0.261 (0.440)	0.319 (0.467)	0.262 (0.442)	0.318 (0.466)
More than High School	0.542 (0.499)	0.592 (0.493)	0.527 (0.500)	0.596 (0.492)	0.526 (0.500)
Household Income	1.388 (0.938)	1.507 (1.002)	1.350 (0.915)	1.518 (0.997)	1.347 (0.916)
Proportions in Groups					
Low Income	0.176 (0.381)	0.183 (0.388)	0.174 (0.380)	0.177 (0.383)	0.176 (0.381)
Middle Income	0.403 (0.491)	0.417 (0.467)	0.431 (0.496)	0.319 [†] (0.468)	0.430 (0.496)
Upper Middle Income	0.276 (0.448)	0.310 (0.464)	0.266 (0.442)	0.312 (0.465)	0.265 (0.442)
High Income	0.144 (0.351)	0.190 (0.394)	0.129 (0.336)	0.191 (0.395)	0.129 (0.336)
Observations	590	142	448	141	449

[†], ^{††}, ^{†††}: column (2), (3), (4), or (5) statistically different from column (1) at 10, 5, and 1 percent level.

Table A4: Application Stage: Does the Loss of Observations due to Inclusion of Fixed Effects Lead to a Selected Sample?

	Whole Sample	Fixed Effect Sample	Balance Sample for Fixed Effect Sample	No Fixed Effect Sample with Complete Set of Addl. vars.	Fixed Effect Sample with Complete Set of Addl. vars.	Balance Sample for Fixed Effect Sample with Compl. Set of Addl. vars.
	(1)	(2)	(3)	(4)	(5)	(6)
Mother's Education	1.170 (0.806)	1.146 (0.813)	1.243 (0.756)	1.119 (0.807)	1.116 (0.802)	1.127 (0.823)
Proportions in Groups						
Less than High School	0.254 (0.435)	0.279 (0.449)	0.273 (0.378)	0.273 (0.446)	0.270 (0.444)	0.282 (0.451)
High School Graduate	0.322 (0.468)	0.326 (0.469)	0.312 (0.464)	0.335 (0.472)	0.345 (0.476)	0.310 (0.463)
More than High School	0.424 (0.494)	0.395 (0.489)	0.415 (0.500)	0.392 (0.489)	0.386 (0.487)	0.409 (0.493)
Household Income	1.433 (0.982)	1.442 (0.987)	1.405 (0.966)	1.427 (0.999)	1.536 (1.002)	1.504 (0.992)
Proportions in Groups						
Low Income	0.188 (0.391)	0.187 (0.390)	0.191 (0.393)	0.172 (0.378)	0.172 (0.377)	0.175 (0.380)
Middle Income	0.361 (0.481)	0.359 (0.480)	0.369 (0.483)	0.329 (0.470)	0.326 (0.469)	0.337 (0.474)
Upper Middle Income	0.280 (0.449)	0.278 (0.448)	0.286 (0.453)	0.297 (0.457)	0.297 (0.457)	0.298 (0.458)
High Income	0.171 (0.377)	0.176 (0.381)	0.155 (0.362)	0.191 (0.401)	0.205 (0.404)	0.190 (0.393)
Observations	1638	1250	388	905	741	164

†, ††, †††: column (2) or (3) statistically different from column (1) at 10, 5, and 1 percent level. ‡, ‡‡, ‡‡‡: column (5) or (6) statistically different from column (4) at 10, 5, and 1 percent level.

Table A5: Enrollment Stage: Does the Loss of Observations due to Inclusion of Fixed Effects Lead to a Selected Sample?

	Whole Sample	Fixed Effect Sample	Balance Sample for Fixed Effect Sample
	(1)	(2)	(3)
Mother's Education	1.390 (0.737)	1.374 (0.742)	1.397 (0.736)
Proportions in Groups			
Less than High School	0.153 (0.360)	0.156 (0.364)	0.151 (0.358)
High School Graduate	0.305 (0.461)	0.313 (0.465)	0.302 (0.460)
More than High School	0.542 (0.499)	0.531 (0.500)	0.547 (0.498)
Household Income	1.388 (0.938)	1.385 (0.967)	1.389 (0.926)
Proportions in Groups			
Low Income	0.176 (0.381)	0.196 (0.398)	0.168 (0.374)
Middle Income	0.403 (0.491)	0.374 (0.485)	0.416 (0.494)
Upper Middle Income	0.276 (0.448)	0.279 (0.450)	0.275 (0.447)
High Income	0.144 (0.351)	0.151 (0.359)	0.141 (0.349)
Observations	590	179	411

†, ††, †††: column (2) or (3) statistically different from column (1) at 10, 5, and 1 percent level.

Table A6: Distribution of Students in schools in fixed effects samples

Panel A: Application Stage: Fixed Effects Regression Sample
with income and mother's education (Table 6 Column 1)

Number of Students	Number of Schools	% of Schools
2-5	14	11.4
6-10	64	52.0
11-15	29	23.6
16-20	11	8.9
21-25	3	2.4
26-30	2	1.6
Total	123	100

Panel B: Application Stage: Fixed Effects Regression Sample
with additional ability measures (Table 6 Column 2)

Number of Students	Number of Schools	% of Schools
2-5	29	29
6-10	53	53
11-15	14	14
16-20	4	4
21-25	0	0
26-30	0	0
Total	100	100

Panel C: Enrollment Stage: Fixed Effects Regression Sample
with income and mother's education (Table 10 Column 1)

Number of Students	Number of Schools	% of Schools
2-5	18	56.3
6-10	13	40.6
11-15	0	0
16-20	1	3.1
21-25	0	0
26-30	0	0
Total	32	100

Table A7: Does Clustering Affect Results?
(Using Logistic Regressions with Standard Errors Clustered by School)

	Panel A. Application Stage					Panel B. Enrollment Stage					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Mother's Education	2.03*** (0.20)	1.77*** (0.23)	1.68*** (0.24)	1.84*** (0.26)	2.09*** (0.28)	1.84*** (0.26)	1.18 (0.27)	0.60 (0.30)	0.49 (0.30)	0.88 (0.39)	
Household Income	0.99 (0.07)	1.05 (0.11)	1.08 (0.14)	1.03 (0.10)	1.04 (0.11)	1.04 (0.11)	1.29 (0.26)	1.94** (0.66)	1.85* (0.65)	1.38 (0.50)	
Contact		1.07*** (0.02)	1.07*** (0.02)	1.07*** (0.02)	1.08*** (0.03)	1.08*** (0.03)		0.96 (0.06)	0.98 (0.05)		
PTO Participation		1.15** (0.08)	1.11 (0.08)	1.11 (0.08)	1.19** (0.10)	1.19** (0.10)		1.08 (0.24)	1.09 (0.25)		
Child-time		0.99 (0.02)	0.98 (0.02)	0.98 (0.02)	0.96 (0.03)	0.96 (0.03)		1.04 (0.07)	1.03 (0.07)		
Educational expectations			1.63*** (0.20)	1.62*** (0.20)	1.83*** (0.27)	1.83*** (0.27)		0.93 (0.44)	0.93 (0.44)		
Mother High School Graduate				1.45 (0.37)						1.60 (0.74)	
Mother > High School Graduate				2.73*** (0.77)						1.38 (0.62)	
Middle Income				1.00 (0.28)						1.87 (0.82)	
Upper Middle Income				1.20 (0.36)						3.12** (1.65)	
High Income				1.18 (0.48)						1.69 (0.89)	
Observations	1468	971	865	865	1250	741	472	121	120	472	179

*, **, ***: significant at the 10, 5, and 1 percent level, respectively. Robust standard errors adjusted for clustering by school level are in parentheses. All columns report odds-ratios. Household Income and Mother's Education are scaled variables. Higher values indicate higher levels of the corresponding variable.

Table A8: Are Differences in Family Size Affecting Results?
(Using Logistic Regressions that Add Controls for Number of Children in Family)

	Panel A. Application Stage					Panel B. Enrollment Stage					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Mother's Education	1.94*** (0.14)	1.68*** (0.17)	1.61*** (0.19)	1.98*** (0.20)	1.75*** (0.28)	1.16 (0.23)	0.62 (0.26)	0.53 (0.28)	0.84 (0.37)		
Household Income	0.99 (0.06)	1.07 (0.09)	1.10 (0.11)	1.07 (0.08)	1.09 (0.13)	1.17 (0.20)	1.78** (0.50)	1.73* (0.50)	1.42 (0.50)		
Contact		1.07*** (0.02)	1.06*** (0.02)	1.06*** (0.02)	1.07*** (0.03)		0.98 (0.05)	1.00 (0.05)			
PTO Participation		1.15** (0.07)	1.12* (0.07)	1.12* (0.07)	1.19** (0.10)		0.96 (0.19)	0.95 (0.19)			
Child-time		1.00 (0.02)	0.99 (0.02)	0.99 (0.02)	0.97 (0.03)		1.05 (0.07)	1.04 (0.06)			
Educational Expectations			1.60*** (0.18)	1.59*** (0.18)	1.77*** (0.27)			0.88 (0.39)			
Mother High School Graduate				1.36 (0.33)					1.62 (0.71)		
Mother > High School Graduate				2.50*** (0.59)					1.40 (0.55)		
Middle Income				0.99 (0.25)					1.60 (0.58)		
Upper Middle Income				1.12 (0.30)					2.40* (1.07)		
High Income				1.29 (0.39)					1.31 (0.60)		
Number of Children	0.81*** (0.03)	0.79*** (0.04)	0.80*** (0.05)	0.79*** (0.05)	0.79*** (0.04)	0.77*** (0.06)	1.02 (0.10)	0.91 (0.19)	0.91 (0.19)	1.04 (0.11)	0.86 (0.13)
Observations	1638	1013	905	905	1250	741	590	142	141	590	179

*, **, ***: significant at the 10, 5, and 1 percent level, respectively. Huber-White standard errors are in parentheses. All columns report odds-ratios. Household Income and Mother's Education are scaled variables. Higher values indicate higher levels of the corresponding variable.

Table A9: Investigating the Role of Distance in Stratification of Enrollment by Income and Ability
(Using Logistic Regressions)

	(1)	(2)	(3)
Mother's Education	1.53* (0.35)	0.86 (0.44)	0.75 (0.50)
Household Income	1.08 (0.21)	1.54 (0.49)	1.51 (0.51)
Contact		0.96 (0.07)	0.99 (0.07)
PTO Participation		1.08 (0.29)	1.02 (0.28)
Child-time		1.10 (0.11)	1.08 (0.10)
Educational Expectations			0.78 (0.49)
Observations	385	87	86

*, **, ***: significant at the 10, 5, and 1 percent level, respectively. Huber-White standard errors are in parentheses. All columns report odds-ratios. Household Income and Mother's Education are scaled variables. Higher values indicate higher levels of the corresponding variable.

Table A10: Survey Questions and Codes Corresponding to Some of the Data Variables

Survey Question	Survey Categories	Codes
Contact:		
During your child’s last year in school, how many times (or someone in your household) contact the school about each of the following?		
Your Child’s Academic Performance	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
The Classes Your Child Took	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Doing Volunteer Work at School	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Participating in Fund Raising	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Providing Information for School Records	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Your child’s behavior	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Helping in classroom	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
PTO Participation:		
During you and your spouse/partner do any of the following at your child’s public school last year?		
Attend parent teacher conferences	Yes/No	1/0
Belong to a parent/teacher organization	Yes/No	1/0
Attend meetings of parent teacher organization	Yes/No	1/0
Take part in activities of parent teacher organizations	Yes/No	1/0
Belong to other organizations dealing with school matters	Yes/No	1/0
Child-time:		
How many times in a normal week would you say you participate in the following activities with your child?		
Read with or to your child	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Work on arithmetic or math	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Work on penmanship or writing	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Watch educational programs on TV with your child	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Participate together in sports activities	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively
Other homework	0, 1-2, 3-4, 5 or more	0,1,2,3 respectively

The responses corresponding to each question were grouped in the survey categories shown. These categories were correspondingly designated by the above codes. The regressions include overall measures of contact, PTO participation and child-time which are obtained by combining the respective component measures using an additive scale. “Contact” ranges from 0-21, “PTO participation” from 0-5 and “child-time” from 0-18.

**Table A11: Survey Questions and Codes Corresponding to Some of the Data Variables
(Continued)**

Survey Question	Survey Categories	Codes
Educational Expectations:		
How far do you expect your child to go in school? (Educ. Expec.)		
Finish some high school	1	0
Graduate from high school	2	1
Go to vocational school after high school	3	1
Go to College	4	2
Go to graduate or professional school after college	5	3
Mother's Education		
Please check the highest education level for female parent/guardian		
Eighth grade or below	1	0
Some high school	2	0
GED	3	1
High School Graduate	4	1
Some college	5	2
4-year college	6	2
Post-graduate work	7	2
Household income:		
What is your family/household income range for one year?		
\$0-2,999	1	0
\$3,000-4,999	2	0
\$5,000-7,4999	3	1
\$7,500-9,999	4	1
\$10,000-14,999	5	2
\$15,000-19,999	6	2
\$20,000-24,999	7	3
\$25,000-34,999	8	3
\$35,000-49,999	9	3
\$50,000 or more	10	3

The responses corresponding to each question were grouped in the survey categories shown. These categories were correspondingly designated by the above codes. In addition to considering mother's education and household income as variables ranging on a scale of 0-2 and 0-3 respectively, I consider dummy variables for different levels of mother's education and household income respectively. In such cases mother's education is modeled by three dummies denoting categories: "Mother<High school graduate", "Mother High school graduate" and "Mother>High School Graduate" and income by four dummies denoting categories: "Low income" (\$0-4,999), "Middle income" (\$5,000-9,999), "Upper-middle income" (\$10,000-19,999) and "High income" (\$20,000-).