

ONLINE APPENDIX

for

School Choice, School Quality and Postsecondary Attainment

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ONLINE APPENDIX SECTION 1:

DATA APPENDIX FOR NATIONAL STUDENT CLEARINGHOUSE

Our college attendance and completion records come from the National Student Clearinghouse (NSC). The NSC is a non-profit organization that provides degree and enrollment verification for more than 3,300 colleges and 93 percent of students nationwide. The NSC provides verification of enrollment and degree receipt for student loan providers and employers in addition to its use as a research tool. In recent years, the Bill and Melinda Gates Foundation has invested nearly \$3 million in the NSC's Student Tracker, a data tool that tracks students longitudinally across all the colleges where they are enrolled. The procedure for matching student records to NSC data is outlined below.

We worked with researchers at CMS to create a file that would be sent to the NSC for matching. Our file included all students who had ever been enrolled in CMS, even if they left prior to or during high school. The match is based on personal identifying information (full name, date of birth, social security number in some cases, and high school attended/graduated from). While the NSC does not disclose its exact matching procedure, they employ a fuzzy matching algorithm that accounts for small differences (i.e. John rather than Jonathan) across the two files, and they supplement this algorithm with manual checking of matches by NSC staff in some cases.

The NSC requests that school districts send separate files for high school graduates and non-graduates. While conversation with NSC staff revealed no particular differences in the matching procedures across the two files, we were concerned that differential match rates might lead to bias in the results for college attendance and degree completion. To see if this might be a concern, we created duplicate records for a random sample of students that differed only in whether they were recorded as a graduate, and we included those students in both files. These duplicate files returned the same college records in over 95 percent of cases, and there was no systematic difference in total enrollment or degree completion for CMS graduates vs. non-graduates. The most likely explanation for the NSC's desire to have separate files for graduates is that they are launching a service that will provide degree verification for high schools.

To examine the gaps in NSC coverage, we match a list of participating schools from the NSC website to the Integrated Postsecondary Education Data System (IPEDS). The Department of Education requires all post-secondary institutions that distribute Federal Title IV money (in the form of Pell Grants and Stafford Loans) to report data to IPEDS. The NSC covers 93 percent of college enrollment in the US, but over 97 percent of enrollment in North Carolina. Appendix Table A8 lists participating North Carolina schools by Fall 2009 enrollment, and Appendix Table A9 lists schools that are not covered by the NSC. Coverage is about 98 percent for public 4-year and 2-year institutions and about 91 percent for private not-for-profit institutions. The major gaps in coverage come from for-profit institutions and private religious schools.

TABLE D1
NORTH CAROLINA SCHOOLS INCLUDED IN THE NATIONAL
STUDENT CLEARINGHOUSE DATA

Institution Name	2009 Enrollment
North Carolina State University at Raleigh	31,130
University of North Carolina at Chapel Hill	27,717
East Carolina University	24,351
University of North Carolina at Charlotte	21,519
Central Piedmont Community College	17,942
University of North Carolina at Greensboro	16,872
Appalachian State University	15,117
Duke University	13,373
University of North Carolina-Wilmington	12,098
Wake Technical Community College	12,046
North Carolina A & T State University	11,098
Fayetteville Technical Community College	10,290
Guilford Technical Community College	9,851
Western Carolina University	8,861
North Carolina Central University	8,675
Cape Fear Community College	7,473
Wake Forest University	6,739
Asheville-Buncombe Technical Community College	6,408
Pitt Community College	6,303
Fayetteville State University	6,301
Forsyth Technical Community College	6,180
Campbell University Inc	6,033
University of North Carolina at Pembroke	5,827
Winston-Salem State University	5,650
Elon University	5,230
Durham Technical Community College	5,094
Rowan-Cabarrus Community College	5,005
Central Carolina Community College	4,875
Catawba Valley Community College	4,869
Gaston College	4,773
Alamance Community College	4,629
Coastal Carolina Community College	4,135
Johnston Community College	4,011
Vance-Granville Community College	3,930
Caldwell Community College and Technical Institute	3,878
Sandhills Community College	3,698
University of North Carolina at Asheville	3,639
Gardner-Webb University	3,556
Cleveland Community College	3,341

Wayne Community College	3,262
Mount Olive College	3,155
Surry Community College	3,072
Craven Community College	3,018
Shaw University	2,882
Davidson County Community College	2,881
High Point University	2,811
Nash Community College	2,760
Western Piedmont Community College	2,754
Guilford College	2,687
Elizabeth City State University	2,681
Mitchell Community College	2,642
Piedmont Community College	2,600
Lenoir Community College	2,532
Stanly Community College	2,513
Edgecombe Community College	2,489
Wilkes Community College	2,407
Randolph Community College	2,319
Robeson Community College	2,313
Haywood Community College	2,278
College of the Albemarle	2,152
Isothermal Community College	2,139
Meredith College	2,138
Queens University of Charlotte	2,118
Methodist University	2,116
Pfeiffer University	2,104
Blue Ridge Community College	2,093
South Piedmont Community College	2,078
Rockingham Community College	2,073
Southwestern Community College	2,065
Southeastern Community College	1,888
Wilson Technical Community College	1,849
Wingate University	1,810
Davidson College	1,667
Mayland Community College	1,638
North Carolina Wesleyan College	1,628
Carteret Community College	1,612
Lenoir-Rhyne College	1,596
Sampson Community College	1,550
Richmond Community College	1,510
Beaufort County Community College	1,482
Johnson C Smith University	1,470
Halifax Community College	1,401

Bladen Community College	1,356
Catawba College	1,269
Mars Hill College	1,250
Saint Augustines College	1,247
Greensboro College	1,233
McDowell Technical Community College	1,203
James Sprunt Community College	1,192
Barton College	1,136
Belmont Abbey College	1,110
Tri-County Community College	1,108
Salem College	1,094
Brunswick Community College	1,011
Roanoke-Chowan Community College	952
Montgomery Community College	951
Warren Wilson College	908
Chowan University	893
Martin Community College	866
North Carolina School of the Arts	845
Miller-Motte Technical College	758
Louisburg College	696
Brevard College	685
Peace College	653
Bennett College for Women	607
Pamlico Community College	418
DeVry University-North Carolina	331
Hood Theological Seminary	285
Roanoke Bible College	156
Heritage Bible College	114
ITT Technical Institute-Charlotte	33

TABLE D2
 NORTH CAROLINA SCHOOLS NOT INCLUDED IN THE
 NATIONAL STUDENT CLEARINGHOUSE DATA

Institution Name	2009 Enrollment
Johnson & Wales University-Charlotte	2,493
NASCAR Technical Institute	1,917
Montreat College	1,039
Livingstone College	907
Lees-McRae College	889
The Art Institute of Charlotte	880
St Andrews Presbyterian College	808
King's College	537
Carolinas College of Health Sciences	529
School of Communication Arts	366
Piedmont Baptist College and Graduate School	347
Cabarrus College of Health Sciences	334
Carolina Academy of Cosmetic Art & Science	210
Brookstone College	161
Brookstone College	152
Mitchells Academy	151
Mercy School of Nursing	141
South College-Asheville	138
John Wesley College	137
Empire Beauty School-Matthews	108
Watts School of Nursing	108
Carolina Beauty College	107
Leons Beauty School Inc	107
Carolina Beauty College	104
CET-Durham	93
Montgomery's Hairstyling Academy	91
Cosmetology Institute of Beauty Arts and Sciences	86
Apex School of Theology	78
Carolina Beauty College	76
The Medical Arts School	75
Durham Beauty Academy	72
Carolina Christian College	66
Carolina Beauty College	61
New Life Theological Seminary	49
Winston Salem Barber School	38
Cheveux School of Hair Design	34
Hairstyling Institute of Charlotte Inc	26
Fayetteville Beauty College	25
Pinnacle Institute of Cosmetology	23

ONLINE APPENDIX SECTION 2:
SUPPLEMENTARY TABLES AND DATA APPENDIX FOR “SCHOOL
CHOICE, SCHOOL QUALITY AND POSTSECONDARY ATTAINMENT”

TABLE A1
TRANSITION MATRIX OF NEIGHBORHOOD TO FIRST CHOICE SCHOOLS, BY RISING GRADE

<i>Rising 9th Graders</i>	First Choice Schools										
	Hopewell	Independence	North Meck	South Meck	West Charlotte	West Meck	Harding Univ	Berry Academy	Northwest Arts	Total	
<i>Neighborhood Schools</i>											
Butler	0.000	20.000	0.000	0.000	0.000	0.000	0.000	8.000	1.000	29.000	
Waddell	0.000	0.000	0.000	61.000	0.000	0.000	4.000	18.000	1.000	84.000	
East Mecklenburg	0.000	45.000	0.000	0.000	0.000	0.000	4.000	23.000	2.000	74.000	
Garinger	0.000	100	0.000	0.000	2.000	0.000	12.000	60.000	3.000	177	
Hopewell	0.000	1.000	27.000	0.000	2.000	0.000	2.000	15.000	0.000	47.000	
Independence	0.000	0.000	3.000	0.000	1.000	0.000	6.000	39.000	4.000	53.000	
Myers Park	0.000	2.000	0.000	0.000	1.000	0.000	8.000	28.000	3.000	42.000	
North Mecklenburg	6.000	0.000	0.000	0.000	0.000	0.000	7.000	17.000	1.000	31.000	
Olympic	0.000	0.000	0.000	22.000	0.000	2.000	5.000	41.000	4.000	74.000	
Providence	0.000	1.000	0.000	0.000	0.000	0.000	0.000	5.000	0.000	6.000	
South Mecklenburg	0.000	0.000	1.000	0.000	0.000	0.000	7.000	22.000	1.000	31.000	
West Charlotte	1.000	1.000	0.000	0.000	0.000	6.000	19.000	94.000	14.000	135	
West Mecklenburg	17.000	0.000	5.000	0.000	4.000	6.000	33.000	149	9.000	223	
Vance	5.000	3.000	54.000	0.000	4.000	0.000	35.000	63.000	7.000	171	
Total	29.000	173	90.000	83.000	14.000	14.000	142	582	50.000	1,177	
<i>Rising 10th and 11th Graders</i>											
	First Choice Schools										
	Butler	Waddell	Myers Park	Olympic	Providence	South Meck	West Charlotte	Harding Univ	Berry Academy	Northwest Arts	Total
<i>Neighborhood Schools</i>											
Butler	0.000	0.000	0.000	0.000	3.000	0.000	0.000	1.000	2.000	0.000	6.000
Waddell	0.000	0.000	1.000	1.000	0.000	32.000	2.000	4.000	4.000	1.000	45.000
East Mecklenburg	64.000	0.000	33.000	0.000	1.000	0.000	0.000	3.000	3.000	3.000	107
Garinger	10.000	0.000	1.000	0.000	7.000	0.000	11.000	4.000	10.000	4.000	47.000
Hopewell	0.000	0.000	0.000	0.000	0.000	0.000	4.000	1.000	5.000	2.000	12.000
Independence	71.000	0.000	1.000	0.000	1.000	0.000	4.000	2.000	8.000	7.000	94.000
Myers Park	1.000	0.000	0.000	0.000	3.000	1.000	7.000	4.000	6.000	2.000	24.000
North Mecklenburg	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	3.000	5.000	10.000
Olympic	0.000	17.000	24.000	0.000	0.000	7.000	3.000	8.000	9.000	2.000	70.000
Providence	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	2.000
South Mecklenburg	0.000	2.000	4.000	0.000	75.000	0.000	0.000	0.000	5.000	0.000	86.000
West Charlotte	0.000	0.000	0.000	0.000	4.000	0.000	18.000	12.000	9.000	14.000	57.000
West Mecklenburg	0.000	0.000	16.000	6.000	0.000	0.000	9.000	18.000	22.000	5.000	76.000
Vance	0.000	0.000	0.000	0.000	0.000	0.000	25.000	8.000	14.000	5.000	52.000
Total	147	19.000	80.000	7.000	94.000	40.000	84.000	66.000	101	50.000	688

TABLE A2
RANDOMIZATION CHECK

	(1)	Male (2)	Female (3)	HQ (4)	LQ (5)
Median HH Income	-168 [490]	488 [726]	-984 [752]	-257 [1,615]	-116 [1,034]
Black	0.037 [0.019]	0.006 [0.022]	0.076* [0.034]	0.028 [0.026]	0.042 [0.024]
Hispanic	-0.013 [0.012]	-0.023 [0.022]	-0.002 [0.025]	-0.011 [0.016]	-0.014 [0.016]
FRPL	0.011 [0.026]	-0.004 [0.037]	0.029 [0.025]	-0.000 [0.025]	0.017 [0.039]
8th Grade Math	0.038 [0.049]	0.072 [0.054]	-0.003 [0.067]	-0.017 [0.086]	0.068 [0.054]
8th Grade Reading	0.001 [0.047]	0.011 [0.065]	-0.009 [0.068]	-0.084 [0.081]	0.047 [0.047]
Distance to Home School	0.113 [0.126]	0.098 [0.123]	0.132 [0.172]	0.198 [0.172]	0.064 [0.149]
Distance to Choice School	0.197 [0.149]	0.402* [0.178]	-0.060 [0.211]	0.721* [0.262]	-0.105 [0.195]
Male	-0.005 [0.028]				
LQ Neighborhood School	-0.015 [0.016]				
Neighborhood School Fixed Effects	X	X	X		
Other Pre-Treatment Covariates		X	X	X	X

Notes: Each row of Column 1 reports intent-to-treat (ITT) estimates of the impact of winning the lottery from equation (2) in the paper. Columns 2 and 3 allow the impact of winning the lottery to vary by gender, while Columns 4 and 5 allow for variation in neighborhood school quality as defined in the text. Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. * - sig. 5% level. ** - sig. 1% level.

TABLE A3
ADDITIONAL ATTAINMENT OUTCOMES

	Gender			Neighborhood School Quality		Low Quality Neighborhood Schools	
	All (1)	Male (2)	Female (3)	High (4)	Low (5)	Male (6)	Female (7)
Attended Any College	-0.002 [0.029]	-0.067 [0.041]	0.084 [0.056]	-0.048 [0.040]	0.052 [0.063]	-0.020 [0.076]	0.137 [0.072]
Attended 2 Year	0.053 [0.049]	0.064 [0.062]	0.048 [0.072]	0.028 [0.070]	0.082 [0.063]	0.063 [0.087]	0.106 [0.075]
Attend Most Competitive	0.014 [0.014]	0.026 [0.014]	-0.001 [0.029]	-0.005 [0.017]	0.037 [0.020]	0.050* [0.020]	0.020 [0.029]
Obtained any Degree	0.037 [0.035]	-0.050 [0.046]	0.153** [0.058]	0.007 [0.049]	0.073 [0.052]	-0.006 [0.079]	0.168** [0.065]
Degree, 2 year	-0.005 [0.032]	0.021 [0.041]	-0.017 [0.035]	0.054 [0.041]	-0.074 [0.055]	-0.045 [0.047]	-0.098 [0.070]
Degree, Most Competitive	0.009 [0.015]	0.022 [0.013]	-0.008 [0.027]	-0.016 [0.017]	0.038 [0.021]	0.047* [0.020]	0.027 [0.031]
<i>Any Four Year (exclude for-profits)</i>							
Ever Attended	0.019 [0.057]	-0.088 [0.056]	0.133 [0.072]	-0.039 [0.066]	0.095 [0.072]	-0.044 [0.072]	0.189 [0.099]
Obtained a Degree	0.044 [0.049]	-0.015 [0.043]	0.134* [0.069]	-0.031 [0.057]	0.143** [0.057]	0.105 [0.063]	0.200* [0.093]
Sample Size	1,865	994	871	578	492	416	379

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3). Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. In columns 2 through 7, indicators for winning the lottery are interacted with the subgroup categories as instruments, and each set of subgroups (i.e. gender, gender and school quality) is mutually exclusive and collectively exhaustive. "Low quality" neighborhood schools are the 4 lowest ranked schools on the college "value-added" measure listed in Table 2 - all others are defined as "high quality". Measures of college quality are calculated using the 2009 Barron's Profile of American Colleges - see text for details. * - sig. 5% level. ** - sig. 1% level.

TABLE A4
LOGIT SPECIFICATION FOR MAIN OUTCOMES AND SUBGROUPS

	All (1)	Male (2)	Female (3)	HQ (4)	LQ (5)	Sample Size (6)
Graduated from CMS	0.148 [0.131]	0.101 [0.160]	0.211 [0.180]	-0.289 [0.198]	0.398** [0.157]	1,865
<i>College Attendance</i>						
4-Year College	0.069 [0.141]	-0.276 [0.178]	0.463** [0.188]	-0.222 [0.208]	0.252 [0.171]	1,858
Very Competitive	0.395 [0.245]	0.165 [0.319]	0.608** [0.309]	0.606* [0.332]	0.218 [0.309]	1,699
Most Competitive	0.392 [0.474]	1.206* [0.722]	-0.034 [0.557]	-0.097 [0.668]	0.802 [0.615]	1,086
<i>Earned a Degree</i>						
4-Year College	0.178 [0.166]	-0.061 [0.214]	0.410* [0.212]	-0.328 [0.237]	0.551*** [0.207]	1,839
Very Competitive	0.516* [0.295]	0.017 [0.408]	0.885** [0.360]	0.480 [0.398]	0.547 [0.381]	1,628
Most Competitive	0.509 [0.572]	1.722* [0.889]	-0.075 [0.665]	-0.762 [0.918]	1.509* [0.792]	1,060

Notes: Each row reports the intent-to-treat (ITT) estimate of winning the lottery on the indicated outcome. Coefficients are standard logits, not odds ratios. Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. Columns 2 and 3 allow the impact of winning the lottery to vary by gender, while Columns 4 and 5 allow for variation in neighborhood school quality as defined in the text. Column 6 reports the sample size, which varies by outcomes since lotteries with no variation across treatment and control groups are dropped. Measures of college quality are calculated using the 2009 Barron's Profile of American Colleges - see text for details. * - sig. 10% level. ** - sig. 5% level. *** - sig. 1% level.

TABLE A5
DIFFERENCES IN IMPACTS BY SUBGROUPS

	White/Other	Black/Hisp	Not Poor	Poor	Low Math	High Math	Grade 9	Grade 10-11
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Graduated from CMS	0.120 [0.086]	0.027 [0.043]	-0.029 [0.104]	0.086* [0.050]	0.057 [0.062]	0.055 [0.047]	0.052 [0.035]	0.055 [0.087]
<i>College Attendance</i>								
4-Year College	0.040 [0.103]	0.013 [0.052]	-0.097 [0.124]	0.068* [0.038]	-0.056 [0.083]	0.052 [0.065]	0.010 [0.053]	0.042 [0.138]
Very Competitive	0.100 [0.072]	0.016 [0.022]	0.039 [0.054]	0.040** [0.018]	0.041 [0.053]	0.049* [0.026]	0.037** [0.017]	0.054 [0.075]
Most Competitive	0.036 [0.039]	0.009 [0.017]	0.020 [0.056]	0.015 [0.019]	0.046 [0.045]	0.007 [0.012]	0.027* [0.015]	-0.027 [0.023]
<i>Earned a Degree</i>								
4-Year College	0.146 [0.109]	0.015 [0.048]	0.034 [0.091]	0.059 [0.047]	0.112* [0.066]	0.042 [0.064]	0.043 [0.041]	0.093 [0.161]
Very Competitive	0.096 [0.070]	0.018 [0.028]	0.034 [0.046]	0.043** [0.020]	0.057 [0.040]	0.041 [0.026]	0.052*** [0.019]	-0.010 [0.045]
Most Competitive	0.043 [0.046]	-0.001 [0.017]	0.016 [0.053]	0.010 [0.013]	0.040 [0.040]	0.001 [0.009]	0.027** [0.014]	- 0.057*
Attainment Index	0.115 [0.132]	0.061 [0.043]	-0.004 [0.128]	0.097* [0.049]	0.088 [0.049]	0.053 [0.041]	0.075* [0.029]	0.040 [0.129]

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3) and indicators for winning the lottery interacted with the indicated subgroup categories as instruments. Each subgroup pair (i.e. male/female, not poor/poor) is mutually exclusive and collectively exhaustive. Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. Measures of college quality are calculated using the 2009 Barron's Profile of American Colleges - see text for details. * - sig. 10% level. ** - sig. 5% level. *** - sig. 1% level.

TABLE A6
COMPLETE QUALITY BY GENDER SPLITS AND ALT. DEFINITIONS OF SCHOOL QUALITY

	High Quality Neighborhood Schools		Low Quality Neighborhood Schools		HQ Alt (5)	LQ Alt (6)	HQ Alt 2 (7)	LQ Alt 2 (8)
	Male (1)	Female (2)	Male (3)	Female (4)				
Graduated from CMS	-0.031 [0.076]	0.015 [0.078]	0.121 [0.077]	0.142 [0.075]	-0.127 [0.084]	0.136*** [0.044]	-0.011 [0.060]	0.117** [0.054]
Ever Attended: 4-Year College	-0.156** [0.064]	0.121 [0.077]	-0.038 [0.073]	0.220* [0.110]	-0.095 [0.076]	0.074 [0.062]	-0.010 [0.071]	0.052 [0.066]
Selective 4-Year College	-0.000 [0.020]	0.097* [0.058]	0.040 [0.049]	0.052 [0.040]	0.072* [0.039]	0.025 [0.018]	0.069* [0.041]	0.011 [0.021]
Earned a Degree from: 4-Year College	-0.120** [0.058]	0.058 [0.061]	0.106 [0.062]	0.226* [0.095]	-0.102 [0.081]	0.124*** [0.041]	-0.000 [0.071]	0.105** [0.045]
Selective 4-Year College	-0.013 [0.022]	0.076 [0.046]	0.036 [0.025]	0.096* [0.047]	0.036 [0.037]	0.042** [0.019]	0.041 [0.028]	0.039** [0.019]

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 (row 3 of column 1 in Table 3) as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3) and indicators for winning the lottery interacted with the indicated subgroup categories as instruments. Each subgroup pair (i.e. HQ/LQ, Grade 9 vs. Grade 10-11) is mutually exclusive and collectively exhaustive. The first alternate HQ/LQ split in Columns 1 and 2 adds 2 schools (West Charlotte and Garinger) to the LQ group that have among the lowest rates of college attendance, even though their college "value added" is higher. The second alternative HQ/LQ split in Columns 3 and 4 picks the 4 lowest ranked schools based only on the 2000 and 2001 9th grade cohorts. "High Math" is students with 8th grade EOC math scores above the state average of zero, "Low Math" are below the state average. Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. Measures of college quality are calculated using the 2009 Barron's Profile of American Colleges - see text for details. The second to last row reports the number of F-Tests (out of a possible 7) for equality of coefficients that is significant at the 10 percent level or less within each subgroup categorization. * - sig. 10% level. ** - sig. 5% level. *** - sig. 1% level.

TABLE A7
SCHOOL QUALITY MEASURES AS FIRST STAGE ENDOGENOUS VARIABLES

	Percent taking SAT		Residual "On-Track" Measure		College "Value Added"	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)
Attend a 4 Year College	-0.908* [0.521]	1.336* [0.792]	-1.332 [1.070]	2.131 [1.333]	-4.185* [2.458]	5.430 [3.404]
p-value for F(male=female)	0.037		0.017		0.259	
Earned a 4 Year Degree	-0.251 [0.336]	1.042* [0.613]	-0.138 [0.785]	2.068 [1.362]	-1.218 [1.602]	4.868 [3.246]
p-value for F(male=female)	0.077		0.029		0.318	

Notes: Each set of estimates reports the local average treatment effect (LATE) of attending a first choice school, using the variable indicated by the column above as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3) and indicators for winning the lottery interacted with gender as instruments. Standard errors are below each estimate in brackets, clustered at the lottery (school-grade-priority group) level, and adjusted for estimation error using the procedure in Murphy and Topel (1985). The p-value for an F-test of equality of coefficients by gender is reported below each outcome-endogenous variable pairing. See text for details. * - sig. 10% level. ** - sig. 5% level. *** - sig. 1% level. When applicable, standard errors adjusted for prediction error as in Murphy-Topel (1985).

TABLE A8
SENSITIVITY OF MAIN RESULTS TO ASSUMPTIONS ABOUT PERSISTENCE

	Gender		Neighborhood School Quality		Low Quality Neighborhood Schools		
	All (1)	Male (2)	Female (3)	High (4)	Low (5)	Male (6)	Female (7)
Earned a Degree from:							
Any 4 Year College	0.047 [0.049]	-0.013 [0.043]	0.139* [0.070]	-0.030 [0.057]	0.149** [0.055]	0.106 [0.062]	0.226* [0.095]
Selective 4 Year College	0.040* [0.017]	0.004 [0.014]	0.089* [0.046]	0.026 [0.023]	0.057** [0.026]	0.036 [0.025]	0.096* [0.047]
<i>Assume that No Lottery Winners, All Lottery Losers Finish</i>							
Earned a Degree from:							
Any 4 Year College	0.005 [0.048]	-0.073 [0.050]	0.109 [0.062]	-0.085 [0.057]	0.112 [0.063]	0.049 [0.061]	0.187* [0.088]
Selective 4 Year College	0.040* [0.017]	0.008 [0.013]	0.085* [0.042]	0.026 [0.025]	0.059* [0.028]	0.033 [0.025]	0.092* [0.047]
Sample Size	1,865	994	871	1,070	795	416	379

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3). Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. In columns 2 through 7, indicators for winning the lottery are interacted with the subgroup categories as instruments, and each set of subgroups (i.e. gender, gender and school quality) is mutually exclusive and collectively exhaustive. "Low quality" neighborhood schools are the 4 lowest ranked schools on the college "value-added" measure listed in Table 2 - all others are defined as "high quality". The attainment index in the last row is a summary measure of all the outcomes above plus enrollment and degree completion in any college (including 2-year) and "most competitive" colleges, and is weighted to account for dependence across outcomes as described in the text. Measures of college quality are calculated using the 2009 Barron's Profile of American Colleges - see text for details. * - sig. 5% level. ** - sig. 1% level.

TABLE A9
RESULTS BY SUBGROUP WITHIN LOW QUALITY NEIGHBORHOOD SCHOOL SAMPLE

	High Quality		Low Quality		High Quality		Low Quality		High Quality		Low Quality	
	White (1)	Minority (2)	White (3)	Minority (4)	Nonpoor (5)	Poor (6)	Nonpoor (7)	Poor (8)	High Math (9)	Low Math (10)	High Math (11)	Low Math (12)
Attainment Index	0.132 [0.139]	-0.042 [0.038]	0.220 [0.134]	0.046 [0.049]	-0.113 [0.142]	0.071 [0.055]	0.056 [0.104]	0.114* [0.057]	-0.022 [0.072]	-0.029 [0.052]	0.114* [0.052]	0.068 [0.043]
Sample Size	349	721	288	507	360	710	324	471	342	665	273	479

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3). Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. Indicators for winning the lottery are interacted with the subgroup categories as instruments, and each set of subgroups (i.e. gender, gender and school quality) is mutually exclusive and collectively exhaustive. "Low quality" neighborhood schools are the 4 lowest ranked schools on the college "value-added" measure listed in Table 2 - all others are defined as "high quality". The attainment index is a summary measure of all the outcomes above plus enrollment and degree completion in any college (including 2-year) and "most competitive" colleges, and is weighted to account for dependence across outcomes as described in the text. Measures of college quality are calculated using the 2009 Barron's Profile of American Colleges - see text for details. * - sig. 5% level. ** - sig. 1% level.

TABLE A10
OAXACA-BLINDER DECOMPOSITION OF RESULTS BY NEIGHBORHOOD SCHOOL QUALITY

	Decomp. 1 (Low Loading)		Decomp. 2 (High Loading)		
	HQ-LQ Difference in Impact	Diffs in Covariates	Diffs in Impact, cond. on covariates	Diffs in Covariates	Diffs in Impact, cond. on covariates
	(1)	(2)	(3)	(4)	(5)
Graduate from CMS	0.175** [0.073]	0.002 [0.009]	0.173*** [0.074]	-0.023*** [0.008]	0.199*** [0.073]
Enrolled, 4 Year College	0.125 [0.097]	-0.004 [0.009]	0.130 [0.099]	-0.040*** [0.014]	0.165 [0.107]
Degree, 4 Year College	0.181*** [0.091]	0.004 [0.012]	0.177*** [0.063]	-0.020 [0.013]	0.201*** [0.068]

Notes: This table presents a decomposition of the difference in within-lottery treatment effects among students with "high quality" and "low quality" neighborhood schools (The estimates in Column 1 come from Columns 7 and 8 of Table 5) into differences in student characteristics (Columns 2 and 4) and differences in treatment effects conditional on covariates (Columns 3 and 5). Column 1 differs slightly from the results in Table 5 because of differences in weighting of the first stages across lotteries in the two procedures. Columns 2 and 3 weight the differences by the treatment effects in the LQ sample, while columns 4 and 5 weight by the HQ sample. The set of covariates is the same as in equations (2) and (3) and includes student demographics and prior math and reading scores - see the text for details. Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. * - sig. 10% level. ** - sig. 5% level. *** - sig. 1% level.

TABLE A11
IMPACTS ON ADDITIONAL SCHOOL CHARACTERISTICS

	Neighborhood School Quality		
	All (1)	High (2)	Low (3)
<i>Peers</i>			
Percent Free Lunch	-0.017 [0.068]	0.056 [0.075]	-0.104 [0.079]
Peer Days Absent	-2.690** [0.340]	-2.000** [0.390]	-3.500** [0.340]
Peer Prior Days Suspended	-0.680** [0.110]	-0.410** [0.100]	-0.990** [0.160]
Peer Prior EOC Math	0.043 [0.380]	-0.005 [0.042]	0.099* [0.040]
<i>Resources</i>			
Books Per Student	1.870 [1.240]	2.390 [1.410]	1.260 [1.400]
Students per Computer	0.520 [0.340]	-0.080 [0.400]	1.220** [0.340]
<i>Teachers</i>			
Licensed in Subject	-0.002 [0.033]	0.009 [0.035]	-0.014 [0.039]
Nat'l Board Certified	0.003 [0.042]	0.002 [0.048]	0.004 [0.039]
Praxis Score in Subject	-7.290 [4.320]	-5.840 [4.930]	-8.980* [3.840]
BA - Most Competitive	0.042 [0.026]	0.053* [0.022]	0.029 [0.034]
<i>Guidance Counselors</i>			
Students per Counselor	19.500 [28.860]	24.350 [43.600]	13.870 [19.420]
BA - Very Competitive	-0.035 [0.045]	-0.089* [0.043]	0.027 [0.059]
BA - Most Competitive	-0.028 [0.028]	-0.046 [0.029]	-0.006 [0.039]
<i>College Prep and Course-Taking</i>			
Average SAT Score	11.300 [28.740]	-27.720 [28.090]	57.350 [33.610]
Percent taking SAT	0.151** [0.023]	0.081** [0.019]	0.234** [0.019]
% Freshmen in Alg I or higher	0.080** [0.019]	0.030 [0.020]	0.139** [0.020]
% Seniors in Pre-Calc or higher	0.079** [0.024]	0.073* [0.030]	0.085** [0.021]
% Freshmen in Biol or higher	0.141** [0.038]	0.050 [0.031]	0.248** [0.042]
% Freshmen Enter 4 yr College	0.057** [0.018]	0.010 [0.018]	0.113** [0.021]

Table A11 (continued)

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3). Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. "Low quality" neighborhood schools are the 4 lowest ranked schools on the college "value-added" measure listed in Table 2 - all others are defined as "high quality". The classroom and teacher measures are calculated for students' EOC math courses, which are required for graduation with a college-preparatory diploma. * - sig. 5% level. ** - sig. 1% level.

TABLE A12
IMPACTS ON ADDITIONAL MEDIATING OUTCOMES

	Neighborhood School Quality			Low Quality Neighborhood Schools	
	All (1)	High (2)	Low (3)	Male (4)	Female (5)
GPA - Math and Science	0.042 [0.061]	-0.062 [0.062]	0.166 [0.110]	0.099 [0.130]	0.244* [0.117]
GPA - English	0.193* [0.074]	0.160* [0.075]	0.232 [0.127]	0.146 [0.141]	0.333* [0.145]
Days Absent, 02-03	-1.68 [1.41]	-0.25 [1.33]	-3.46 [2.06]	-3.54 [3.01]	-3.36* [1.55]
Days Suspended, 02-03	-1.49* [0.74]	-1.45* [0.69]	-1.55 [1.10]	-1.68 [1.41]	-1.40 [0.82]
Days Absent, 03-04	-1.15 [1.49]	1.22 [2.33]	-4.01** [1.36]	-4.83** [1.65]	-3.14* [1.43]
Days Suspended, 03-04	-0.27 [0.56]	0.16 [0.91]	-0.78* [0.36]	-0.79 [0.49]	-0.86* [0.40]
English I Score	-0.024 [0.060]	-0.054 [0.062]	0.007 [0.073]	-0.077 [0.081]	0.098 [0.121]
Took English I Exam	0.024 [0.018]	0.018 [0.023]	0.030 [0.023]	0.003 [0.031]	0.061 [0.053]
Alg I Score	-0.125 [0.067]	-0.180* [0.084]	-0.065 [0.090]	0.011 [0.097]	-0.147 [0.122]
Took Algebra I Exam	0.071** [0.023]	0.049 [0.031]	0.096** [0.037]	0.059 [0.058]	0.138** [0.051]
Alg. I or higher - 9th grd.	0.120** [0.035]	0.100** [0.016]	0.140* [0.062]	0.139* [0.065]	0.141* [0.069]
Geometry Score	-0.129 [0.091]	-0.249** [0.094]	0.029 [0.116]	0.009 [0.151]	0.049 [0.121]
Took Geometry Exam	0.108** [0.030]	0.120** [0.042]	0.093* [0.048]	-0.004 [0.065]	0.205** [0.048]
Geom or higher - 10th grd.	0.121** [0.041]	0.047 [0.049]	0.216** [0.059]	0.172* [0.070]	0.269** [0.062]
Algebra II Score	-0.153 [0.086]	-0.245* [0.107]	-0.041 [0.109]	-0.106 [0.130]	0.012 [0.144]
Took Algebra II Exam	0.061* [0.030]	-0.022 [0.035]	0.160** [0.058]	0.061 [0.068]	0.278** [0.092]
Alg. II or higher - 11th grd.	0.034 [0.033]	-0.070 [0.041]	0.156** [0.043]	0.073 [0.057]	0.258** [0.082]
Upper lvl math - 12th grd.	-0.057 [0.054]	-0.038 [0.067]	-0.081 [0.069]	-0.038 [0.090]	-0.132 [0.072]

Table A12 (continued)

	All (1)	Neighborhood School Quality		Low Quality Neighborhood Schools	
		High (2)	Low (3)	Male (4)	Female (5)
Biology Score	-0.119 [0.088]	-0.099 [0.098]	-0.141 [0.111]	-0.162 [0.174]	-0.108 [0.104]
Took Biology Exam	0.093** [0.027]	0.106** [0.033]	0.077 [0.040]	0.036 [0.072]	0.123* [0.055]
Biology or higher - 9th grd.	0.186** [0.066]	0.224** [0.066]	0.147* [0.076]	0.162* [0.079]	0.126 [0.082]
Chemistry Score	-0.219 [0.131]	-0.376* [0.157]	-0.004 [0.186]	0.105 [0.247]	-0.114 [0.271]
Took Chemistry Exam	0.124** [0.040]	0.056 [0.047]	0.205** [0.068]	0.153* [0.075]	0.267* [0.105]
Chemistry or higher- 10th grd.	-0.076 [0.046]	-0.120* [0.055]	-0.020 [0.078]	-0.067 [0.111]	0.054 [0.070]
AP English	0.075 [0.060]	-0.037 [0.056]	0.207* [0.098]	0.140 [0.096]	0.288* [0.145]
Creative Writing	0.001 [0.031]	-0.010 [0.026]	0.010 [0.047]	0.013 [0.029]	0.006 [0.087]
Journalism / Debate	0.044 [0.042]	0.028 [0.038]	0.063 [0.068]	0.024 [0.058]	0.111 [0.089]
AVID Program	0.028 [0.018]	0.039 [0.027]	0.019 [0.029]	0.002 [0.031]	0.042 [0.045]
Adv. Foreign Lang.	-0.042 [0.027]	-0.111** [0.035]	0.041 [0.031]	0.079 [0.046]	-0.004 [0.046]
AP Art or Music	-0.006 [0.016]	-0.012 [0.023]	0.002 [0.014]	-0.010 [0.015]	0.015 [0.018]
Team Sports	-0.001 [0.041]	-0.047 [0.066]	0.053 [0.037]	-0.007 [0.039]	0.122 [0.068]
ROTC	- 0.089*** [0.027]	-0.120* [0.050]	-0.052 [0.035]	-0.029 [0.062]	-0.076 [0.044]

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the 2SLS system in equations (2) and (3). Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. In columns 2 through 5, indicators for winning the lottery are interacted with the subgroup categories as instruments, and each set of subgroups (i.e. gender and school quality) is mutually exclusive and collectively exhaustive. "Low quality" neighborhood schools are the 4 lowest ranked schools on the college "value-added" measure listed in Table 2 - all others are defined as "high quality". EOC math are state standardized courses in Algebra I, Geometry and Algebra II, and are required for graduation with a college-preparatory diploma. * - sig. 5% level. ** - sig. 1% level.

TABLE A13
IMPACTS ON ENROLLMENT AND TYPE OF SCHOOL

	Gender		Neighborhood School Quality		Low Quality Neighborhood Schools		
	All (1)	Male (2)	Female (3)	High (4)	Low (5)	Male (6)	Female (7)
In CMS, Fall 2002	0.021 [0.013]	0.020 [0.023]	0.022 [0.021]	0.016 [0.016]	0.024 [0.016]	0.022 [0.019]	0.027 [0.021]
In CMS, Spring 2004	0.047* [0.017]	0.042 [0.021]	0.053 [0.027]	0.033 [0.018]	0.065 [0.037]	0.037 [0.045]	0.081* [0.039]
In 1st Choice, Fall 2002	0.557** [0.064]	0.579** [0.058]	0.529** [0.073]	0.548** [0.077]	0.568** [0.058]	0.573** [0.052]	0.559** [0.071]
In Neighborhood School, Fall 2002	-0.382** [0.038]	-0.397** [0.032]	-0.362** [0.046]	-0.367** [0.050]	-0.400** [0.040]	-0.408** [0.036]	-0.390** [0.052]
In Magnet School, Fall 2002	0.297* [0.115]	0.323** [0.113]	0.264* [0.117]	0.247* [0.123]	0.362** [0.117]	0.370** [0.112]	0.349** [0.123]
Distance to Fall 2002 School	1.46** [0.54]	1.84** [0.53]	0.99 [0.54]	1.62** [0.56]	1.25 [0.66]	1.53* [0.57]	0.91 [0.76]

Notes: Each estimate reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3). Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. In columns 2 through 5, indicators for winning the lottery are interacted with the subgroup categories as instruments, and each set of subgroups (i.e. gender, gender and school quality) is mutually exclusive and collectively exhaustive. "Low quality" neighborhood schools are the 4 lowest ranked schools on the college "value-added" measure listed in Table 2 - all others are defined as "high quality". * - sig. 5% level. ** - sig. 1% level.

TABLE A14
TESTS FOR IMPACT OF DIFFERENTIAL ATTRITION

<i>Panel A: Imputing High School Test Scores Under Various Assumptions</i>						
	Lee (2009) Bounds					
<i>EOC Test Scores</i>	Main (1)	Test-Taking (2)	Lower Bound (3)	Upper Bound (4)	Imp. 8th Math (5)	Imp. Cov Adj (6)
Algebra I	-0.106 [0.071]	0.095** [0.028]	-0.197* [0.069]	0.011 [0.062]	-0.076 [0.069]	-0.083 [0.066]
Geometry	-0.140 [0.101]	0.134** [0.030]	-0.315** [0.110]	0.039 [0.102]	-0.105 [0.078]	-0.101 [0.074]
Algebra II	-0.158 [0.086]	0.076** [0.029]	-0.280** [0.102]	-0.068 [0.083]	-0.074 [0.049]	-0.081 [0.049]
Biology	-0.124 [0.086]	0.110** [0.036]	-0.224* [0.089]	0.043 [0.088]	-0.113 [0.077]	-0.100 [0.079]
Chemistry	-0.217 [0.132]	0.136** [0.041]	-0.570** [0.154]	0.095 [0.135]	-0.115 [0.072]	-0.118 [0.068]
<i>Panel B: Imputing High School Graduation for Students with NSC Records</i>						
	Main (1)	Imp. 4 Yr (2)	Imp. V. Compet (3)			
Graduated from CMS	0.055 [0.032]	0.049 [0.034]	0.058 [0.033]			

Notes: Each row reports the local average treatment effect (LATE) of attending a first choice school, using enrollment in Fall 2002 as the endogenous variable in the first stage of the 2SLS system in equations (2) and (3) and an indicator for winning the lottery as an instrument. Panel A reports imputation procedures for high school test scores, while Panel B reports imputation for high school graduates. Column 1 reports results with no adjustment for missing data, as in the main text. In Column 2 the outcome is the probability of taking the test. Columns 3 and 4 represent lower and upper bounds based on assumptions about the scores of students who didn't take the test, following the procedure in Lee (2009). Column 5 imputes a predicted score for each student with missing data based on a full sample regression of the score in each row on the student's EOC 8th grade math score. Column 6 adds all other covariates from the main empirical specification in the paper to the prediction. In Panel B, Column 1 reports the unadjusted impact on high school graduation, while Columns 2 and 3 set high school graduation equal to one if the student attended any 4 year college or a very competitive college respectively, based on NSC data. Standard errors are below each estimate in brackets and clustered at the lottery (school-grade-priority group) level. * - sig. 10% level. ** - sig. 5% level. *** - sig. 1% level.