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Who Chooses in Hartford? Report 1: Statistical analysis of Regional School Choice Office applicants and non-applicants among Hartford-resident HPS students in grades 3-7, Spring 2012

Jack Dougherty
Trinity College, jack.dougherty@trincoll.edu

Diane Zannoni
Trinity College

Marissa Block
Trinity College, marissa.block@trincoll.edu

Stephen Spirou
Trinity College, stephen.spirou@trincoll.edu

Who Chooses in Hartford?
Report 1: Statistical analysis of Regional School Choice Office applicants and non-applicants among Hartford-resident HPS students in grades 3-7, Spring 2012

by Jack Dougherty, Diane Zannoni, Marissa Block, Stephen Spirou
Cities Suburbs and Schools Project at Trinity College, Hartford CT
http://commons.trincoll.edu/cssp/
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Summary:
Which Hartford-area families were more (or less) likely to apply for public school choice options, and how do they vary by student characteristics & achievement, school composition, and neighborhood demographics? This study seeks to answer these questions based on student-level data provided by the Connecticut State Department of Education (CSDE), the Regional School Choice Office (RSCO), and selected local school districts. Our goal is to help policymakers evaluate the depth and breadth of interdistrict school choice participation, and thereby contribute to school choice program planning efforts and the improved quality of instruction of students.

Report 1 offers a statistical analysis of RSCO applicants versus non-applicants among 6,673 Hartford-resident students enrolled in Hartford Public Schools (HPS) — both district schools and interdistrict magnet schools — from grades 3 through 7 in Spring 2012. ***Overall, we found that participation in the RSCO application process was not random, but linked to student socioeconomic characteristics that often showed higher participation by more privileged families. In this sample, there were statistically significant lower levels of RSCO participation among English Language Learners and those with special needs, and generally higher levels by students with high CMT scores, and those who live in census areas with higher median household incomes and higher percentages of owner-occupied housing.*** The report also evaluates statistically significant differences and the magnitude of numbers of expected versus actual applicants by race and ethnicity, school performance, location, and other characteristics.

Background on public school choice for Hartford students:
Over the past two decades, the range of public school choices for Hartford students has increased dramatically through three different policy changes. After the Connecticut Supreme Court's *Sheff v O'Neill* school desegregation ruling in 1996, and the court-approved Sheff I (2003) and Sheff II (2007) remedies, the state legislature funded the growth of voluntary integration through interdistrict magnet schools (with curricular themes designed to attract both city and suburban students) and the Open Choice program (where city students enroll in suburban district schools, and vice versa). Also in 1996, Connecticut lawmakers approved a bill to allow the creation of charter schools (which operate with public funds, but fewer regulations than district schools). Furthermore, in 2008, the Hartford Public Schools shifted from neighborhood school attendance areas to an "all-choice" initiative, which required families with students entering kindergarten or

high school to submit a lottery application to their preferred HPS district school, with the option to switch schools between grades. Today, when all of these options are combined, the parent of a typical Hartford 6th grader is eligible to apply to over 40 different district and interdistrict public schools or programs in the metropolitan Hartford region.[1]

This report focuses solely on public school choice options administered by the Regional School Choice Office (RSCO), which in spring 2012 received over 17,000 raw lottery applications from city and suburban families. Beginning in late fall 2011, RSCO invited families to submit applications for the spring 2012 lottery, and to indicate their preferences for Open Choice (yes/no), interdistrict magnets (rank up to five), and technical schools & agricultural programs. RSCO staff cleaned the raw application data to check the validity of students' home addresses and phone numbers, then forwarded "active" validated application data into the lottery process, and removed "inactive" non-validated ones. After RSCO ran the "initial" round of the lottery in spring 2012, it later added a second round for New Schools and Opportunities (NSO), and accepted more applications in late spring/early summer 2012. This report defines "applicants" as individual students whose active validated application was submitted for either the initial RSCO phase and/or the NSO phase of the spring 2012 lottery for enrollment during the following school year.

Data sources, methods, and limitations:

Data for this study was provided by CSDE under a no-cost contract approved by Connecticut's Office of the Attorney General, which restricted the use of confidential student-level records only for the purpose of this study. Our research team implemented stringent security practices to protect the data, is prohibited from disclosing the data to any other party without the express written consent from the CSDE, and is required to destroy the data once the purpose is completed or the period of the agreement has ended. In this report, all student-level data has been aggregated into larger units to protect anonymity, meaning that we do not report table cells of groups smaller than 5 students, or 20 students when it involves assessment data. Furthermore, we agreed to provide CSDE a 30-day review and approval period prior to sharing or publishing any findings or results from this study. Also, the Hartford Public Schools provided additional data under a related no-cost agreement to protect student confidentiality.

In October 2013, CSDE provided us with three large datasets:

1) Public School Information System (PSIS) records, consisting of nearly 180,000 per year for students enrolled in the 43 traditional public school districts located in the RSCO transportation region of central Connecticut, plus 5 non-traditional districts located in the Hartford area: Capitol Region Education Council (CREC), Achievement First Hartford, Jumoke Academy, Odyssey Community, and the CT Technical High Schools. (Later, we realized that we also should have requested data for about 250 Goodwin College magnet students in the LEARN district, a regional service center that usually manages schools in

the shoreline region.) While RSCO applicants may reside anywhere in Connecticut, focusing on those in the transportation region improves the efficiency of our matching.
2) Connecticut Mastery Test (CMT) subject scores for grade 3-8 students enrolled in the districts above, which are linked to PSIS by unique student ID numbers (SASID).
3) Regional School Choice Office (RSCO) student applications for Spring 2011 and 2012.

However, the RSCO application data had several constraints:

a) No lottery application preferences: We were provided data on RSCO lottery outcomes (e.g., Offer1 by school name, Offer1Accepted: yes/no; Offer2, etc.), but not the preferences listed on the original application form. As a result, we cannot analyze how applicants ranked their preferred magnet schools, or whether or not they were willing to participate in both magnets and Open Choice.

b) Limited RSCO ID numbers: RSCO assigned a set of ID numbers for applicants in the initial lottery, then assigned a set of ID numbers to applicants in the NSO lottery in Spring 2012 (and most likely 2011, which we have yet to examine). But RSCO did not assign unique ID numbers to individuals. Therefore, an applicant could be assigned one ID for the initial lottery and a second ID for the NSO lottery. As a result, students are not traceable across lotteries (or subsequent years) solely within the RSCO database. Also, ID numbers were re-used in the two rounds, so that an ID might appear in both the initial and NSO lottery, but that ID might not be assigned to the same person. Overall, RSCO ID numbers were not useful for this analysis.

c) No links to other state databases: While CSDE maintains the RSCO application data, it currently does not contain the unique student ID (SASID), and therefore cannot be easily matched to students' related records in the CSDE's PSIS and CMT databases. As a result, we had to create our own matching system.

Furthermore, our study did not have access to supply-side data, meaning the number of seats available to students in RSCO schools, which would have offered a richer portrait of this market.

Given the available data and constraints, our first major task was to carefully link records between different state databases in 2011-12, as shown in figure 1. We began with 18,921 validated RSCO applications (initial and NSO combined, by unique individual), and nearly 180,000 PSIS records (with linked CMT data) for students in Hartford-area districts and the RSCO transportation zone, as shown in figure 2.

In the first round of matching RSCO applications with PSIS-CMT data, we used SPSS software to automatically merge student records with three identical variables (date of birth, last name, and first name), resulting in a 55 percent yield of Spring 2012 applications. For the second round,

we focused on a subset of unmatched Hartford-resident HPS grade 3-8 applications, and ran additional SPSS merges to catch mistaken birthdates, different name spellings, hyphenations, the addition of Jr. or III, etc. In this semi-automated process, we manually inspected and judged each pair before confirming the match. Overall, for spring 2012 RSCO applicants who self-reported as Hartford residents attending any HPS-run school in grades 3-8, we successfully matched all except 80 students (or 1%) out of the 8,085 possible records in the PSIS-CMT pool.

After matching RSCO applicants with the PSIS-CMT database, we added more variables by merging those records by unique student ID (SASID) with the Hartford Public Schools student database, which was continuously updated through June 2012. The HPS database includes additional CMT data (such as vertical scale scores for reading and math) and student addresses, which were not available in the CSDE's PSIS-CMT database. By geocoding the address of each student and aggregating to the census block group level, we also matched income and housing variables from the U.S. Census Bureau, American Community Survey 5-year estimate (2008-12).

Figure 1: Data Matching Process, 2011-12

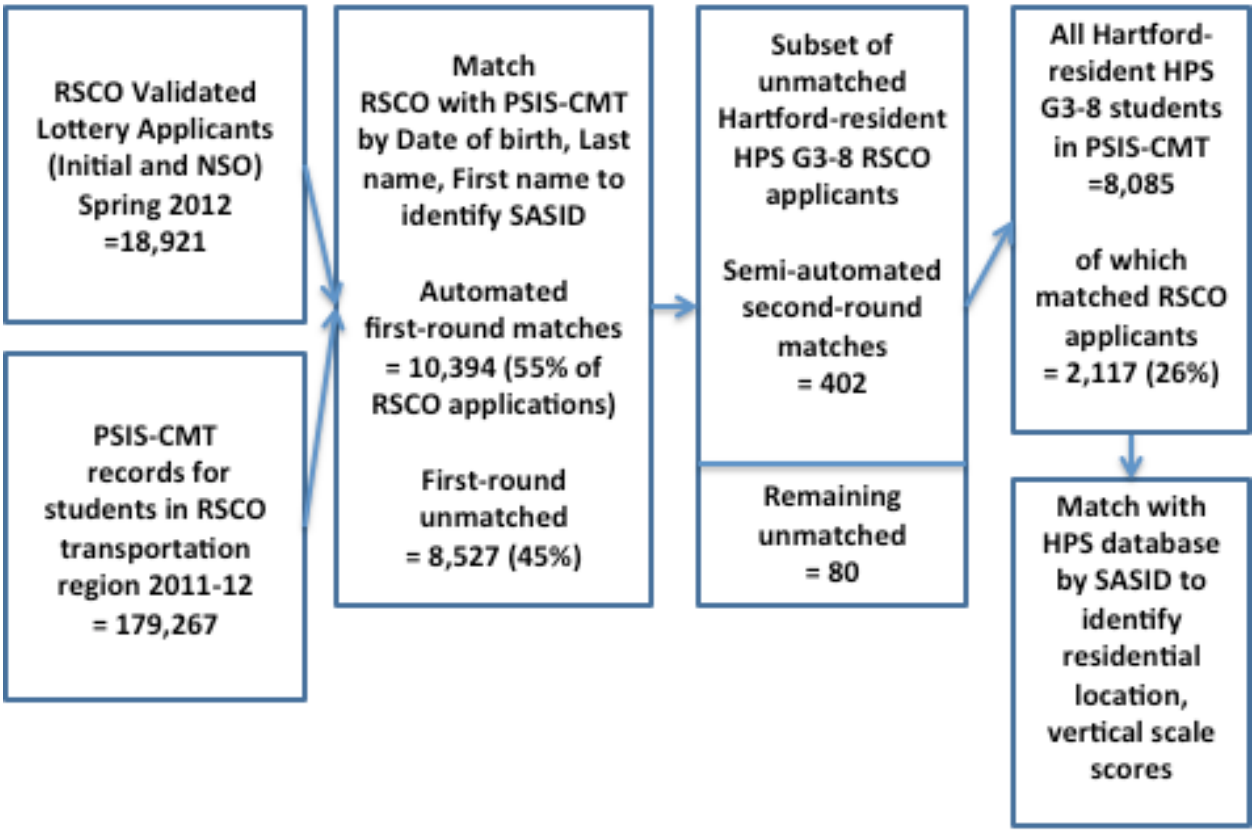
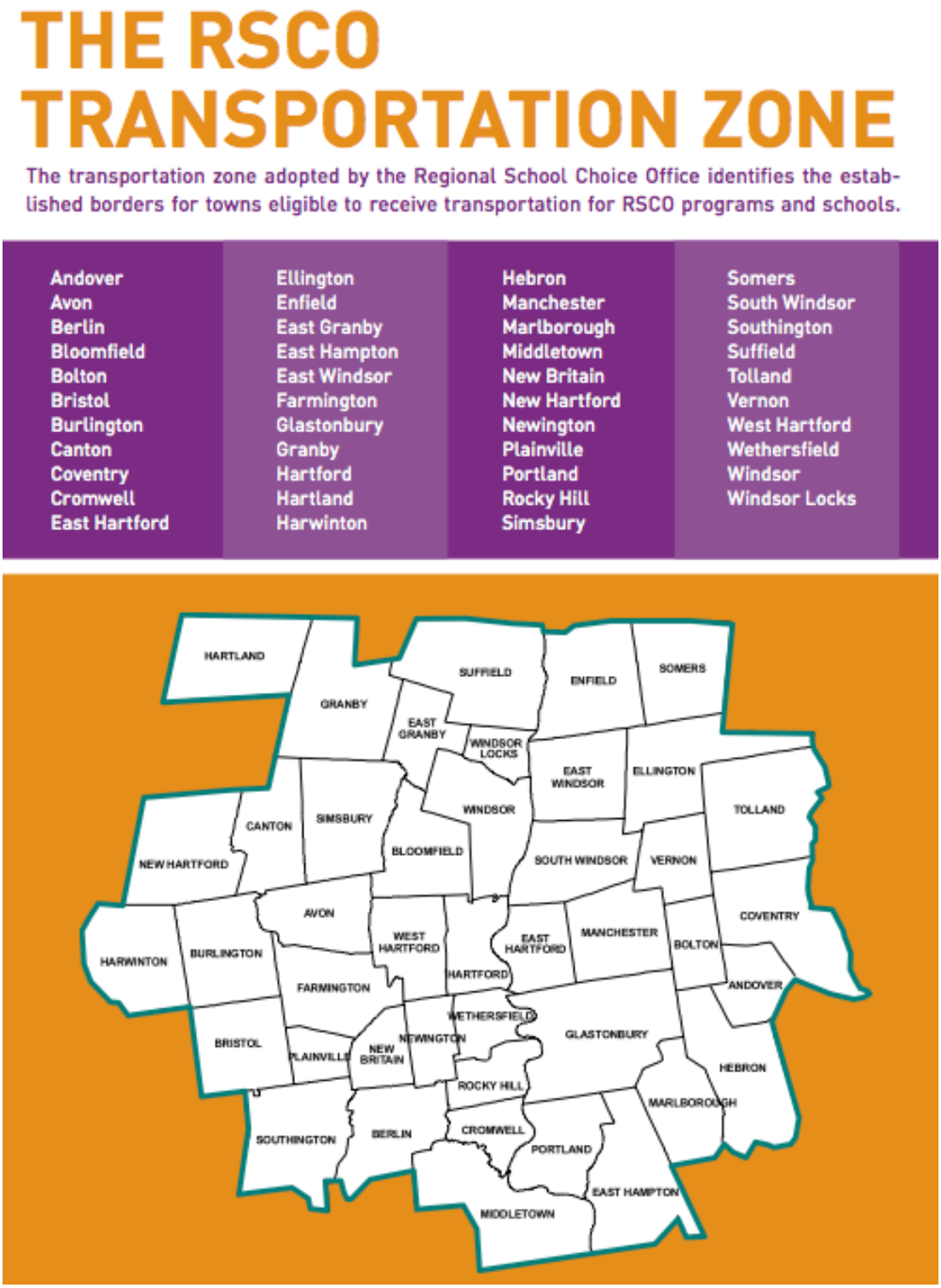


Figure 2:



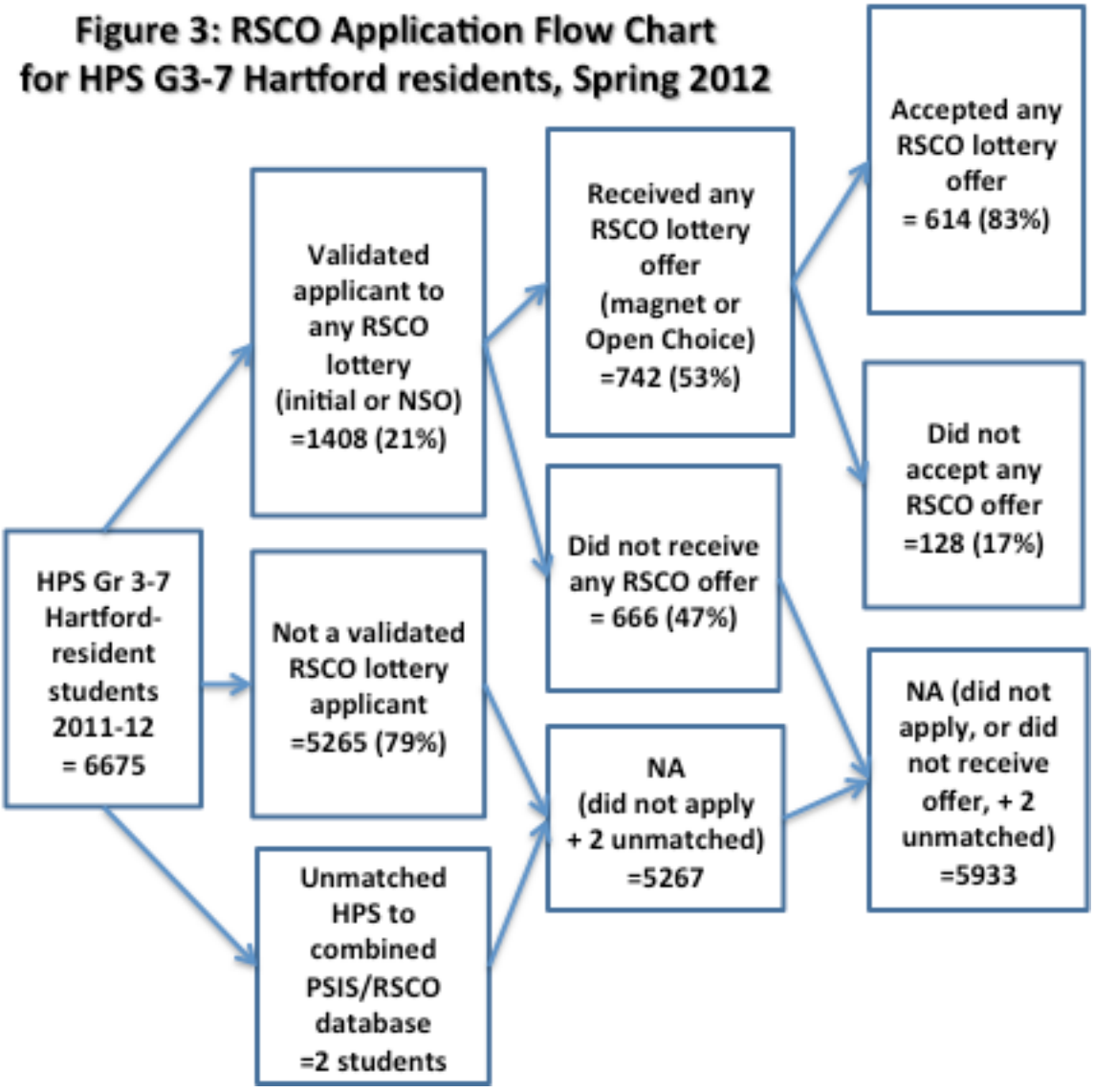
PSIS data included traditional districts above plus five non-traditional districts: CREC, Achievement First Hartford, Jumoke, Odyssey, and CT Technical Schools.

Image source: Regional School Choice Office transportation brochure, 2014-15

The RSCO sample:
This report focuses on Hartford-resident students (defined by our geocoding of their home address) from grades 3-7 enrolled in HPS-run schools, including district and interdistrict magnets. These grade levels were selected based on the availability of CMT data, though we omitted grade 8 in this report because most of these students are at the end of their last grade level in an HPS K-8 school, and we will analyze their choices separately in a subsequent report.

Based on an initial pool of 6,675 HPS Grade 3-7 Hartford-resident students in 2011-12, we followed those who were validated applicants to any RSCO lottery in spring 2012 (1408, or 21 percent), the number of those who received any RSCO magnet or Open Choice offer (742, or 53 percent), and the number of those who accepted any RSCO placement (614, or 83 percent), as shown in Figure 3. Since our RSCO data did not include the date when the offer was made (which could have occurred anytime between the spring and the beginning of the next school year), our future analysis of offers and acceptances will be limited.

Figure 3: RSCO Application Flow Chart for HPS G3-7 Hartford residents, Spring 2012



Characteristics of Applicants and Non-Applicants by Category

Tables 1, 2, and 3 describe the characteristics of validated RSCO applicants and non-applicants among the pool of all 6,673 Hartford-resident grade 3-7 students enrolled in HPS schools during the spring 2012 lottery. For example, in the student demographics category in Table 1a, 12 percent of the applicants were English Language Learners and 11 percent had special education needs, while nearly all (98 percent) were eligible for free or reduced-price meals. Table 1b shows that among all applicants, 28 percent are owner-occupants, while among non-applicants 25 percent are owner-occupants. Table 2a breaks down the pool by student achievement, where 18 percent of applicants received a score of 4-5 on each of the math, reading, and writing CMT tests. Table 3 lists HPS schools in order of applicants as a percentage of total enrollment by Hartford-resident grade 3-7 students, led by Betances Early Reading Lab (in 2011-12, a PreK-3 district school, 37 percent) and Sanchez (a PreK-5 district school, 32 percent).

Table 1a: General Characteristics of RSCO Applicants and Non-Applicants, among Hartford-resident HPS grade 3-7 students, Spring 2012

	All	Applicants	Non-Applicants
	6673	1408 (21%)	5265 (79%)
by Student demographics			
% Male	51	49	51
% English language learners (ELL)	19	12	20
% Special education needs	15	11	17
% Free or reduced-price meals	97	98	97
% Black	35	39	34
% Hispanic	57	55	57
% White	4.4	3.5	4.6
by Grade level			
% grade 3	22	17	23
% grade 4	20	16	21
% grade 5	20	30	17
% grade 6	19	16	20
% grade 7	20	20	19
by School type and composition			
% already enrolled in Magnet school	16	7	18
Avg % Black students in school	33	33	33
Avg % Hispanic students in school	53	56	54
Avg % students in racial minority in school	31	29	32
by Home location			
% in HPS zone 1	16	17	16
% in HPS zone 2	20	19	20
% in HPS zone 3	37	40	37
% in HPS zone 4	27	25	28
by School location			
% attend HPS zone 1	17	17	17
% attend HPS zone 2	20	18	21
% attend HPS zone 3	35	41	33
% attend HPS zone 4	28	25	29
Avg distance home to current school (miles)	0.92	0.90	0.92

Table 1b: Housing and Income of RSCO Applicants and Non-Applicants among Hartford-resident HPS grade 3-7 students, Spring 2012

	Based on Census Data Reported					
	All	**Applicants**	**Non-Apps**	**All**	**Applicants**	**Non-Apps**
Avg % Owner Occupied Housing				26%	28%	25%
Avg Median Household Income	$29,876	$31,138	$29,541			

Table 2a: Student Achievement Measures of RSCO Applicants and Non-Applicants among Hartford-resident HPS grade 3-7 students, Spring 2012

by Student achievement (CMT)	**Based on CMT Scores**		
	All	**Applicants**	**Non-Apps**
All			
% High-Achieving Math level (4-5)	31%	35%	30%
% High-Achieving Reading level (4-5)	37%	40%	36%
% High-Achieving Writing level (4-5)	34%	37%	33%
% High-Achieving in All Levels (4-5)	15%	18%	14%
Avg Math Vertical score (200-700)	478	484	476
Avg Reading Vertical score (200-700)	443	449	441

Table 2b: School Achievement Measures of RSCO Applicants and Non-Applicants among Hartford-resident HPS grade 3-7 students, Spring 2012

by School achievement (CMT)	**Based on CMT Vertical Scores Reported**			**Based on all Schools Reported by CSDE**		
	All	**Applicants**	**Non-Apps**	**All**	**Applicants**	**Non-Apps**
Avg Matched-N Vertical Growth Math	21	21	21			
Avg Matched-N Vertical Growth Reading	25	25	25			
Avg School Performance Index (SPI)				55	53	56

Table 3: HPS school of RSCO Applicants among Hartford-resident HPS G3-7 students, Spring 2012

by HPS School	Type in 2011-12	Applicants	Percent of Total Applicants	School Enrollment (Hartford-resident Grade 3-7 only)	Applicants as Percent of Hartford-res Gr3-7 School Enrollment
Betances/Early Reading Lab*	District	13	0.9%	35	37%
Sanchez*	District	58	4.1%	184	32%
Rawson	District	66	4.7%	214	31%
Batchelder	District	94	6.7%	310	30%
Rawson Middle	District	40	2.8%	136	29%
Kennelly	District	127	9.0%	439	29%
Moylan/ELAMS*	District	77	5.5%	307	25%
Milner	District	53	3.8%	214	25%
Breakthrough II	District	15	1.1%	63	24%
Bellizzi/Asian Studies	District	66	4.7%	279	24%
SAND/America's Choice	District	59	4.2%	251	24%
Simpson-Waverly	District	39	2.8%	167	23%
Parkville*	District	43	3.1%	190	23%
McDonough	District	71	5.1%	316	22%
MD Fox	District	59	4.2%	263	22%
Renzulli	District	19	1.4%	89	21%
Burr	District	81	5.8%	379	21%
West Middle	District	66	4.7%	323	20%
Naylor	District	71	5.1%	349	20%
Burns Latino Stds	District	62	4.4%	308	20%
Noah Webster	Magnet	26	1.9%	138	19%
ML King	District	38	2.7%	206	18%
Wish	District	39	2.8%	219	18%
Global IB Academy	District	30	2.1%	172	17%
Capital Prep	Magnet	9	0.6%	60	15%
Breakthrough	Magnet	13	0.9%	92	14%
Clark	District	25	1.8%	190	13%
AFisher/Montessori	Magnet	<5	0.1%	20	10%
Classical	Magnet	10	0.7%	100	10%
Hooker Env Sci	Magnet	11	0.8%	119	9%
Kinsella Arts	Magnet	12	0.9%	162	7%
AFisher/STEM Magnet	Magnet	6	0.4%	119	5%
Sport & Medical	Magnet	<5	0.2%	73	4%
HMMS/HMTCA	Magnet	5	0.4%	187	3%
Total		**1408**	**100.2%**	**6673**	

*Betances ended at grade 3, and the other three schools ended at grade 5

Statistical Analysis of the Characteristics of RSCO Applicants

In Tables 1 and 2, we looked at all applicants (and non-applicants) who had a particular characteristic. This enabled us to describe our pool of students who submitted applications. For example, as we have already seen in Table 1, partially reproduced below, among all applicants only 12% were English Language Learners.

But different questions can be answered by looking at all students who have (or do not have) a particular characteristic, and by calculating the probability of applying. For example, as seen below, among all ELL students, the probability of applying is 0.14.

Comparison of Table 1 vs Table 4

Percentage of RSCO Applicants and Non-Applicants who are English Language Learners (ELL)

	All	Applicants	Non-Applicants
n (%)	6673	1408 (21%)	5265 (79%)
ELL	19%	12%	20%

Probability that an ELL student applies

	Probability of applying	of not applying	All
ELL	0.14	0.86	1.00
non ELL	0.23	0.77	1.00

Both tables show only Hartford-resident HPS grade 3-7 students, Spring 2012

Once the probability of submitting an application is calculated for all students who do and do not have each characteristic, we can ask the more important question: are students *with a specific characteristic* more likely to apply than students *without that characteristic*? Then we can test to see if that difference is statistically significant, and if so, in what direction. These results of these tests are reported in Table 4. Since our sample size is large, small differences can be statistically significant, so the difference between the actual number of students applying with different characteristics and the number expected to apply is calculated, and is reported in Table 5. We use the Pearson chi-square statistic to test for statistical significance at the 95 percent level of confidence.

In the first row of Table 4, we see that the probability of a male or female student submitting an application was about 0.20 and not statistically significantly different. Similarly, no significant difference appeared based on a student's racial minority status, so that those who were in the minority in their school (such as a Black student in a predominantly Hispanic school) were just as likely to apply as those in the racial majority (such as an Hispanic student in a predominantly Hispanic school). Likewise, there were no meaningful patterns in the probability of applying by student residence across the four HPS zones. Furthermore, the category of distance from home to current school did not matter, as the probability of applying remained about the same regardless of the distance.

But most rows in Table 4 reveal statistically significant differences, with some trends signaling lower RSCO participation by less privileged students. For example, English Language Learners had a lower probability of applying (0.14) than non-ELL students (0.23), and special needs students were less likely to apply (0.16) than students without special needs (0.23). Table 5 illustrates the magnitude of these differences between actual versus expected applicants. For example, 89 fewer ELL students applied than expected, and 57 fewer special education students applied than expected. In addition, as median income rises, the probability of applying rose, from

0.18 to 0.25 and students living in census block groups with more owner-occupied housing had a higher probability of applying, rising from 0.17 to 0.26. For Hartford families with incomes over $30,000, 57 more applied than expected. Similarly, for Hartford census block areas with over 40% owner-occupied housing, 74 more students applied than expected, as shown in Table 5.

Similarly, RSCO lottery participation tends to increase for students with higher standardized test scores. The achievement section reveals that those with math, reading, and writing CMT levels in the 4-5 range have a higher probability of applying than those in the 1-3 range, which translates into over 40 more applicants than expected (see Table 5). When examining vertical scale scores with a wider range (200 to 700), we see some non-linear trends as described in the table 4. At the lower ends of the vertical scores, there are fewer applicants than expected, while at the upper end there are generally more than expected (see Table 5).

By contrast, a few categories point to higher RSCO participation by students with less privilege. For example, students who receive free or reduced-price meals were almost twice as likely to apply (21 percent) than non-qualifying students (12 percent). But this finding should be interpreted cautiously, because as Table 1 revealed, only 3 percent of the Hartford-resident HPS grade 3-7 student population — or 185 students — do not receive free or reduced-price lunch, so while statistically significant, it is a very small number.

In addition, the probability of RSCO participation varied by student race and ethnicity. Among Hartford-resident HPS grades 3-7, Asian (0.07) and White students (0.17) were statistically less likely to apply than Black (0.24), multiracial (0.22), or Hispanic students (0.20). For example, 58 more Black students applied than expected, while 28 fewer Hispanic students applied than expected (see Table 5). But patterns of school-wide racial composition were not as easy to interpret. For example, students who attend a school with less than 20 percent Black students or greater than 80 percent Black students had a higher probability of applying (0.25) than students enrolled in schools with 20 to 80 percent Black students (0.18). On a related note, students attending a school with 40 to 60 percent Hispanic students are least likely to apply (0.14) when compared to those attending schools with more than 60 percent Hispanics (0.24) or fewer than 40 percent Hispanics (0.20).

Furthermore, significant patterns emerged by school type, performance, location, and grade level. Students already attending an HPS-run magnet had a lower probability of applying to the RSCO lottery (0.10) than those attending district schools (0.23), or in other words, 129 fewer than expected (see Table 5). As the School Performance Index (based on the percent at or above goal) increases, the probability of applying increases, but then falls for SPIs above 65. This means that 126 fewer students than expected applied from schools with the highest SPI level, while 130 more students than expected applied from schools with the SPI index between 45 and 65.

As a school's math and reading vertical growth measure rise, so does the probability of a student applying, but not linearly. Also, students attending an HPS-run school located in zone 3 (southwest) are more likely to apply (0.25) than students enrolled in the other three zones, though there was no pattern by student residence, as previously discussed. Overall, 80 more students than expected applied who reside in HPS zone 3, while 27 and 47 fewer students applied from zones 2 and 4, respectively. Finally, students enrolled in grades 5 (0.33) and grade

7 (0.22) were more likely to apply than other grades in this sample (0.17 - 0.18). In particular, 153 more 5th grade students applied than expected, while only 8 more 7th grade students applied than expected. These trends may be driven by RSCO schools that enroll students in grades 6-12 (rather than K-8 and 9-12), which we will examine in a future report.

Table 4: Statistical Analysis of Probability of Submitting a RSCO Application across Characteristics among Hartford-resident HPS grade 3-7 students, Spring 2012 (revised March 12, 2015)

Characteristic	**Significant Difference: Yes or No?**	**Probability of Applying**
Gender	No	The probability of applying is the same across gender, about 0.20.
English language learner	**Yes**	**The probability of applying is lower for ELL students** than non-ELL (0.14 versus 0.23).
Special Education	**Yes**	**Special ed students are less likely** to apply than non-special ed students (0.16 versus 0.22).
Free or reduced-price meals	**Yes**	**Students who qualify for lunch subsidies are almost twice as probable** to apply than non-qualifying students (0.21 versus 0.12), but see the text for a caution about interpreting very small numbers of the latter.
Race/Ethnicity	**Yes**	Among all students, **Asian and White students have a lower probability of** applying (0.07 and 0.17) than Black, multiracial, or Hispanic students (0.24, 0.22 and 0.20). Among Blacks and Hispanics only, Black students are more likely to apply (0.24) than Hispanic students (0.20).
Grade level	**Yes**	**Students in grades 5 and 7 have a higher probability of** applying (0.33 and 0.22) than those in grades 3, 4, and 6 (0.17 to 0.18).
Magnet school	**Yes**	**The probability of applying is lower for students currently attending a magnet school** (0.09) than for students attending a non-magnet school (0.23).
Avg % Black in school	**Yes**	The pattern is not easy to interpret. See paragraph above.
Avg % Hispanic in school	**Yes**	This pattern is not easy to interpret. See paragraph above.
Student's racial minority status	No	The probability of applying is the same for students who are in the racial minority in their school as it is for students who are in the racial majority: approximately 0.20.
Home location	No	The proportion of applicants residing across HPS zones is the same: approximately 0.20.
School location	**Yes**	**Students attending school in HPS Zone 3 (southwest) are more likely** to apply (0.25) than students enrolled in the other three zones (0.20).
Distance from home to current school	No	The probability of applying is the same across various distances of residences to current school, about 0.20.
by Housing and Income		
Owner Occupied Housing	**Yes**	The probability of applying increases (from 0.17 to 0.26) as **the percentage of owner-occupied housing increases** from less than 1% to greater than 40%,
Median Houshold Income	**Yes**	**As household median income increases** from less than $20,000 to more than $40,000, the probability of applying increases from 0.18 to 0.25.

by Achievement		
Math CMT level (1-5)	**Yes**	**Students with higher math CMT scores (level 4 to 5) have a higher probability of** applying (about 0.26) than students with lower scores (levels 1 to 3, about 0.21).
Reading CMT level (1-5)	**Yes**	**The probability of applying among students with higher reading CMT scores (level 4 to 5) is higher** (0.25) than among students with lower scores (levels 1 to 3, about 0.22).
Writing CMT level (1-5)	**Yes**	**The probability of students applying rises as their writing CMT scores rise** from level 1 (0.18) to level 5 (0.27).
High-Achieving Math CMT (4-5)	**Yes**	**Students scoring a 4 or 5 on their Math CMT** have a higher probability of applying (0.25 vs 0.21).
High-Achieving Reading CMT (4-5)	**Yes**	**Students scoring a 4 or 5 on their Reading CMT** have a higher probability of applying (0.25 vs 0.22).
High-Achieving Writing CMT (4-5)	**Yes**	**Students scoring a 4 or 5 on their Writing CMT** have a higher probability of applying (0.24 vs 0.21).
High-Achieving in All Tests (4-5)	**Yes**	**Students scoring 4-5 on all three CMT test**s have a higher probability (0.26) of applying than those who do not (0.21).
Math CMT vertical score (200-700 range)	**Yes**	**As Math CMT vertical scores rise from 300 to 600, students are more likely to apply** (increasing from .17 to .26). But for those scoring 600 to 700, the probability of applying **falls** to 19.
Reading CMT vertical score (200-700 range)	**Yes**	**Students with CMT vertical reading scores from 300 to 400 are less likely to apply** compared with students whose scores are below or above this range (about 0.17 versus 0.24).
Math Matched Vertical Growth	**Yes**	**When the school's math test growth (measured by N-matched vertical scores of CMT cohorts)** is 25% or less, the probabilty of applying remains about the same (around 0.20). But when the school's math test growth exceeds 25%, the probability of applying rises to around 0.23 to 0.25.
Reading Matched Vertical Growth	**Yes**	**For schools with very low reading test growth** (under 21%, as measured by the N-matched vertical scores of CMT cohorts), the probability of applying is under 0.16. But, as the reading test growth rises over 21%, the probability of applying is higher (between 0.16 to 0.24).
SPI Index	**Yes**	**As the School Performance Index (SPI, based on percent at or above CMT goal)** increases from less than 45 to 65, the probability of applying increases from 0.20 to 0.26, but then drops to 0.10 for students in school with an SPI above 65.
Statistically significant means probability of difference due to random chance is less than 5 percent		

Table 5: Actual and Expected Number of RSCO Applicants among Hartford-resident HPS grade 3-7 students, only where statistically significant differences were found, Spring 2012

	Total number of students	**Actual number who applied**	**Expected number to apply**	**Difference in number of students**
	6673			
by Student demographics				
Gender				*no sig diff*
English Language Learner	1246	174	263	-89
Special Education	1030	160	217	-57
Free or reduced-price meals				*see details in text*
Black	2314	546	488	58
Hispanic	3771	768	796	-28
White	294	49	62	-13
by Grade level				
grade 3	1432	245	302	-57
grade 4	1334	221	281	-60
grade 5	1305	428	275	153
grade 6	1297	231	274	-43
grade 7	1305	283	275	8
by School type and Student composition				
Currently enrolled in Magnet school	1070	97	226	-129
% Black students in school				
0 to 20%	2936	708	619	89
20 to 40%	1307	217	276	-59
40 to 60%	1535	270	324	-54
60 to 80%	339	69	72	-3
80 to 100%	556	144	117	27
% Hispanic students in school				
0 to 20%	695	152	147	5
20 to 40%	1112	214	235	-21
40 to 60%	1605	232	339	-107
60 to 80%	2453	619	518	101
80 to 100%	808	191	170	21
Student in the racial minority in his/her school				*no sig diff*
by Home location				
% in HPS zone 1				*no sig diff*
% in HPS zone 2				*no sig diff*
% in HPS zone 3				*no sig diff*
% in HPS zone 4				*no sig diff*
by School location				
attend HPS zone 1	1139	235	240	-5
attend HPS zone 2	1346	257	284	-27
attend HPS zone 3	2328	571	491	80
attend HPS zone 4	1860	345	392	-47
Avg distance home to current school (miles)				

	Total number of students	Actual number who applied	Expected number to apply	Difference in number of students
by Housing and Income				
Median Household income in residential census area	6665			
less than $20,000	1561	277	329	-52
$20,000 to $30,000	2378	496	501	-5
$30000 to $40,000	1399	304	294	10
over $40,0000	1327	326	279	47
% Owner Occupied Housing in resid. census area	6665			
less than 1%	463	77	97	-20
1% to 20%	3178	616	669	-53
20 to 40%	1352	284	285	-1
over 40%	1672	426	352	74
by Achievement				
Math CMT level	5568			
1 (lowest)	1186	240	268	-28
2	1162	262	262	0
3	1513	321	342	-21
4	1350	337	305	32
5 (highest)	357	97	81	16
Reading CMT level	5424			
1	1668	342	380	-38
2	844	193	192	1
3	931	210	212	-2
4	1735	430	396	34
5	246	62	56	6
Writing CMT level	6081			
1	933	164	207	-43
2	1267	262	281	-19
3	1807	421	401	20
4	1767	420	393	27
5	307	84	68	16
High Achieving Math CMT level (4-5)	1707	434	385	49
High Achieving Reading CMT level (4-5)	1981	492	452	40
High Achieving Writing CMT level (4-5)	2074	504	461	43
High Achieving All CMT Tests level (4-5)	934	239	206	33

	Total number of students	Actual number who applied	Expected number to apply	Difference in number of students
Math CMT vertical score	5568			
200 to 300 (lowest)	3	0	1	-1
300 to 400	436	72	98	-26
400 to 500	3201	698	723	-25
500 to 600	1859	474	420	54
600 to 700 (highest)	69	13	16	-3
Reading CMT vertical score	5424			
200 to 300 (lowest)	14	3	3	0
300 to 400	1103	188	252	-64
400 to 500	3560	854	812	42
500 to 600	746	192	170	22
600 to 700 (highest)	1	0	0	0
Math Matched-N Vertical Growth by school	6555			
less than 10 (lowest)	670	141	141	0
10 to 15	261	49	55	-6
15 to 20	2647	518	556	-38
20 to 25	1289	266	271	-5
25 to 30	677	156	142	14
over 30	1011	248	213	35
Reading Matched-N Vertical Growth by school	6555			
less than 18	775	116	163	-47
18 to 21	571	91	120	-29
21 to 24	2300	544	484	60
24 to 27	627	102	132	-30
27 to 30	1529	361	321	40
over 30	753	164	158	6
School Performance Index (SPI)	6502			
less than 45	1086	222	226	-4
45 to 55	2861	661	596	65
55 to 65	1396	356	291	65
over 65	1159	116	242	-126

Next steps:
This first data report summarized our data sources, matching process, and statistical analysis of RSCO applicants among Hartford-resident grade 3-7 students enrolled in HPS-run schools in 2011-12. If time permits, we wish to do additional analyses for this group:

- Perform a spatial analysis of neighborhood characteristics of RSCO applicants among HPS-enrolled Hartford residents, to identify significant spatial clustering and hot spots by census block groups.
- Conduct a logistic regression analysis of RSCO participation as a function of the characteristics of those students, to identify the effect of each characteristic on the probability of submitting an application.
- Include a spatial regression analysis to identify the effect of each characteristic on the percentage of students in a census block group who submit a RSCO application.

Since we did not receive any CSDE data until October 2013, we plan to request that our one-year no-cost contract deadline be extended to October 2014. Furthermore, if CSDE provides us with more recent data (2012-13 onward), we wish to replicate the work above and expand our matching process with RSCO and PSIS-CMT databases to include all Hartford-resident students in all grade levels (preK-12).

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Revised on March 12, 2015:
We made a calculation error in the original Table 4 and text by stating that 28 percent of the students who qualified for lunch subsidies were applicants. The corrected figure is 21 percent, and we revised our interpretation of the difference. We also clarified some of our wording on page 10. After making these corrections, all of the conclusions in our report remain the same. We thank Peg Cibes for closely reading our report and helping us to identify our errors.

[1] Jack Dougherty et al., "School Information, Parental Decisions, and the Digital Divide: The SmartChoices Project in Hartford, Connecticut," in *Educational Delusions? Why Choice Can Deepen Inequality and How to Make Schools Fair*, ed. Gary Orfield and Erica Frankenberg (Berkeley: University of California Press, 2013), 219–37; Matthew Daly, "Governor Signs Lottery, Charter School Bills," *Hartford Courant*, June 6, 1996; *SmartChoices: A Digital Guide to Public School Choice in the Greater Hartford Region*, Trinity College, December 2013, http://smartchoices.trincoll.edu.