Evaluating an Alternative Approach to Traditional Remedial Coursework at Community Colleges:

Evidence from CUNY Start

Drew Allen
Aaron Horenstein

OCTOBER 2013 WORKING DRAFT

PREPARED FOR THE **APPAM** ANNUAL CONFERENCE
NOVEMBER 9, 2013 -- WASHINGTON, DC

Summary

CUNY Start began in Fall 2009 with the goal of offering students an intensive, low-cost alternative to traditional remedial requirements at CUNY based on students' scores on the CUNY Assessment Tests (CAT) in reading, writing, and math. CUNY Start students temporarily delay the start of their degree program studies to participate in a semester-long program. While the program has demonstrated success in helping students pass or make significant gains in test scores on the CUNY Assessment Tests, there has not been a thorough evaluation of how CUNY Start students perform as compared to students who enroll in traditional CUNY degree programs, or how CUNY Start students compare to non-CUNY Start students once they begin their degree programs and persist to the goal of graduation.

The following report uses a constructed comparison group methodology to address these issues. Using data from CUNY's Office of Institutional Research and Assessment (OIRA) and from the CUNY Start database, we performed propensity score matching to create multiple comparison groups that were similar to CUNY Start students on all observable characteristics (e.g., demographics and initial remedial needs). Propensity score matching, a methodology that attempts to match similar individuals from two groups, is frequently used in the social sciences when studying groups that are not randomly assigned. After matching we examined a variety of remedial and postsecondary outcomes for the CUNY Start and comparison group students. A summary of our findings is provided below.

Remediation Outcomes/Proficiency Gains

A. *After one semester, CUNY Start students were more likely to achieve proficiency in reading, writing, and math, in comparison to a similar group of students who did not enroll in the program.*

i. Of all students needing remediation in reading, 57.3% of CUNY Start students achieved proficiency, compared to 33.1% of comparison group students.
ii. Of all students needing remediation in writing, 61.9% of CUNY Start students achieved proficiency, compared to 26.1% of comparison group students.
iii. Of all students needing remediation in math, 53.0% of CUNY Start students achieved proficiency, compared to 10.2% of comparison group students.

B. *CUNY Start students also achieved more skill area proficiencies after one semester in the program than comparison group students after one semester in a college degree program.*

i. Of students needing remediation in all three skill areas, 20.6% of CUNY Start students achieved proficiency in all areas, compared to 1.2% of comparison group students.
ii. Of all students with two remedial needs, 34.1% of CUNY Start students achieved proficiency in those two areas, compared to 7.1% of comparison group students.
iii. Of all students with one remedial need, 63.5% of CUNY Start students achieved proficiency in that one area, compared to 19.2% of comparison group students.

iv. Overall, 31.3% of CUNY Start students finished the semester without needing any further remediation, while only 5.8% of comparison group students finished their first semester without needing any further remediation.

C. After using ordinary least squares (OLS) regression to control for any observable factors that might not have been fully accounted for in the original matching, CUNY Start is still shown to have a positive impact on the remedial outcomes discussed above.

i. After one semester, CUNY Start students are 22.7% more likely than comparison group to achieve proficiency in reading, 35.6% more likely to achieve proficiency in writing, and 43.7% more likely to achieve proficiency in math.
ii. After one semester, CUNY Start students with initial remedial need in three skills areas achieve proficiency in an average of 0.8 more skills areas than comparison group students with initial remedial need in three areas (the number of skills areas is out of three total: reading, writing, and math).
iii. The differences in proficiency gains between CUNY Start students and comparison group students hold across race and gender groups. In other words, CUNY Start students achieved proficiency in more areas than comparison group students, regardless of race or gender.

Postsecondary Outcomes

A. Once CUNY Start students began a degree program, they attempted and earned more credits than comparison group students after one semester, and had higher GPAs.

i. In their first semester, CUNY Start students attempted an average of 9.7 credits and earned an average of 7.5 credits with a 2.45 GPA. Comparison group students attempted an average of 5.0 credits and earned an average of 3.3 credits with a 2.08 GPA.
ii. CUNY Start students attempted a greater proportion of non-remedial courses in their first semester (0.76 versus 0.37 for comparison group students).

B. Using a different methodology to examine cumulative outcomes, CUNY Start students, after being enrolled in CUNY for one semester, earned only slightly fewer credits than comparison group students who were enrolled for two semesters. CUNY Start students also had slightly higher GPAs.

i. After one semester in CUNY, CUNY Start students earned an average of 8.9 cumulative credits with a 2.47 cumulative GPA. After two semesters in CUNY, comparison group students earned an average of 10.1 cumulative credits with a 2.09 GPA.

C. *Once CUNY Start students begin a degree program, they are retained at higher rates than comparison group students.*

i. Using a methodology that defines the first semester of enrollment as the semester of initial CUNY Start program participation for CUNY Start students and the semester of CUNY degree enrollment for comparison group students, CUNY Start students had slightly lower second-semester retention rates than comparison group students (68.8% vs. 74.7%). This is likely a result of the fact that not all CUNY Start students enroll in CUNY degree programs in the very next semester.

When CUNY Start students do enter CUNY degree programs, they are retained at higher rates, and their retention rates catch up to and eventually surpass those of comparison group students. For example, CUNY Start students had third- and fourth-semester retention rates of 58.5% and 51.6%, respectively, while comparison group students had third-and fourth-semester rates of 59.0% and 49.2%, respectively.

D. *After using ordinary least squares (OLS) regression to control for any observable factors that might not have been fully accounted for in the original matching, CUNY Start is still shown to have a positive impact on the postsecondary outcomes discussed above.*

i. At the end of the first semester, CUNY Start students attempt and earn an average of 4.55 and 3.98 more credits, respectively, attempt a higher proportion of non-remedial credits, and have a 0.33 points higher GPA than comparison group students.

ii. Looking at cumulative outcomes, results show that at the end of their first semester in CUNY, CUNY Start students earn only slightly fewer credits (2.04) than comparison group students earn after two CUNY semesters, and CUNY Start students have a .30 points higher GPA.

Contents

Tables

Figures

PART ONE:

Introduction

SETTING THE STAGE

Nationally, over half of students entering community colleges are underprepared for college-level work and are placed into remedial courses. Most students never complete their remedial sequence, much less complete gatekeeper courses in English and math or earn a degree (Jaggars & Hodara, 2011; Rutschow & Schneider, 2011; Bailey, Jeong, & Cho, 2010). The trends are similar at CUNY, which currently serves more than 90,000 students in associate degree programs. In the fall of 2012, 82.5% of students who entered CUNY community colleges placed into remediation based on their scores on the CUNY Assessment Tests in reading, writing, and math, and, after matriculation, most failed to complete the required remedial sequence(s) or a gatekeeper course.

A study of CUNY's remedial education course-taking patterns and student outcomes by the Community College Research Center (CCRC) found that only 38% of students placing into remedial math finished the required courses two years after matriculation, and just a fifth passed a gatekeeper math course. A higher proportion of students completed remedial writing (approximately two-thirds), but only a third successfully completed a gatekeeper course in writing. Additionally, University data reveals that only 26.1% of CUNY's remedial students graduate after six years, compared to 40.3% of non-remedial students (CUNY Office of Academic Affairs, 2011; Jaggars & Hodara, 2011).

Some of the factors preventing students in need of remediation from progressing to college-level coursework include the length of traditional remedial course sequences and the financial burden of remedial coursework. It can take students several semesters to complete the pre-determined sequence of remedial classes, providing many exit points where students can drop out of the sequence. In addition, students pay regular tuition fees for remedial courses and many students use financial aid resources or pay out of pocket to cover the costs. These issues have prompted an increasing number of community colleges around the country to test new strategies for accelerating the remediation sequences and minimizing the time required to earn a degree (Edgecombe, 2011; Bailey, Jeong, & Cho, 2010; Bettinger & Long, 2009).

PROGRAM OVERVIEW

CUNY Start, originally the College Transition Initiative (CTI), began in Fall 2009 with the goal of helping students reduce their remedial needs and become better prepared to take college-level courses. CUNY Start provides intensive preparation in academic reading/writing, math, and "college success" to students admitted to CUNY whose scores on the CUNY Assessment Tests in reading, writing and math indicate that they are in need of significant remediation. Those who enroll in the program

temporarily delay starting their degree studies in order to participate in the 15- to 18-week CUNY Start program. CUNY Start seeks both to minimize the amount of required remedial coursework students must take, and to foster increased persistence and higher graduation rates among students, once they start their degree programs.

CUNY Start consists of two phases: twelve weeks of 'core instruction,' and then an additional three to six weeks of core instruction as needed. Originally each phase was immediately followed by re-taking any CUNY Assessment Tests that had not already been passed. However, as of Fall 2012, math proficiency has instead been determined by students' performance in the math class overall and by their scores on a common departmental final exam that was constructed by CUNY's math faculty, so that the Math CUNY Assessment Test is now taken only once, prior to instruction, for placement purposes.

Instruction in CUNY Start is intensive: 25 hours a week in the full-time program and 12 hours a week in the part-time afternoon/evening program that addresses *either* math *or* reading/writing. The curricula in academic reading/writing, pre-college math and college success have been developed by instructional experts from the CUNY central office and participating colleges. In addition, as part of their preparation for teaching in the program, all current instructors spend one semester observing and working closely with a lead CUNY Start instructor in his or her classroom.

CUNY Start (or CTI) originally began at two CUNY community colleges: LaGuardia and Kingsborough. The program started out as a full-time program only, but in the fall of 2010 two part-time programs were added at the Borough of Manhattan Community College (BMCC) and Hostos Community College. At the end of the 2010-2011 academic year, there were four programs, all of which were renamed CUNY Start. Beginning in the fall of 2011, the University expanded the program significantly by adding full-time programs at the College of Staten Island and Bronx Community College and Queensborough Community College. At the same time, a part-time component was added to LaGuardia and two additional full-time programs were added at Hostos and BMCC. Medgar Evers College is slated to launch a full-time CUNY Start program in Fall 2013 and three additional part-time programs will be added.

CUNY Start is now offered at six CUNY community colleges[1] as well as at the College of Staten Island, and as of Fall 2013, it will be offered at Medgar Evers College. All eight participating colleges offer the full-time program; Hostos, BMCC, Bronx, College of Staten Island, Kingsborough, and LaGuardia also offer the afternoon/evening program. Table 1.1 on the next page shows CUNY Start enrollment from Fall 2009 through Spring 2012 by entering cohort and college program.[2]

[1] CUNY opened a new community college in Fall 2012: New Community College (NCC). NCC does not currently have a CUNY Start program, as all remediation is embedded directly in first-year courses.

[2] Fall 2012 enrollments are not included in this table because final enrollment and completion data for this cohort had not been finalized by the time this report was written.

Table 1.1 CUNY Start Enrollment by Cohort and College Program

	CUNY Start Cohort						
	Fall 2009	Spring 2010	Fall 2010	Spring 2011	Fall 2011	Spring 2012	**Total**
College of CUNY Start Program							
BMCC (FT)	-	-	-	-	63	44	107
BMCC (PT)	-	-	90	38	107	70	305
Bronx Community College (FT)	-	-	-	-	54	33	87
College of Staten Island (FT)	-	-	-	-	53	43	96
Hostos Community College (FT)	-	-	-	-	55	29	84
Hostos Community College (PT)	-	-	75	41	80	74	270
Kingsborough Community College (FT)	36	22	44	20	57	42	221
LaGuardia Community College (FT)	34	49	57	38	57	42	277
LaGuardia Community College (PT)	-	-	-	-	105	76	181
Queensborough Community College (FT)	-	-	-	-	54	34	88
Total	**70**	**71**	**266**	**137**	**685**	**487**	**1,716**

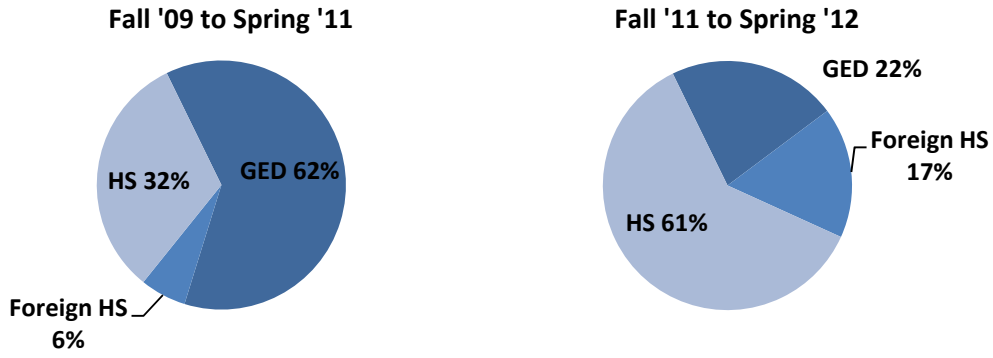
Source: CUNY Start database.

WHO ARE CUNY START STUDENTS?

A total of 1,716 students enrolled in CUNY Start between Fall 2009 and Spring 2012, and cohort sizes have increased substantially since the program began. As Table 1.1 above shows, 1,172 students enrolled in the Fall 2011 and Spring 2012 cohorts, compared to 544 students in all the previous cohorts combined.

Initially, the majority of students entering CUNY Start were GED students, as that was the population the program initially targeted. As shown in Figure 1.1 on the next page, 62% percent of CUNY Start students in the Fall 2009 through Spring 2011 cohorts were GED recipients. Over time, the number of students in the program with traditional high school diplomas increased. In Fall 2011 and Spring 2012, during the program's first large expansion phase, a reversal in the percent of high school degree to GED graduates occurred. Students with a high school diploma comprised 61% of program participants, and GED recipients comprised 22%. The remaining students came from foreign high schools.

Figure 1.1 Diploma Type by CUNY Start Cohort



Tables 1.2 and 1.3 on the following pages summarize additional characteristics of CUNY Start students disaggregated by CUNY Start program type and cohort, respectively. Overall, 84% of students have remedial needs in writing, 58% in reading, 64% in Math 1 (pre-algebra), and 91% in Math 2 (algebra). Forty-eight percent of CUNY Start students entered the program with remedial needs in all three basic skill areas: reading, writing and math.

Over half (56%) of CUNY Start students are female, 45% are Hispanic, 32% are black, 11% are Asian, and 11% are white. Just under half (49%) were born outside of the U.S., while 44% speak a language other than English.[3] CUNY Start students in the later cohorts are slightly younger than students in previous cohorts, as 48% of Fall 2011 and Spring 2012 students are 20 and younger, compared to 31% of students in previous cohorts. This reflects the trends in diploma type; during this period of time more students were entering CUNY Start with a high school diploma instead of a GED. Prior to Fall 2011, only 11% of CUNY Start students entered the program within 15 months of graduating from a NYCDOE high school, compared to 38% of Fall 2011 and Spring 2012 students.

[3] Note that the self-reported nature of the data may underestimate the number of students who speak a language other than English.

Table 1.2 Profile of CUNY Start Students by Program Type: Fall 2009 through Spring 2012

		All Cohorts	Full-Time	Part-Time
Total Enrollment	**N**	**1,716**	**960**	**756**
Remedial Need at Beginning of Term				
Writing	%	84.1	94.6	70.9
Reading	%	58.0	67.0	46.7
Math 1 (pre-algebra)	%	64.2	68.1	59.3
Math 2 (algebra)	%	91.3	99.0	81.6
Math (Overall)	%	93.5	99.8	85.4
Total Number of Remedial Needs				
One	%	12.8	0.5	28.3
Two	%	38.8	37.6	40.3
Three	%	48.4	61.9	31.3
Gender				
Female	%	55.5	52.5	59.3
Male	%	44.5	47.5	40.7
Race				
Asian/Pacific Islander	%	11.0	11.9	9.8
Black	%	32.0	31.4	32.8
Hispanic	%	45.2	42.5	48.7
American Indian/Native Alaskan	%	0.6	0.6	0.7
White	%	11.2	13.6	8.1
Age Group				
20 and Younger	%	42.4	48.9	34.1
21 to 25	%	29.4	29.2	29.8
26 and Older	%	28.2	22.0	36.1
Mean Age	Mean	24.7	23.6	26.1
Born Outside of U.S.				
Yes	%	49.2	46.8	52.2
No	%	50.5	53.2	47.1
Missing	%	0.3	0.0	0.7
Speaks Language Other than English				
Yes	%	44.3	42.6	46.6
No	%	53.6	54.0	53.0
Missing	%	2.1	3.4	0.4
Graduated from NYC Public HS				
Within 3 Months of Entering CS	%	15.0	16.9	12.6
Within 15 Months of Entering CS	%	29.7	34.0	24.3
Within 27 Months of Entering CS	%	34.2	37.3	30.3

Source: CUNY Start database.

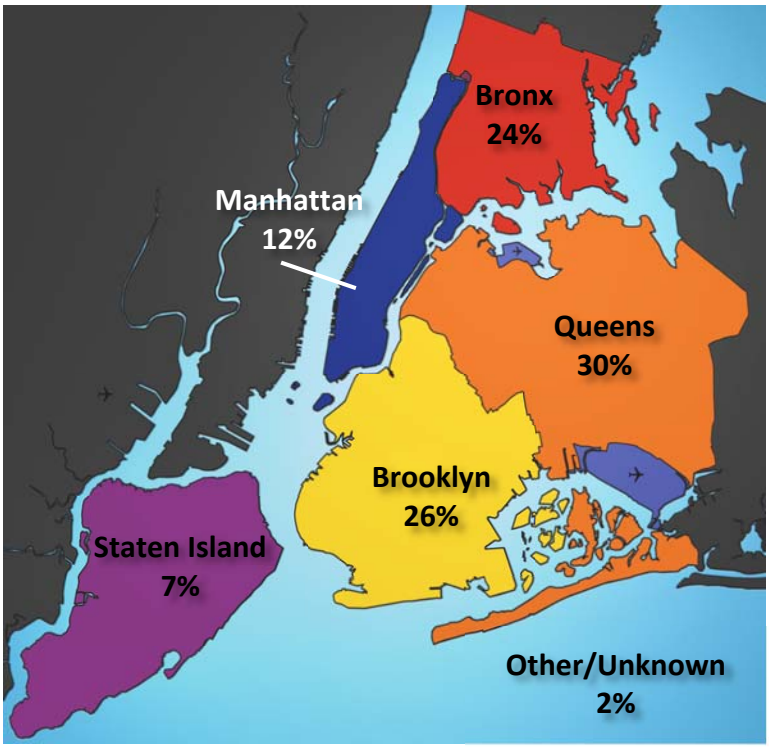
Table 1.3 Profile of CUNY Start Students by Cohort: Fall 2009 through Spring 2012

		All Cohorts	Fall '09 to Spring '11	Fall '11 to Spring '12
Total Enrollment	**N**	**1,716**	**544**	**1,172**
Remedial Need at Beginning of Term				
Writing	%	84.1	84.9	83.8
Reading	%	58.0	44.7	64.2
Math 1 (pre-algebra)	%	64.2	52.8	69.5
Math 2 (algebra)	%	91.3	91.4	91.3
Math (Overall)	%	93.5	93.0	93.7
Total Number of Remedial Needs				
One	%	12.8	14.2	12.1
Two	%	38.8	49.1	34.0
Three	%	48.4	36.8	53.8
Gender				
Female	%	55.5	54.4	56.0
Male	%	44.5	45.6	44.0
Race				
Asian/Pacific Islander	%	11.0	12.3	10.3
Black	%	32.0	31.1	32.4
Hispanic	%	45.2	42.1	46.7
American Indian/Native Alaskan	%	0.6	0.6	0.7
White	%	11.2	14.0	9.9
Age Group				
20 and Younger	%	42.4	30.5	47.9
21 to 25	%	29.4	31.3	28.6
26 and Older	%	28.2	38.2	23.5
Mean Age	Mean	24.7	26.5	23.9
Born Outside of U.S.				
Yes	%	49.2	51.7	48.0
No	%	50.5	47.6	51.9
Missing	%	0.3	0.7	0.1
Speaks Language Other than English				
Yes	%	44.3	39.5	46.6
No	%	53.6	54.2	53.2
Missing	%	2.1	6.3	0.2
Graduated from NYC Public HS				
Within 3 Months of Entering CS	%	15.0	5.1	19.5
Within 15 Months of Entering CS	%	29.7	11.4	38.2
Within 27 Months of Entering CS	%	34.2	13.8	43.7

Source: CUNY Start database.

As Figure 1.2 illustrates, CUNY Start students come from all areas of New York City, although most come from the outer boroughs of Queens, Brooklyn, and the Bronx.

Figure 1.2 CUNY Start Students by Borough of Residence



RESEARCH QUESTIONS

To date, CUNY Start has demonstrated success in helping students pass the CUNY Assessment Tests. For the first six full-time cohorts, 75% of students requiring writing remediation achieved proficiency in writing, 70% of students requiring reading remediation achieved proficiency in reading, 68% of students requiring Math 1 (pre-algebra) remediation achieved proficiency in Math 1, and 67% of students requiring Math 2 (algebra) remediation achieved proficiency in Math 2 (percentages are calculated for program completers only).

Even with these impressive outcomes, there is need for a thorough evaluation of the impact of CUNY Start as the program continues to expand. This present study, an update of an earlier preliminary report from August 2012, attempts to compare both the skill area proficiency gains and postsecondary outcomes of CUNY Start students to the skill area proficiency gains and postsecondary outcomes of comparable students in traditional CUNY degree programs. The key research questions that will be addressed are:

- **Are CUNY Start students more likely than students in traditional CUNY degree programs to achieve proficiency in reading, writing, and math?**

- **How do CUNY Start students perform once they begin their degree programs, and how do they compare to students who enrolled in traditional CUNY degree programs?**

This study examines these questions using a rigorous methodological approach involving matched comparison groups, as described in the following sections. Because CUNY Start began fairly recently (Fall 2009), longitudinal data on students who participated in the program and subsequently enrolled at CUNY are limited. The following analysis attempts to examine all available performance data on CUNY Start students, as well as to build a foundation for a longer longitudinal study that tracks program alumni as they progress through CUNY, ideally to graduation.

The remainder of the report is organized as follows: In Part Two, we discuss the data sources used and procedures for creating comparison groups; Part Three presents analysis of reading, writing, and math proficiencies gained by CUNY Start and comparison group students; Part Four shows postsecondary outcomes for CUNY Start and comparison group students; Parts Five and Six disaggregates findings by program type (full-time and part-time) and college; Parts Seven and Eight present subgroup analyses by race/ethnicity and gender; Part Nine includes a discussion of the falsification tests; and Part Ten concludes the report with a discussion of findings and implications.

PART TWO:

Data and Methods

DATA SOURCES

Data on CUNY Start student characteristics, program enrollment, and exam scores were obtained from the CUNY Start program database, which is maintained by the Research & Evaluation Unit within The Office of the Senior University Dean for Academic Affairs. The CUNY Start program has developed a set a policies and procedures to ensure the accurate and timely collection and consolidation of data from its multiple campus sites. Data on students' postsecondary outcomes were obtained from CUNY's Institutional Research Database (IRDB). CUNY's IRDB is maintained by the CUNY Office of Institutional Research and Assessment and contains comprehensive data on all students who enroll at CUNY colleges. For students who graduated from New York City public high schools, student-level administrative data from the NYC Department of Education (NYCDOE)[4] were merged with data extracts from CUNY's IRDB and CUNY Start databases.

METHODOLOGICAL APPROACH: MATCHED COMPARISON GROUPS

The typical approach for evaluating the effectiveness of a program or intervention involves comparing the outcomes of individuals who participated with those who did not. A randomized experiment in which individuals are randomly assigned to the treatment and control groups is widely considered the "gold standard" in such research, because it ensures that the treated and control groups are similar in terms of both their observed and their unobserved characteristics (e.g., race, sex, individual motivation). This enables researchers to attribute any differences in outcomes to the intervention. Despite their benefits, randomized experiments can be difficult to implement (especially in educational settings) due to logistical, ethical, and economic hurdles. Researchers may therefore turn to quasi-experimental designs in order to estimate the effects of a given treatment (Agodini & Dynarski, 2004; Titus, 2007). One such method is propensity score matching.

Propensity score matching, originally introduced by Rosenbaum and Rubin (1983), is a methodology that attempts to construct a comparison group that is similar to the treatment group. It is frequently used in the social sciences when studying two groups that are not randomly assigned. The propensity score is defined as the conditional probability of being assigned to the treatment group, based on individuals' observable characteristics (e.g., demographic attributes and prior academic achievement). The propensity score can be thought of as a single variable that summarizes an individual's observable characteristics. Therefore, it is expected that matching a treated participant to a control participant with a similar propensity score will create balance, based on observable characteristics, between the two groups and reduce group differences that might otherwise bias the outcomes of interest (Thoemmes & Kim, 2011; Rosenbaum & Rubin, 1983).

[4] High school data is made possible through an innovative data-sharing agreement between CUNY and the New York City Department of Education. This has given R&E the opportunity to collect, analyze, and report detailed statistics on students who came to CUNY Start with prior experience in the NYC public school system.

This study utilizes multiple comparison groups in order to address different research questions. Because not all CUNY Start students enroll in CUNY degree programs, separate comparison groups are needed for analyzing remedial and postsecondary outcomes. Prior to matching, CUNY Start students and those in traditional CUNY degree programs (who comprise the potential pool of comparison group students) differed noticeably in variables such as initial remedial needs, GED/high school background, and age. Because of this, propensity score matching was used in order to minimize these group differences and create comparison groups that were more similar to CUNY Start students.[5] As a first step, the probability of being in CUNY Start was estimated using logistic regression.[6] Each CUNY Start student was then matched to a single student from a large pool[7] of non-CUNY Start students who had the most similar propensity score (a process referred to as "greedy" 1:1 matching). Once a match was made, the comparison student was removed from the pool and was no longer available for future matches. The end result of this process was the creation of a group of comparison students who were similar to CUNY Start students in terms of all observable characteristics, with a single student in the comparison group matched to each and every student in the CUNY Start group. Descriptions of the main comparison groups used in this study are provided in the following sections.

In spite of the rigorous methodology that was employed, this study does have some limitations. CUNY Start began only a few years ago, making it difficult to track the longer-term outcomes of program participants once they begin their CUNY degree programs. In addition, while this study compares CUNY Start students to a similar group of comparison students who participated in traditional CUNY remediation, it is not a perfect comparison. For example, CUNY Start students temporarily delay enrollment in a degree program in order to participate in the program, while students enrolled in traditional remedial courses are already enrolled in degree programs and may also be taking college-level courses (for credit).

Although it is impossible to verify that our matching procedure includes all relevant factors that are correlated with both CUNY Start participation and the outcomes being studied, we are able to provide evidence that suggests that our matching performs reasonably well. First, our findings are not practically sensitive to reasonable adjustments to the model. Including or excluding one specific covariate or adding time constrains to the model does not significantly change our results. Our methods are robust to small variations in specification. Second, we perform falsification tests by analyzing the degree to which CUNY Start participation predicts academic achievement *prior to* CUNY Start enrollment. These falsification tests, which are discussed in Part Nine of this report, provide no evidence to suggest that our primary estimates are biased by unobservable factors.

---

[5] The propensity score is defined as the probability of receiving treatment based on measured covariates: $e(x) = P\ (Z = 1|X)$ where $e(x)$ is the abbreviation for propensity score, P a probability, Z =1 a treatment indicator with values 0 for control and 1 for treatment, the "|" symbol stands for "conditional on", and X is a set of observed covariates.

[6] The propensity score model was constructed to include all relevant information available about CUNY Start students that could also be correlated with outcomes.

[7] Each pool of potential comparison group students consisted of over 50,000 students.

FIRST MATCH: STUDENT REMEDIATION OUTCOMES IN THE CUNY START PROGRAM

In order to compare remediation outcomes, our first comparison group (subsequently referred to as Comparison Group One) was constructed by matching CUNY Start students to all full-time, first-time freshmen and advanced transfer students[8] in CUNY associate degree programs from Fall 2009 through Spring 2012. The matching criteria included the college attended, CUNY assessment exam scores, experience in the University Skills Immersion Program (USIP)[9], gender, race, age, NYC borough of residence, household income by Census tract, country of origin, language, and whether students received a GED or high school diploma.

In addition, we forced matched on students' remedial needs and semester of enrollment (e.g., CUNY Start students who entered the program in Fall 2010 and had remedial needs in reading and math were only matched to comparison group students who entered CUNY in Fall 2010 with remedial needs in reading and math). Students participating in CUNY Accelerated Study in Associate Programs (ASAP) were not included in the pool of potential matches. The results of the matching used to create Comparison Group One are shown in Table 2.1. As shown in the differences column, the matched comparison group appears almost identical to CUNY Start students on the variables of interest.

Table 2.1 Profile of CUNY Start Students and CUNY Comparison Group One Students

		CUNY Start Students	Matched Comparison Group		Total Pool of Similar CUNY Students[1]	
Total	**N**	**1,716**	**1,716**		**59,028**	
College						
BMCC	%	24.0	24.0	*0.0*	26.1	*+2.1*
Bronx	%	5.1	5.9	*+0.8*	12.9	*+7.8*
College of Staten Island	%	5.6	4.3	*-1.3*	6.2	*+0.6*
Hostos	%	20.6	21.8	*+1.2*	8.4	*-12.2*
Kingsborough	%	12.9	13.5	*+0.6*	16.5	*+3.6*
LaGuardia	%	26.7	26.6	*-0.1*	15.5	*-11.2*
Queensborough	%	5.1	3.9	*-1.2*	14.5	*+9.4*
Semester Enrolled in CUNY Start/CUNY						
Fall '09	%	4.1	4.1	*0.0*	21.6	*+17.5*
Spring '10	%	4.1	4.1	*0.0*	11.9	*+7.8*
Fall '10	%	15.5	15.5	*0.0*	20.5	*+5.0*
Spring '11	%	8.0	8.0	*0.0*	11.4	*+3.4*
Fall '11	%	39.9	39.9	*0.0*	23.7	*-16.2*
Spring '12	%	28.4	28.4	*0.0*	11.0	*-17.4*

[8] "Advanced transfer" is a broad category referring to any students entering with prior degree enrollment at either CUNY or non-CUNY colleges.

[9] USIP is a CUNY program that enables CUNY students to receive remedial or other types of instruction during the summer and winter sessions.

Table 2.1 continued from previous page

Remedial Need at Beginning of Term						
Writing	%	84.1	84.1	*0.0*	59.3	*-24.8*
Reading	%	58.0	58.0	*0.0*	38.1	*-19.9*
Math 1	%	64.2	64.2	*0.0*	46.9	*-17.3*
Math 2	%	91.3	91.3	*0.0*	78.8	*-12.5*
Math (Overall)	%	93.5	93.5	*0.0*	80.8	*-12.7*
Total Number of Remedial Needs						
One	%	12.8	12.8	*0.0*	44.9	*+32.1*
Two	%	38.8	38.8	*0.0*	32.0	*-6.8*
Three	%	48.4	48.4	*0.0*	23.1	*-25.3*
USIP Experience	%	5.5	6.1	*+0.6*	8.6	*+3.1*
Gender						
Female	%	55.5	54.8	*-0.7*	54.9	*-0.6*
Male	%	44.5	45.2	*+0.7*	45.1	*+0.6*
Race						
American Indian/Native Alaskan	%	0.6	1.2	*+0.6*	0.4	*-0.2*
Asian/Pacific Islander	%	11.0	9.7	*-1.3*	13.2	*+2.2*
Black	%	32.0	33.2	*+1.2*	30.3	*-1.7*
Hispanic	%	45.2	44.6	*-0.6*	40.3	*-4.9*
White	%	11.2	11.3	*+0.1*	15.7	*+4.5*
Age Group						
20 and Younger	%	42.4	41.9	*-0.5*	61.4	*+19.0*
21 to 25	%	29.4	27.7	*-1.7*	25.1	*-4.3*
26 and Older	%	28.2	30.4	*+2.2*	13.5	*-14.7*
Mean Age	Mean	24.7	24.8	*+0.1*	21.6	*-3.1*
Born Outside of U.S.						
Yes	%	49.2	48.7	*-0.5*	25.7	*-23.5*
No	%	50.5	45.9	*-4.6*	44.5	*-6.0*
Missing	%	0.3	5.5	*+5.2*	29.8	*+29.5*
Speaks Language Other than English						
Yes	%	44.3	44.3	*0.0*	31.4	*-12.9*
No	%	53.6	51.7	*-1.9*	45.2	*-8.4*
Missing	%	2.1	4.0	*+1.9*	23.4	*+21.3*
NYC Public High School Graduate[2]	%	34.2	34.3	*+0.1*	49.2	*+15.0*
Received a GED	%	34.3	32.4	*-1.9*	11.9	*-22.4*
Household Income by Census Tract [3]	Mean	$43,851	$43,626	*- $225*	$45,872	*+ $2,021*
NYC Borough of Residence						
Bronx	%	23.6	24.2	*+0.6*	24.0	*+0.4*
Brooklyn	%	25.7	26.9	*+1.2*	27.6	*+1.9*
Manhattan	%	12.4	13.3	*+0.9*	11.6	*-0.8*
Queens	%	30.2	29.2	*-1.0*	28.5	*-1.7*
Staten Island	%	6.5	5.1	*-1.4*	5.6	*-0.9*
Outside NYC	%	1.6	1.2	*-0.4*	2.7	*+1.1*

Source: CUNY's Institutional Research Database, CUNY Start database, and U.S. Census Bureau.

[1]*All full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students who did not require remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

[2]*Graduated from a NYCDOE high school within 27 months of entering CUNY or CUNY Start.*

[3]*The income data may not reflect actual student income levels. To calculate income, student addresses were geocoded and matched to U.S. Census tracts. Median household income by Census tract was then used as a proxy for household income.*

SECOND MATCH: POSTSECONDARY OUTCOMES OF CUNY START STUDENTS

In order to compare postsecondary outcomes, a second matched comparison group (Comparison Group Two) was constructed by matching CUNY Start students who enrolled in CUNY after CUNY Start from Spring 2010 through Spring 2012 to first-time freshmen and advanced transfer students in CUNY degree programs during the same time period.[10] Comparison Group Two students entered CUNY at the same time that CUNY Start students entered CUNY. Matching criteria included the college attended, semester enrolled (this was a forced match), initial remedial needs before CUNY Start (this was a forced match), CUNY assessment exam scores, college admissions average (a standardized high school GPA calculated by the University Application Processing Center), experience in the University Skills Immersion Program (USIP), gender, race, age (log), NYC borough of residence, household income by Census tract, country of origin, language, and whether students received a GED or high school diploma. Additional matching criteria included whether students received New York State Tuition Assistance Plan (TAP) or a federal Pell grant, whether students were recent graduates of a NYC public high school, admission type (first-time freshman versus transfer student), and whether students enrolled full- or part-time (this was a forced match). Students participating in ASAP were included in the pool of potential matches because ASAP participation can be considered a positive outcome of the CUNY Start program. The results of the matching for Comparison Group Two are shown in Table 2.2.

Table 2.2 Profile of CUNY Start Alumni in CUNY and Comparison Group Two Students

		CUNY Start Alumni in CUNY	Matched Comparison Group[1]		Total Pool of Similar CUNY Students[2]	
Total	**N**	**841**	**841**		**65,975**	
College of CUNY Degree Enrollment						
Baruch	%	0.1	0.0	*-0.1*	0.2	*+0.1*
Brooklyn	%	0.1	0.0	*-0.1*	0.3	*+0.2*
BMCC	%	21.0	19.7	*-1.3*	23.7	*+2.7*
Bronx	%	6.2	6.7	*+0.5*	10.9	*+4.7*
City College	%	0.2	0.1	*-0.1*	0.3	*+0.1*
College of Staten Island	%	5.0	3.8	*-1.2*	4.7	*-0.3*
Hostos	%	13.4	13.1	*-0.3*	6.5	*-6.9*
Hunter	%	0.0	0.2	*+0.2*	0.1	*+0.1*
John Jay	%	0.1	0.4	*+0.3*	1.0	*+0.9*
Kingsborough	%	17.4	16.9	*-0.5*	12.9	*-4.5*
LaGuardia	%	30.1	29.6	*-0.5*	13.6	*-16.5*
Lehman	%	0.0	0.1	*+0.1*	0.5	*+0.5*
Medgar Evers	%	0.4	0.6	*+0.2*	4.6	*+4.2*
New York City College of Technology	%	1.1	2.4	*+1.3*	7.6	*+6.5*
Queens	%	0.0	0.0	*0.0*	0.3	*+0.3*

[10] Students initially exempt from remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data are excluded from the potential matches. The decision to only include full-time students in the comparison group helps ensure that academic outcomes are not driven, in part, by differing percentages of part-time students.

Table 2.2 continued from previous page

Queensborough	%	4.9	6.1	*+1.2*	12.0	*+7.1*
York	%	0.0	0.4	*+0.4*	0.6	*+0.6*
Semester Enrolled in CUNY						
Spring '10	%	5.5	5.5	*0.0*	15.2	*+9.7*
Fall '10	%	5.5	5.5	*0.0*	25.8	*+20.3*
Spring '11	%	22.8	22.8	*0.0*	14.6	*-8.2*
Fall '11	%	12.0	12.0	*0.0*	30.5	*+18.5*
Spring '12	%	54.2	54.2	*0.0*	13.9	*-40.3*
Remedial Need at Beginning of Term						
Writing	%	82.5	82.5	*0.0*	54.6	*-27.9*
Reading	%	54.1	54.1	*0.0*	34.1	*-20.0*
Math 1	%	58.7	58.7	*0.0*	47.1	*-11.6*
Math 2	%	91.1	91.1	*0.0*	79.9	*-11.2*
Math (Overall)	%	93.1	93.1	*0.0*	82.0	*-11.1*
Total Number of Remedial Needs						
One	%	14.1	14.1	*0.0*	49.5	*+35.4*
Two	%	42.0	42.0	*0.0*	30.3	*-11.7*
Three	%	43.9	43.9	*0.0*	20.2	*-23.7*
USIP Experience	%	11.2	10.0	*-1.2*	12.2	*+1.0*
NY Resident (for tuition purposes)	%	95.0	94.6	*-0.4*	92.7	*-2.3*
Received Pell Grant	%	68.0	62.9	*-5.1*	72.6	*+4.6*
Received NY State Tuition Assistance (TAP)	%	48.9	46.6	*-2.3*	44.2	*-4.7*
Admission Classification						
First-time Freshmen	%	82.6	82.5	*-0.1*	81.7	*-0.9*
Advanced Transfer/Continuing Degree	%	17.4	17.5	*+0.1*	18.3	*+0.9*
Enrollment Status						
Full-Time	%	76.7	76.7	*0.0*	84.9	*+8.2*
Part-Time	%	23.3	23.3	*0.0*	15.1	*-8.2*
College Admissions Average	%	72.9	72.7	*-0.2*	73.6	*+0.7*
Gender						
Female	%	56.1	56.7	*+0.6*	54.4	*-1.7*
Male	%	43.9	43.3	*-0.6*	45.6	*+1.7*
Race						
American Indian/Native Alaskan	%	0.5	0.5	*0.0*	0.4	*-0.1*
Asian/Pacific Islander	%	14.1	14.3	*+0.2*	12.9	*-1.2*
Black	%	30.6	31.2	*+0.6*	34.1	*+3.5*
Hispanic	%	39.8	41.3	*+1.5*	38.2	*-1.6*
White	%	15.0	12.8	*-2.2*	14.5	*-0.5*

Source: CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched comparison group of CUNY students who enrolled in Spring 2010 through Spring 2012 as full- or part-time students.*

[2]*All first-time freshmen and advanced transfer students in CUNY degree programs in Spring 2010 through Spring 2012. Students who did not require remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students with incomplete assessment exam/exemption data are excluded.*

THIRD MATCH: AN ALTERNATIVE WAY TO EVALUATE POSTSECONDARY OUTCOMES

An alternative way to evaluate postsecondary outcomes is to examine cumulative outcomes after two semesters. For this purpose, a third comparison group (Comparison Group Three) was constructed by matching CUNY Start students who enrolled in CUNY after participating in CUNY Start to first-time freshmen and advanced transfer students in CUNY degree programs who enrolled between Fall 2009 and Fall 2011.[11] The matching criteria are similar to Comparison Group Two above, except that Comparison Group Three students entered CUNY at the same time that CUNY Start students entered CUNY Start.

Comparison Group Three allows us to compare the outcomes of students who experienced one semester in CUNY Start and one semester in a CUNY degree program to students who enrolled for two semesters in a CUNY degree program. In order to calculate postsecondary outcomes after two semesters, we only included CUNY Start students who enrolled in a CUNY degree program in the semester immediately following CUNY Start, and only included comparison group students who were enrolled for two consecutive semesters. The results of the matching for Comparison Group Three are shown in Table 2.3.

Table 2.3 Profile of CUNY Start Alumni in CUNY and Comparison Group Three Students

		CUNY Start Alumni in CUNY	Matched Comparison Group[1]		Total Pool of Similar CUNY Students[2]	
Total	**N**	**800**	**800**		**60,769**	
College of CUNY Degree Enrollment						
Baruch	%	0.1	0.1	*0.0*	0.2	*+0.1*
Brooklyn	%	0.1	0.1	*0.0*	0.4	*+0.3*
BMCC	%	21.3	24.8	*+3.5*	22.1	*+0.8*
Bronx	%	6.4	8.3	*+1.9*	9.8	*+3.4*
City College	%	0.1	0.0	*-0.1*	0.4	*+0.3*
College of Staten Island	%	4.9	2.4	*-2.5*	5.3	*+0.4*
Hostos	%	13.4	12.5	*-0.9*	6.3	*-7.1*
Hunter	%	0.0	0.1	*+0.1*	0.2	*+0.2*
John Jay College of Criminal Justice	%	0.1	0.4	*+0.3*	2.7	*+2.6*
Kingsborough	%	17.0	15.3	*-1.7*	13.1	*-3.9*
LaGuardia	%	30.4	24.9	*-5.5*	12.4	*-18.0*
Lehman	%	0.0	0.6	*+0.6*	0.5	*+0.5*
Medgar Evers	%	0.3	0.9	*+0.6*	4.6	*+4.3*
New York City College of Technology	%	0.9	1.6	*+0.7*	7.9	*+7.0*
Queens	%	0.0	0.5	*+0.5*	0.4	*+0.4*

[11] Students initially exempt from remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data are excluded from the potential matches. The decision to only include full-time students in the comparison group helps ensure that academic outcomes are not driven, in part, by differing percentages of part-time students.

Table 2.3 continued from previous page

Queensborough	%	5.1	7.4	*+2.3*	12.8	*+7.7*
York	%	0.0	0.3	*+0.3*	0.8	*+0.8*
Semester Enrolled in CUNY Start/CUNY						
Fall '09	%	5.8	5.8	*0.0*	26.9	*+21.1*
Spring '10	%	5.3	5.3	*0.0*	11.4	*+6.1*
Fall '10	%	23.3	23.3	*0.0*	23.1	*-0.2*
Spring '11	%	10.5	10.5	*0.0*	11.0	*+0.5*
Fall '11	%	55.3	55.3	*0.0*	27.7	*-27.6*
Remedial Need at Beginning of Term						
Writing	%	82.5	82.5	*0.0*	56.1	*-26.4*
Reading	%	54.1	54.1	*0.0*	34.8	*-19.3*
Math 1	%	59.3	59.3	*0.0*	45.0	*-14.3*
Math 2	%	90.5	90.5	*0.0*	76.1	*-14.4*
Math (Overall)	%	92.6	92.6	*0.0*	78.4	*-14.2*
Total Number of Remedial Needs						
One	%	14.4	14.4	*0.0*	50.1	*+35.7*
Two	%	42.0	42.0	*0.0*	30.6	*-11.4*
Three	%	43.6	43.6	*0.0*	19.3	*-24.3*
USIP Experience	%	10.3	8.5	*-1.8*	6.7	*-3.6*
NY Resident (for tuition purposes)	%	94.9	95.1	*+0.2*	93.1	*-1.8*
Received Pell Grant	%	68.1	70.9	*+2.8*	73.6	*+5.5*
Received NY State Tuition Assistance (TAP)	%	48.5	43.6	*-4.9*	49.3	*+0.8*
Admission Classification						
First-time Freshmen	%	83.3	84.0	*+0.7*	83.2	*-0.1*
Advanced Transfer	%	16.8	16.0	*-0.8*	16.8	*0.0*
Enrollment Status						
Full-Time	%	76.8	76.8	*0.0*	87.9	*+11.1*
Part-Time	%	23.3	23.3	*0.0*	12.1	*-11.2*
College Admissions Average	%	73.1	73.2	*+0.1*	74.1	*+1.0*
Gender						
Female	%	56.0	55.5	*-0.5*	56.2	*+0.2*
Male	%	44.0	44.5	*+0.5*	43.8	*-0.2*
Race						
American Indian/Native Alaskan	%	0.5	0.9	*+0.4*	0.4	*-0.1*
Asian/Pacific Islander	%	14.4	13.0	*-1.4*	13.9	*-0.5*
Black	%	30.5	33.0	*+2.5*	32.9	*+2.4*
Hispanic	%	39.5	39.5	*0.0*	37.3	*-2.2*
White	%	15.1	13.6	*-1.5*	15.4	*+0.3*

Source: CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched comparison group of CUNY students who enrolled in Fall 2009 through Fall 2011 as full- or part-time students and subsequently enrolled in a second semester.*

[2]*All first-time freshmen and advanced transfer students in CUNY degree programs in Fall 2009 through Fall 2011. Students who did not require remediation, students enrolled in the Online BA program or at the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students with incomplete assessment exam/exemption data are excluded.*

PART THREE:

Remediation Outcomes

The analyses in the following sections include outcomes for all enrolled CUNY Start students, including those who did not complete the program. The table below provides supplementary statistics to help with understanding the outcomes data by outlining CUNY Start completion rates. Overall, approximately 84% of CUNY Start students complete the program.

Table 3.1 CUNY Start Completion Rates by Student Characteristics

	Total Students Enrolled[1]	Completed CUNY Start[2]	
		#	%
All Enrolled Students	**1,716**	**1,446**	**84.3**
College (Site of CUNY Start Program)			
BMCC	412	352	85.4
Bronx	87	73	83.9
College of Staten Island	96	73	76.0
Hostos	354	288	81.4
Kingsborough	221	180	81.4
LaGuardia	458	403	88.0
Queensborough	88	77	87.5
Semester Enrolled in CUNY Start			
Fall '09	70	54	77.1
Spring '10	71	59	83.1
Fall '10	266	219	82.3
Spring '11	137	108	78.8
Fall '11	685	587	85.7
Spring '12	487	419	86.0
Total Number of Remedial Needs			
One	219	191	87.2
Two	666	566	85.0
Three	831	689	82.9
Gender			
Female	952	810	85.1
Male	764	636	83.2
Race			
Asian/Pacific Islander	188	169	89.9
Black	549	458	83.4
Hispanic	776	650	83.8
White	192	163	84.9

Source: CUNY Start database.

[1]*Students are counted as officially enrolled in CUNY Start when they remain enrolled in the program through the third week of classes.*

[2]*Students are counted as program completers if they finish the first 12 weeks of core instruction (Phase 1) and retake the required CAT exams.*

The primary goal of remedial courses is to help underprepared students achieve proficiency in reading, writing, and/or math so that they are better prepared to enter and successfully pass the college-credit courses required for their chosen degrees. Using Comparison Group One, which matched CUNY Start students to full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012, the following tables show the percent of students who achieved proficiency in each skill area after one semester. The tables are disaggregated by initial CUNY Assessment Test score and by the skill areas in which students required remediation. Disaggregating by severity of remedial need provides extra context for understanding the proficiency gains.

The data in the bottom half of Tables 3.2R, 3.2W, and 3.2M show the mean change in test scores for students who re-took any required skills assessment exams. CUNY Start students re-test at the conclusion of the program, while comparison group students enrolled in traditional remedial courses re-test at the end of the semester. The differences for both groups are calculated *only* for students who re-took exams during the time of the study, ensuring that differences are not driven primarily by CUNY Start students' higher test-taking rates. Note that changes in math exam scores are not shown due to the small number of comparison group students who re-test in math.[12]

The following tables demonstrate that, after one semester, CUNY Start students were more likely to achieve proficiency in reading, writing, and math, in comparison to a similar group of students who did not enroll in the program. For example, of all students needing remediation in reading, 57% of CUNY Start students achieved proficiency, compared to 33% of comparison group students. Of all students needing remediation in writing, 62% of CUNY Start students achieved proficiency, compared to 26% of comparison group students. Of all students needing remediation in math, 53% of CUNY Start students achieved proficiency, compared to 10% of comparison group students.

The pool of matches for Comparison Group One (used in the analyses in Part Three of this report) included full-time students only. We felt that CUNY Start participants in both the full- and part-time models were more similar to full-time CUNY degree students than those enrolled on a part-time basis. We did construct, however, an alternate comparison group that included part-time students in the potential pool of matches; 15% of the resulting alternative comparison group was composed of part-time students. Results from this alternate group are not presented in this report, but proficiency gains were quite similar to the proficiency gains described above for the full-time comparison group as described above: 31% achieved proficiency in reading, 25% achieved proficiency in writing, and 11% achieved proficiency in math.

[12] Although we do not show changes in math scores, the overall changes in math scores for CUNY Start students are significant. The average changes in Math 1 and Math 2 exam scores for CUNY Start students are 18.4 and 21.7, respectively. The CUNY Assessment Test in Mathematics is no longer utilized to determine exit from developmental math courses and interventions. Students enrolled in arithmetic/pre-algebra developmental courses, workshops, or other interventions demonstrate readiness for elementary algebra by meeting the curriculum requirements established by the home college. Students enrolled in elementary algebra developmental courses, workshops, or other interventions demonstrate readiness for college level math courses by passing the CUNY Elementary Algebra Final Exam (CEAFE) with a score of 60 or more and having an overall course average of 74 or higher, with the final exam being worth 35% of the overall average.

Table 3.2R Reading Proficiency Gains and Change in Reading Assessment Exam Score

	CUNY Start Students		Matched Comparison Group[1]		
Proficiency Gains in Reading[2]	N	% Achieving proficiency	N	% Achieving proficiency after One Semester[3]	
All Students Needing Remediation in Reading	882	57.3	882	33.1	*-24.2*
Initial Exam Score: Less than 40	56	25.0	93	5.4	*-19.6*
Initial Exam Score: 40 through 49	149	44.3	134	9.0	*-35.3*
Initial Exam Score: 50 through 59	287	55.4	254	24.0	*-31.4*
Initial Exam Score: 60 through 69	390	68.2	401	53.4	*-14.8*
Initial Need in Reading + Writing Only	59	67.8	59	45.8	*-22.0*
Initial Need in Reading + Math Only	55	63.6	55	54.5	*-9.1*
Initial Need in Reading + Writing + Math	766	55.9	766	30.5	*-25.4*
***Change* (Δ) in Reading Assessment Exam Score (test-takers only)**	N	Mean Change in Score	N	Mean Change in Score	
All Students Needing Remediation in Reading	727	17.4	409	13.1	*-4.3*
Initial Exam Score: Less than 40	42	30.8	14	18.8	*-12.0*
Initial Exam Score: 40 through 49	125	22.6	25	19.5	*-3.1*
Initial Exam Score: 50 through 59	243	18.4	101	13.9	*-4.5*
Initial Exam Score: 60 through 69	317	12.7	269	11.8	*-0.9*
Initial Need in Reading + Writing Only	53	19.6	30	14.3	*-5.3*
Initial Need in Reading + Math Only	44	19.7	38	12.7	*-7.0*
Initial Need in Reading + Writing + Math	628	17.0	339	13.0	*-4.0*

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]The matched comparison group comes from a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students exempt from remediation in reading, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.

[2]Percentage of students achieving proficiency in reading at the end of the first semester (in CUNY Start or in CUNY) by taking and passing the CUNY assessment exam. All students are included in the denominator, including those who did not re-take an exam.

[3]A total of 457 comparison group students did not take a reading basic skills course in their first semester. Of the 425 comparison group students who did take a reading basic skills course in their first semester, 44.2% achieved proficiency in reading.

Note: Proficiency gains are calculated only for CUNY Start students needing remediation in reading AND — in the case of part-time students — enrolled in a CUNY Start program that relates to the specific skills area.

Table 3.2W Writing Proficiency Gains and Change in Writing Assessment Exam Score

	CUNY Start Students		Matched Comparison Group[1]		
Proficiency Gains in Writing[2]	N	% Achieving proficiency	N	% Achieving proficiency after One Semester[3]	
All Students Needing Remediation in Writing	1,275	61.9	1,275	26.1	*-35.8*
Initial Exam Score: Less than 26	44	34.1	77	1.3	*-32.8*
Initial Exam Score: 26 through 35	235	51.9	227	11.5	*-40.4*
Initial Exam Score: 36 through 45	268	56.0	255	16.9	*-39.1*
Initial Exam Score: 46 through 55	728	69.0	716	36.7	*-32.3*
Initial Need in Writing + Reading Only	59	64.4	59	11.9	*-52.5*
Initial Need in Writing + Math Only	400	75.5	400	43.5	*-32.0*
Initial Need in Writing + Reading + Math	766	54.2	766	17.2	*-37.0*
***Change* (Δ) in Writing Assessment Exam Score (test-takers only)**	N	Mean Change in Score	N	Mean Change in Score	
All Students Needing Remediation in Writing	1,065	14.9	533	9.5	*-5.4*
Initial Exam Score: Less than 26	36	32.5	12	16.0	*-16.5*
Initial Exam Score: 26 through 35	198	23.9	54	15.6	*-8.3*
Initial Exam Score: 36 through 45	224	16.4	84	13.2	*-3.2*
Initial Exam Score: 46 through 55	607	10.4	383	7.6	*-2.8*
Initial Need in Writing + Reading Only	54	15.8	21	6.7	*-9.1*
Initial Need in Writing + Math Only	337	16.7	228	10.8	*-5.9*
Initial Need in Writing + Reading + Math	631	14.1	259	8.1	*-6.0*

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]The matched comparison group comes from a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students exempt from remediation in writing, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.

[2]Percentage of students achieving proficiency in writing at the end of the first semester (in CUNY Start or in CUNY) by taking and passing the CUNY assessment exam. All students are included in the denominator, including those who did not re-take an exam. Writing exam scores were standardized to accommodate changes in how the test was scaled over the analysis period; tests taken prior to Fall 2011 were re-scaled to be comparable to new the scoring system.

[3]A total of 679 comparison group students did not take a writing basic skills course in their first semester. Of the 596 comparison group students who did take a writing basic skills course in their first semester, 38.4% achieved proficiency in writing.

Note: Proficiency gains are calculated only for CUNY Start students needing remediation in writing AND — in the case of part-time students — enrolled in a CUNY Start program that relates to the specific skills area.

Table 3.2M Math Proficiency Gains[1]

	CUNY Start Students		Matched Comparison Group[2]		
Proficiency Gains in Math[3]	N	% Achieving proficiency	N	% Achieving proficiency after One Semester[4]	
All Students Needing Remediation in Math	1,354	53.0	1,354	10.2	*-42.8*
Initial Need in Math Only	166	62.0	166	12.7	*-49.3*
Initial Need in Math + Reading Only	99	50.5	99	10.1	*-40.4*
Initial Need in Math + Writing Only	421	61.3	421	13.5	*-47.8*
Initial Need in Math + Reading + Writing	668	45.8	668	7.5	*-38.3*

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]Changes in math exam scores are not shown due to the small number of comparison group students who retest in math.

[2]The matched comparison group comes from a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students exempt from remediation in math, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.

[3]Percentage of students achieving proficiency in math at the end of the first semester (in CUNY Start or in CUNY) by taking and passing the COMPASS Math 2 (algebra) assessment exam. For Spring 2011 and later, pass rates reflect the number of students who passed the COMPASS Math 2 exam or passed the last-in-sequence math course (grade C or better).

[4]A total of 731 comparison group students did not take any remedial math courses in their first semester. Of the 623 comparison group students who did take a remedial math course in their first semester, 22.0% achieved proficiency in math.

Note: Proficiency gains are calculated only for CUNY Start students needing remediation in math AND — in the case of part-time students — enrolled in a CUNY Start program that relates to the specific skills area.

Table 3.3 shows the distribution of proficiencies achieved for both CUNY Start students and the matched comparison group. Given that students may require remediation in more than one area, they have the potential to achieve proficiency in more than one skills area. As Table 3.3 illustrates, CUNY Start students achieved more skill area proficiencies than comparison group students after one semester. Of all students needing remediation in all three skills areas, 20.6% of CUNY Start students achieved proficiency in all areas, compared to 1.2% of comparison group students. Of all students with two remedial needs, 34.1% of CUNY Start students achieved proficiency in those two areas, compared to 7.1% of comparison group students. Of all students with one remedial need, 63.5% of CUNY Start students achieved proficiency in that one area compared to 19.2% of comparison group students. Even after two semesters, comparison group students do not achieve proficiency in as many skill areas as CUNY Start students.

Table 3.3 Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	831	20.6	27.9	20.7	30.8
Initial Remedial Need in Two Areas	666		34.1	40.4	25.5
Initial Remedial Need in One Area	219			63.5	36.5
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	831	1.2	11.8	27.4	59.6
Initial Remedial Need in Two Areas	666		7.1	43.7	49.2
Initial Remedial Need in One Area	219			19.2	80.8
Matched Comparison Group after Two Semesters[2]	N	%	%	%	%
Initial Remedial Need in All Areas	584	4.1	24.3	26.7	44.9
Initial Remedial Need in Two Areas	493		17.2	48.1	34.7
Initial Remedial Need in One Area	152			34.2	65.8

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

[2]*Includes only a subset of the original matched comparison group that initially enrolled prior to Spring 2012. Proficiency status for students after two semesters is not yet available for Spring 2012 students.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Tables 3.1, 3.2, and 3.3 present straight comparisons in outcomes between CUNY Start students and matched comparison group students, without controlling for any other factors not already accounted for in the propensity score matching. We make these comparisons because it is assumed that the two groups, as a result of the matching process, are equivalent. However, it is still useful to estimate the effect of CUNY Start, taking into account any observable factors that might not have been fully accounted for in the original matching. To accomplish this more rigorous analysis, we used ordinary least squares (OLS) or linear regression to examine whether CUNY Start students outperform comparison group students on the remedial outcomes discussed above. For example, Table 3.4 presents the results of four OLS models that estimate the impact of CUNY Start participation on the likelihood of achieving proficiency in each skills area, as well as CUNY Start's impact on the total number of proficiency gains. The models contain the same main independent variable (whether a student is a

CUNY Start or comparison group student) and the same control variables, including initial remedial need and demographic characteristics. The results indicate that CUNY Start students are 22.7% more likely than comparison group to achieve proficiency in reading, 35.6% more likely to achieve proficiency in writing, and 43.7% more likely to achieve proficiency in math. In addition, CUNY Start students achieve proficiency in an average of 0.802 more skills areas than comparison group students (the number of skills areas is out of three total: reading, writing, and math). [13]

Table 3.4 OLS Estimates of CUNY Start Participation on Remedial Outcomes (After One Semester)

	Achieving Reading Proficiency	Achieving Writing Proficiency	Achieving Math Proficiency	Total Number of Skill-Area Proficiencies Achieved[1]
CUNY Start Participation	0.227** (0.022)	0.356** (0.018)	0.437** (0.015)	0.802** (0.046)
Observations	1,764	2,550	2,708	1,662
R-squared	0.203	0.246	0.351	0.292

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]Because students with more remedial needs have the potential to achieve proficiency in more skills areas, we only include triple remedial students in this analysis (831 CUNY Start students and 831 comparison group students).

Notes: Sample includes 1,716 CUNY Start students who enrolled in CUNY Start between Fall 2009 and Spring 2012, and 1,716 comparison group students who enrolled in CUNY degree programs in the same semester that CUNY Start students began CUNY Start. All models include the main effect of participating in CUNY Start and a set of covariates including initial remedial need, initial CUNY assessment exam scores, prior USIP experience, college and semester of enrollment, race/ethnicity, gender, native language, country of origin, age, high school/GED type, borough of residence, and median neighborhood income (based on US Census Block). Standard errors are in parentheses.

** p <.05 ** p < .01*

[13] Logistic regression was also employed for binary outcome variables, and results were very similar to OLS estimates.

PART FOUR:

Postsecondary Outcomes

The tables in the following sections present data on postsecondary outcomes of CUNY Start and comparison group students. Because CUNY Start students temporarily delay starting their degree studies in order to participate in the CUNY Start program, it is important to understand the matriculation patterns of CUNY Start students after they participate in the program. Table 4.1 (displayed on the following page) shows the enrollment of CUNY Start students into CUNY degree programs through Fall 2012. Approximately three-quarters of students enrolled in CUNY after participating in CUNY Start. The percentage is slightly higher among those who completed the program. In addition, there were 31 students who enrolled in non-CUNY colleges after participating in CUNY Start. CUNY Start students tend to enroll at CUNY immediately following the semester they participated in CUNY Start, as illustrated in Table 4.2. Students who participate in CUNY Start in the fall are more likely, however, to delay subsequent CUNY degree enrollment for a semester and enter the following fall. Table 4.3 shows that most students who enroll in CUNY degree programs stay at the same college as their CUNY Start experience.

Table 4.1 Subsequent Enrollment of CUNY Start Students in CUNY Degree Programs[1]

	Students **Enrolled** in CUNY Start[2]		Students **Completing** Phase I of CUNY Start	
	N	% Enrolling in CUNY	N	% Enrolling in CUNY
All Enrolled Students	**1,627**	**72.0**	**1,366**	**80.2**
CUNY Start Program				
Part-Time Program	672	69.0	565	76.6
Full-Time Program	955	74.1	801	82.6
CUNY Start College				
BMCC	381	73.8	324	81.2
Bronx	87	77.0	73	82.2
College of Staten Island	96	56.3	73	67.1
Hostos	320	68.4	257	77.8
Kingsborough	220	78.6	180	90.6
LaGuardia	435	71.7	382	78.0
Queensborough	88	75.0	77	80.5
Semester Enrolled in CUNY Start				
Fall '09	70	74.3	54	90.7
Spring '10	71	74.6	59	86.4
Fall '10	266	78.6	219	85.4
Spring '11	136	70.6	107	80.4
Fall '11	677	74.2	581	81.1
Spring '12	407	63.9	346	72.5
Total Number of Remedial Needs				
One	195	80.5	170	86.5
Two	634	72.1	536	80.2
Three	798	69.9	660	78.5
Gender				
Female	906	73.5	767	80.8
Male	721	70.2	599	79.3
Race				
Asian/Pacific Islander	184	80.4	165	86.1
Black	521	69.5	434	78.1
Hispanic	724	69.9	603	78.1
White	187	79.1	158	87.3
NYC Public High School Graduate	559	72.6	463	80.6
GED Recipient	565	72.4	469	81.4

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]CUNY enrollment includes any term through Fall 2012; an additional 31 students enrolled at non-CUNY institutions, including six SUNY colleges, Nassau Community College, and Monroe College (among others).

[2]27 students re-enrolled in the CUNY Start program in Fall 2012 and thus are not included in this analysis.

Table 4.2 Subsequent Enrollment of CUNY Start Students in CUNY Degree Programs by CUNY Start Semester and Entering CUNY Semester

Semester in CUNY Start	Semester of First CUNY Degree Enrollment after CUNY Start						Total
	Spring '10	Fall '10	Spring '11	Fall '11	Spring '12	Fall '12	
Fall '09	46	4	0	1	0	1	52
Spring '10		42	6	1	2	2	53
Fall '10			186	16	6	1	209
Spring '11				83	10	3	96
Fall '11					437	65	502
Spring '12						260	260
Total	**46**	**46**	**192**	**101**	**455**	**332**	**1,172**

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Table 4.3 Subsequent Enrollment of CUNY Start Students in CUNY Degree Programs by CUNY Start Program and CUNY College of Degree Enrollment

CUNY Start Program	CUNY College of First Degree Enrollment after CUNY Start								
	BMCC	Bronx	Hostos	KCC	LaGuardia	QCC	Staten Island	Other CUNY Colleges	Total
BMCC	219	2	3	10	17	3	14	13	281
Bronx	1	63	1	0	0	0	0	2	67
Hostos	13	13	174	0	10	1	2	6	219
Kingsborough	3	0	0	167	1	1	0	1	173
LaGuardia	5	1	0	1	300	2	0	3	312
Queensborough	0	0	0	0	2	63	0	1	66
Staten Island	0	0	1	0	0	0	52	1	54
Total	**241**	**79**	**179**	**178**	**330**	**70**	**68**	**27**	**1,172**

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

FIRST-SEMESTER POSTSECONDARY OUTCOMES

In order to examine first-semester postsecondary outcomes, we used Comparison Group Two to compare CUNY Start students' academic performance in their first semester to similar students who entered CUNY in that same semester. For example, we compare CUNY Start students who entered CUNY degree programs in Spring 2011 with matched comparison group students who also entered CUNY in Spring 2011. First-semester postsecondary outcomes disaggregated by term of CUNY degree enrollment are shown in Table 4.4 and Table 4.5 below. The data suggest that CUNY Start students attempted and earned more credits in their first semester than comparison group students, and also had higher GPAs. Equated credits, as shown in the following table and in subsequent sections of this report, refer to credits toward a degree *plus* the number of contact hours (or "billable credits") spent in remedial or developmental courses.

Table 4.4 First-Semester Postsecondary Outcomes of CUNY Start Alumni and Comparison Group Students, by Semester of CUNY Degree Enrollment

		First-Semester Postsecondary Outcomes					
Semester of CUNY Degree Enrollment		Credits Attempted	Credits Earned	Equated Credits Attempted	Equated Credits Passed	Proportion of Non-Remedial Credits Attempted	GPA
Spring 2010	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	44	12.8**	9.4**	14.7	10.3	0.87**	2.28
Matched Comparison Group	44	5.7	4.5	14.3	9.3	0.39	2.39
Fall 2010	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	45	11.8**	7.4*	13.7	8.2	0.84**	2.12
Matched Comparison Group	45	6.4	5.0	14.8	9.8	0.43	2.29
Spring 2011	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	186	9.6**	7.5**	12.6*	9.2	0.77**	2.59*
Matched Comparison Group	186	5.4	3.6	13.7	8.9	0.41	2.30
Fall 2011	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	98	9.9**	7.5**	12.6	8.9	0.78**	2.46
Matched Comparison Group	98	5.3	3.2	13.7	8.4	0.39	2.11
Spring 2012	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	451	9.1**	7.3**	12.4*	9.1*	0.74**	2.45**
Matched Comparison Group	451	4.6	3.0	13.1	8.1	0.35	1.93
All Cohorts Combined	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	824	9.7**	7.5**	12.7**	9.1*	0.76**	2.45**
Matched Comparison Group	824	5.0	3.3	13.5	8.5	0.37	2.08

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.
Note: The comparison group was constructed using a propensity score matching methodology, drawing from a pool of CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students who did not require remediation, students enrolled in the Online BA program or with the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.
** p <.05 ** p < .01*

Table 4.5 First-Semester GPA of CUNY Start Students and Comparison Group Students, by Semester of CUNY Degree Enrollment

Semester of CUNY Degree Enrollment		2.0 GPA or Higher	2.5 GPA or Higher	3.0 GPA or Higher	3.5 GPA or Higher
Spring 2010	N	%	%	%	%
CUNY Start Students	44	61.0	48.8	34.1	22.0
Matched Comparison Group	44	71.0	64.5	48.4	16.1
Fall 2010	N	%	%	%	%
CUNY Start Students	45	59.5	52.4	26.2	19.0
Matched Comparison Group	45	69.4	47.2	27.8	13.9
Spring 2011	N	%	%	%	%
CUNY Start Students	186	74.7	63.2	49.4	27.0
Matched Comparison Group	186	66.4	58.4	42.3	15.3
Fall 2011	N	%	%	%	%
CUNY Start Students	98	73.3	60.0	43.3	25.6
Matched Comparison Group	98	57.4	47.1	36.8	13.2
Spring 2012	N	%	%	%	%
CUNY Start Students	451	73.9	55.0	36.1	18.9
Matched Comparison Group	451	54.8	43.6	29.9	15.3
All Cohorts Combined	N	%	%	%	%
CUNY Start Students	824	72.5	57.0	39.3	21.7
Matched Comparison Group	824	59.6	48.8	34.5	15.0

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was constructed using a propensity score matching methodology, drawing from a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students who did not require remediation, students enrolled in the Online BA program or with the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

Table 4.6 presents the results of four separate OLS regression models that estimate the impact of CUNY Start participation on first-semester credits attempted, first-semester credits earned, proportion of non-remedial credits attempted in the first semester, and first-semester GPA. The models contain the same main independent variable (whether a student is a CUNY Start or comparison group student) and the same control variables, including initial remedial need and demographic characteristics. Results indicate that at the end of the first semester, CUNY Start students attempt and earn an average of 4.55 and 3.98 more credits, respectively, attempt a higher proportion of non-remedial credits, and have a 0.33 points higher GPA than comparison group students.

Table 4.6 OLS Estimates of CUNY Start Participation on Selected Postsecondary Outcomes

	First-Semester Credits Attempted	First-Semester Credits Earned	Proportion of Non-Remedial Credits Attempted	First-Semester GPA
CUNY Start Participation	4.551** (0.165)	3.984** (0.191)	0.382** (0.012)	0.334** (0.064)
Observations	1,648	1,648	1,648	1,350
R-squared	0.572	0.398	0.536	0.217

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start Database.

Notes: Sample includes 824 CUNY Start students and 824 comparison group students who enrolled in CUNY degree programs (excluding certificate programs) between Spring 2010 and Spring 2012. All models include the main effect of participating in CUNY Start and a list of covariates including initial remedial need, initial CUNY assessment exam scores, prior USIP experience, college and semester of enrollment, full-time/part-time CUNY enrollment status, race/ethnicity, gender, native language, country of origin, age, high school/GED type, months since high school graduation, borough of residence, NYC resident status (for tuition purposes), median neighborhood income (based on US Census Block), PELL/TAP receipt, college admissions average (CAA), and cumulative credits earned prior to enrolling in a CUNY degree program. Standard errors are in parentheses.

** p <.05 ** p < .01*

We also used Comparison Group Two to examine participation in and successful completion of gatekeeper and remedial courses during students' first semester in a CUNY degree program.

- **Gatekeeper courses:** Out of the 841 CUNY Start students who enrolled in a CUNY degree program after participating in CUNY Start, 87 enrolled in a gatekeeper English course during their first CUNY semester, and 72 (83%) of these students passed the course. Twenty comparison group students (out of 841) enrolled in a gatekeeper English course, 15 (75%) of which passed the course. In addition, 21 CUNY Start students enrolled in a gatekeeper math course, 15 (71%) of which passed the course. Only four comparison group students enrolled in a gatekeeper math course, three of which passed the course.

- **Remedial courses:** Of the 285 CUNY Start students who required remediation in math upon entering their first CUNY semester, 130 (45%) enrolled in a remedial math course, and of these 130 students, 60 (46% passed the course). Of the 783 comparison group students requiring remediation in math in their first CUNY semester, 360 (46%) enrolled in a remedial math course, and of these 360 students, 213 (59%) passed the course.

  In addition, of the 267 CUNY Start students who needed remediation in reading and/or writing upon entering their first CUNY semester, 170 (64%) enrolled in a remedial reading or writing course, and of these 170 students, 124 (73%) passed the course. Of the 748 comparison group students needing remediation in reading and/or writing in their first CUNY semester, 521 (70%) enrolled in a remedial reading or writing course, and of these 521 students, 370 (71%) passed the course.

CUMULATIVE POSTSECONDARY OUTCOMES

In order to examine cumulative postsecondary outcomes, we used Comparison Group Two to compare CUNY Start students' academic performance in their first and second semester to similar students who entered CUNY in the same semester. Tables 4.7 and 4.8 show postsecondary outcomes after one and two semesters, respectively. The data suggest that CUNY Start students attempt and earn more credits after two semesters, and have higher GPAs. CUNY Start students are also more likely to finish the semester with no remedial needs and be retained for a subsequent semester.

Table 4.7 First-Semester Postsecondary Outcomes of CUNY Start Students and Comparison Group Students

		First-Semester Postsecondary Outcomes				
Semester of CUNY Degree Enrollment		Credits Attempted	Credits Earned	GPA	Percent Who Finished Semester With No Remedial Needs	Percent Retained for a Second Semester
Spring 2010 - Spring 2012	N	Mean	Mean	Mean	%	%
CUNY Start Students	824	9.7**	7.5**	2.45**	54.2	79.7
Matched Comparison Group	824	5.0	3.3	2.08	7.5	67.8

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was constructed using a propensity score matching methodology, drawing from a pool of CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in spring 2010 through spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete placement exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

Table 4.8 Cumulative Outcomes of CUNY Start Students and Comparison Group Students, After Two Semesters in a Degree Program

		Postsecondary Outcomes after Two Semesters[1]				
Semester of CUNY Degree Enrollment		Credits Attempted	Credits Earned	GPA	Percent Who Finished Semester With No Remedial Needs	Percent Retained for a Third Semester
Spring 2010 - Spring 2012	N	Mean	Mean	Mean	%	%
CUNY Start Students	657	20.9**	16.8**	2.56**	60.4	78.8
Matched Comparison Group	559	13.0	9.5	2.15	15.4	70.3

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]The data presented is shown only for the subset of students who were retained for a second semester.

Note: The comparison group was constructed using a propensity score matching methodology, drawing from a pool of CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in spring 2010 through spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete placement exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

In order to compare cumulative postsecondary outcomes using an alternative methodology, Comparison Group Three was constructed by matching CUNY Start students who enrolled in CUNY in the following semester to first-time freshmen and advanced transfer students who entered CUNY degree programs between Fall 2009 and Fall 2011. Comparison Group Three allows us to compare outcomes of students who had experience with one semester of CUNY Start plus one semester in a CUNY degree program to students who enrolled for two semesters in a CUNY degree program. The purpose of this analysis is to determine if CUNY Start students "catch up" to comparison group students, despite delaying their degree studies to participate in CUNY Start.

Table 4.9 shows the cumulative credits earned and cumulative GPA of CUNY Start students at the end of their first semester in CUNY alongside similar outcomes for a comparison group after two CUNY semesters. For example, CUNY Start students who began the program in Fall 2010 and then entered CUNY in Spring 2011 earned an average of 9.3 credits with a 2.70 GPA by the end of the Spring semester. Comparison group students who entered CUNY the same time that CUNY Start students began the program (Fall 2010) earned an average of 11.1 credits with a 2.44 GPA after two semesters (Fall 2010 and Spring 2011). This suggests that CUNY Start students, after being enrolled in CUNY for one semester, earned only slightly fewer credits than comparison group students who were enrolled for two semesters.

Table 4.9 Cumulative Credits and GPA of CUNY Start Alumni and Comparison Group Students: Fall 2009 through Fall 2011

Entering CUNY Start Cohort		Cumulative Outcomes after Two Semesters: One Semester of CUNY Start + One Semester Enrolled in a CUNY Degree Program			
		Cumulative Credits Earned		Cumulative GPA	
Fall 2009	N	Mean		Mean	
CUNY Start Students	44	11.5		2.76	
Matched Comparison Group	44	12.0	*+0.5*	2.34	*-0.42*
Spring 2010	N	Mean		Mean	
CUNY Start Students	41	9.8		2.39	
Matched Comparison Group	41	8.5	*-1.3*	2.14	*-0.25*
Fall 2010	N	Mean		Mean	
CUNY Start Students	180	9.3*		2.70*	
Matched Comparison Group	180	11.1	*+1.8*	2.44	*-0.26*
Spring 2011	N	Mean		Mean	
CUNY Start Students	83	9.3		2.84*	
Matched Comparison Group	83	11.6	*+2.3*	2.43	*-0.41*
Fall 2011	N	Mean		Mean	
CUNY Start Students	437	8.2*		2.31**	
Matched Comparison Group	437	9.4	*+1.2*	1.88	*-0.43*
All Cohorts Combined	N	Mean		Mean	
CUNY Start Students	785	8.9**		2.47**	
Matched Comparison Group	785	10.1	*+1.2*	2.09	*-0.38*

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students began the program. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Fall 2009 through Fall 2011. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

Table 4.10 presents the results of two separate OLS regression models that estimate the impact of CUNY Start participation on cumulative credits earned and cumulative GPA after two semesters. Note that for CUNY Start students, the two semesters in this analysis include one semester of CUNY Start plus one semester in a CUNY degree program, while for comparison group students the two semesters include two semesters in a CUNY degree program. The models contain the same main independent variable (whether a student is a CUNY Start or comparison group student) and the same control variables, including initial remedial need and demographic characteristics. Results show that at the end of their first semester in a degree program, CUNY Start students earn only slightly fewer credits (2.04) than comparison group students earn after CUNY semesters, and CUNY Start students have a .30 points higher GPA.

Table 4.10 OLS Estimates of CUNY Start Participation on Cumulative Outcomes after Two Semesters

	Cumulative Credits Earned after Two Semesters	Cumulative GPA after Two Semesters
CUNY Start Participation	-2.039** (0.275)	0.301** (0.057)
Observations	1,570	1,492
R-squared	0.580	0.240

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Notes: Sample includes 785 CUNY Start students who enrolled in the program between Fall 2009 and Fall 2011 and enrolled in CUNY degree programs in the subsequent semester, as well as 785 comparison group students who enrolled in CUNY degree programs in the same semester that CUNY Start students entered CUNY Start. All models include the main effect of participating in CUNY Start and a set of covariates including initial remedial need, initial CUNY assessment exam scores, prior USIP experience, college and semester of enrollment, full-time/part-time CUNY enrollment status, race/ethnicity, gender, native language, country of origin, age, high school/GED type, months since high school graduation, borough of residence, NYC resident status (for tuition purposes), median neighborhood income (based on US Census Block), PELL/TAP receipt, college admissions average (CAA), and cumulative credits earned prior to enrolling in a CUNY degree program. Standard errors are in parentheses.

** p <.05 ** p < .01*

CUNY RETENTION OUTCOMES

In an attempt to better understand the retention of CUNY Start students at CUNY, the following tables present retention data for CUNY Start students and comparison group students. The methodology presented below uses Comparison Group One and considers students' first semester of enrollment to be their first experience at CUNY. In this case, the first semester of enrollment is defined as the semester of initial CUNY Start program participation for CUNY Start students, [14] and the semester of CUNY degree enrollment for comparison group students. System retention rates are calculated as the percentage of students who are still enrolled in CUNY Start *or* at any CUNY college in the subsequent semester(s) or who have earned a degree. This means that CUNY Start students who enroll in CUNY degree programs or re-enroll in CUNY Start are counted as being retained. This method allows for the analysis of

[14] A CUNY Start student is counted in this analysis if she/he is enrolled through the third week of classes (and is therefore counted as being officially enrolled).

retention based on which path similar students take into CUNY: CUNY Start or direct entry into a degree program. The benefit is that the comparison group in this study comes closest to a true counterfactual. A limitation of this method is that it does not take into account the extra steps CUNY Start students must take in order to transition from non-matriculated to matriculated status (i.e. obtaining financial aid, seeking advisement to register for courses, and fulfilling other enrollment requirements). Comparison group students can simply re-register for second-semester coursework.[15]

For third- and fourth-semester retention analyses presented below, retention calculations do not require consecutive semester enrollment. For instance, a student who entered CUNY in Fall 2011 is counted as being retained for a third semester if she/he is enrolled in Fall 2012, regardless of Spring 2012 enrollment status. This method closely resembles the methodology of CUNY's Office of Institutional Research and Assessment (OIRA). For future reports, we hope to analyze retention in greater detail and to explore impacts of consecutive enrollment.

Retention results reveal that CUNY Start students had slightly lower second-semester retention rates than comparison group students (68.8% vs. 74.7%). This is likely a result of the fact that not all CUNY Start students enroll in CUNY degree programs in the very next semester. When CUNY Start students do enter CUNY degree programs, they are retained at higher rates, and their retention rates catch up to and eventually surpass those of comparison group students. For example, when looking at the Fall 2009 through Fall 2011 entering cohorts, CUNY Start students had third- and fourth-semester retention rates of 60.7% and 51.6%, respectively, while comparison group students had third-and fourth-semester rates of 59.0% and 49.2%, respectively.

Table 4.11 CUNY System Retention of CUNY Start Students and Comparison Group Students

Semester Enrolled in CUNY Start or CUNY Degree Program	Total Students Enrolled	CUNY System Retention[1]					
		Retained for Second Semester		Retained for Third Semester		Retained for Fourth Semester	
		#	%	#	%	#	%
Fall 2009 - Spring 2012							
CUNY Start Students	1,654	1,138	68.8%	967	58.5%	-	-
Matched Comparison Group	1,654	1,235	74.7%	976	59.0%	-	-
Fall 2009 - Fall 2011							
CUNY Start Students	1,222	853	69.8%	742	60.7%	630	51.6%
Matched Comparison Group	1,222	942	77.1%	721	59.0%	601	49.2%

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]System Retention rates for this analysis are calculated as the percentage who are still enrolled at any CUNY/CUNY Start college in the subsequent term(s) or have earned a degree.

Note: The comparison group was matched using propensity score methods, using a pool of CUNY students who entered CUNY in the same term that CUNY Start students entered CUNY Start. Comparison group students entered CUNY as full-time, first-time freshmen or advanced transfer students in fall 2009 through spring 2012. Students not needing remediation, students enrolled in ASAP, transfer students with prior degrees and/or over 24 earned credits and students having incomplete placement exam/exemption data were excluded from the pool of matches.

[15] This is just one method of calculating retention. We present retention results using alternative methodologies in Appendix A.

Table 4.12 CUNY System Retention Rates with Cumulative Credits Earned and GPA[1]

	CUNY System Retention with Cumulative Credits Earned and GPA[1]												
Semester Enrolled in CUNY Start or CUNY Degree Program	Total Students Enrolled	Retained for Second Semester		Credits Earned	GPA	Retained for Third Semester		Credits Earned	GPA	Retained for Fourth Semester		Credits Earned	GPA
Fall 2009 - Spring 2012		#	%	Mean	Mean	#	%	Mean	Mean	#	%	Mean	Mean
CUNY Start Students	1,654	1,138	68.8%	7.3	2.47	967	58.5%	-	-	-	-	-	-
Matched Comparison Group	1,654	1,235	74.7%	9.9	2.14	976	59.0%	-	-	-	-	-	-
Fall 2009 - Fall 2011													
CUNY Start Students	1,222	853	69.8%	7.4	2.48	742	60.7%	15.5	2.48	630	51.6	-	-
Matched Comparison Group	1,222	942	77.1%	10.0	2.15	721	59.0%	17.6	2.34	601	49.2	-	-
Fall 2009 - Spring 2011													
CUNY Start Students	543	362	66.7%	8.4	2.71	324	59.7%	16.8	2.61	277	51.0%	26.3	2.75
Matched Comparison Group	543	405	74.6%	11.3	2.42	312	57.5%	19.2	2.58	257	47.3%	28.0	2.60

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]System Retention rates for this analysis are calculated as the percentage who are still enrolled at any CUNY/CUNY Start college in the subsequent term(s) or have earned a degree. Cumulative credits earned and cumulative GPAs are only calculated for students who were retained in the specified semester and were enrolled in CUNY degree programs.

Note: The comparison group was matched using propensity score methods, using a pool of CUNY students who entered CUNY in the same term that CUNY Start students entered CUNY Start. Comparison group students entered CUNY as full-time, first-time freshmen or advanced transfer students in fall 2009 through spring 2012. Students not needing remediation, students enrolled in ASAP, transfer students with prior degrees and/or over 24 earned credits and students having incomplete placement exam/exemption data were excluded from the pool of matches.

Table 4.13 CUNY System Retention of CUNY Start Students and Comparison Group Students: **By Number of Initial Remedial Needs**

	Semester Enrolled in CUNY Start or CUNY Degree Program	Total Students Enrolled	CUNY System Retention[1]					
			Retained for Second Semester		Retained for Third Semester		Retained for Fourth Semester	
			#	%	#	%	#	%
One Remedial Need	**Fall 2009 - Spring 2012**							
	CUNY Start Students	195	149	76.4%	131	67.2%	-	-
	Matched Comparison Group	195	142	72.8%	115	59.0%	-	-
	Fall 2009 - Fall 2011							
	CUNY Start Students	149	113	75.8%	103	69.1%	83	55.7%
	Matched Comparison Group	149	109	73.2%	87	58.4%	76	51.0%
Two Remedial Needs	**Fall 2009 - Spring 2012**							
	CUNY Start Students	647	445	68.8%	380	58.7%	-	-
	Matched Comparison Group	647	478	73.9%	374	57.8%	-	-
	Fall 2009 - Fall 2011							
	CUNY Start Students	492	351	71.3%	308	62.6%	256	52.0%
	Matched Comparison Group	492	381	77.4%	285	57.9%	237	48.2%
Three Remedial Needs	**Fall 2009 - Spring 2012**							
	CUNY Start Students	812	544	67.0%	456	56.2%	-	-
	Matched Comparison Group	812	615	75.7%	487	60.0%	-	-
	Fall 2009 - Fall 2011							
	CUNY Start Students	581	389	67.0%	331	57.0%	291	50.1%
	Matched Comparison Group	581	452	77.8%	349	60.1%	288	49.6%

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]System Retention rates for this analysis are calculated as the percentage who are still enrolled at any CUNY/CUNY Start college in the subsequent term(s) or have earned a degree.

Note: The comparison group was matched using propensity score methods, using a pool of CUNY students who entered CUNY in the same term that CUNY Start students entered CUNY Start. Comparison group students entered CUNY as full-time, first-time freshmen or advanced transfer students in fall 2009 through spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete placement exam/exemption data were excluded from the pool of matches.

PART FIVE:

Subgroup Analysis by CUNY Start Program Type

In order to assess whether the effects of CUNY Start program participation vary by whether students enrolled in the full- or part-time program, Table 5.1 presents skills area proficiency gains for CUNY Start and comparison group students, disaggregated by CUNY Start program type. Note that all CUNY Start students in the analyses below are matched to full-time comparison group students, and that the full-time / part-time categorization only applies to CUNY Start students. Therefore, the matched comparison group students under the "Part-Time" heading are full-time CUNY students matched to students in the part-time CUNY Start program. The results suggest that CUNY Start students were more likely than comparison group students to achieve proficiency in reading, writing, and math, regardless of whether they participated in the full- or part-time program.

Table 5.1 Skill Area Proficiency Gains of CUNY Start Students and Comparison Group Students: **By CUNY Start Program Type**

	% Achieving Reading Proficiency[1]		% Achieving Writing Proficiency[2]		% Achieving Math Proficiency[3]	
Full-Time	N	%	N	%	N	%
CUNY Start Students	643	58.2	908	63.0	958	51.7
Matched Comparison Group	643	31.3	908	25.6	958	10.1
Part-Time[4]	N	%	N	%	N	%
CUNY Start Students	239	54.8	367	59.1	396	56.1
Matched Comparison Group	239	38.1	367	27.5	396	10.4

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]Percentage of students achieving proficiency in reading at the end of the first semester (in CS or in CUNY) by taking and passing the CUNY assessment exam. All students are included in the denominator, including those who did not re-take an exam.

[2]Percentage of students achieving proficiency in writing at the end of the first semester (in CS or in CUNY) by taking and passing the CUNY assessment exam. All students are included in the denominator, including those who did not re-take an exam.

[3]Percentage of students achieving proficiency in math at the end of the first semester (in CS or in CUNY) by taking and passing the COMPASS Math 2 (algebra) assessment exam. For Spring 2011 and later, comparison group pass rates reflect the number of students who passed the COMPASS Math 2 exam or passed the last-in-sequence math course (grade C or better).

[4]All CUNY Start students, including those from the part-time program, are matched to full-time comparison group students.

Note: The comparison group was matched using propensity score methods, using a pool of full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students exempt from remediation in writing, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.

Tables 5.2 and 5.3 below present postsecondary outcomes disaggregated by CUNY enrollment status. For these analyses, the full-time / part-time categorization refers to students' enrollment status in a CUNY degree program, not their CUNY Start program type. This means that CUNY Start students who enrolled in CUNY as full-time students are matched to full-time comparison group students, and CUNY Start students who enrolled in CUNY as part-time students are matched to part-time comparison group students. Table 5.2 shows that for both full- and part-time students, CUNY Start was associated with a greater number of credits attempted and earned in their first semester than comparison group students. CUNY Start students also earned higher GPAs, although the differences were only statistically significant for full-time students.

Table 5.2 First-Semester Postsecondary Outcomes of CUNY Start Students and Comparison Group Students: **By CUNY Enrollment Status**

		First-Semester Postsecondary Outcomes					
		Credits Attempted	Credits Earned	Equated Credits Attempted	Equated Credits Passed	Proportion of Non-Remedial Credits Attempted	GPA
Full-Time CUNY Students	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	629	10.9**	8.5**	14.3**	10.2*	0.77**	2.44**
Matched Comparison Group	629	5.7	3.8	15.1	9.5	0.38	2.04
Part-Time CUNY Students	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	195	5.5**	4.2**	7.6*	5.6	0.74**	2.49
Matched Comparison Group	195	2.7	1.9	8.2	5.1	0.36	2.29

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

Table 5.3 shows that CUNY Start students, after being enrolled in CUNY for one semester, earned only slightly fewer credits than comparison groups who were enrolled for two semesters. The differences in credits earned were slightly higher among part-time students.

Table 5.3 Cumulative Credits and GPA of CUNY Start Students and Comparison Group Students: **By CUNY Enrollment Status**

CUNY Start Program		Cumulative Outcomes after Two Semesters: One Semester of CUNY Start + One Semester Enrolled in a CUNY Degree Program			
		Cumulative Credits Earned		Cumulative GPA	
Full-Time CUNY Students	N	Mean		Mean	
CUNY Start Students	600	9.8*		2.47**	
Matched Comparison Group	600	10.9	***+1.1***	2.11	***-0.36***
Part-Time CUNY Students	N	Mean		Mean	
CUNY Start Students	185	5.8*		2.47**	
Matched Comparison Group	185	7.7	***-1.9***	2.03	***-0.44***

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students began the program. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Fall 2009 through Fall 2011. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/ exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

PART SIX:

Subgroup Analysis by College

The following tables provide remedial outcomes data disaggregated by college. For these analyses we created a new comparison group that forced matched students from the same college (e.g., CUNY Start students who enrolled in the program at BMCC were only matched with comparison group students at BMCC). Due to small sample sizes, college by college comparisons should be made with caution, but the results suggest that CUNY Start students were more likely than comparison group students to achieve proficiency in reading, writing, or math, regardless of college.

Table 6.1. Reading Proficiency Gains by College

	CUNY Start Students		Matched Comparison Group[1]		
Proficiency Gains in Reading[2]	N	% Achieving proficiency	N	% Achieving proficiency after One Semester	
College					
BMCC	160	61.3	160	30.6	*-30.7*
Bronx	71	46.5	71	22.5	*-24.0*
College of Staten Island	49	44.9	49	38.8	*-6.1*
Hostos	155	51.6	155	29.0	*-22.6*
Kingsborough	110	67.3	110	23.6	*-43.7*
LaGuardia	236	65.3	236	36.4	*-28.9*
Queensborough	76	47.4	76	34.2	*-13.2*

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1] Matched comparison group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students exempt from remediation in reading, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.

[2] Percentage of students achieving exemption in reading at the end of the first semester (in CS or in CUNY) by taking and passing the CUNY assessment exam. All students are included in the denominator, including those who did not re-take an exam.

Table 6.2 Writing Proficiency Gains by College

	CUNY Start Students		Matched Comparison Group[1]		
Proficiency Gains in Writing[2]	N	% Achieving proficiency	N	% Achieving proficiency after One Semester	
College					
BMCC	233	54.5	233	32.2	*-22.3*
Bronx	86	50.0	86	16.3	*-33.7*
College of Staten Island	60	51.7	60	31.7	*-20.0*
Hostos	219	66.7	219	32.0	*-34.7*
Kingsborough	219	69.9	219	20.1	*-49.8*
LaGuardia	348	67.2	348	29.0	*-38.2*
Queensborough	83	55.4	83	19.3	*-36.1*

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1] Matched comparison group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students exempt from remediation in writing, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.

[2] Percentage of students achieving exemption in writing at the end of the first semester (in CS or in CUNY) by taking and passing the CUNY assessment exam. All students are included in the denominator, including those who did not re-take an exam.

Table 6.3. Math Proficiency Gains by College

	CUNY Start Students		Matched Comparison Group[1]		
Proficiency Gains in Math[2]	N	% Achieving proficiency	N	% Achieving proficiency after One Semester	
College					
BMCC	289	57.1	289	15.2	*-41.9*
Bronx	87	40.2	87	4.6	*-35.6*
College of Staten Island	70	24.3	70	7.1	*-17.2*
Hostos	220	45.0	220	9.5	*-35.5*
Kingsborough	221	61.5	221	3.6	*-57.9*
LaGuardia	352	62.2	352	19.6	*-42.6*
Queensborough	88	43.2	88	1.1	*-42.1*

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1] Matched comparison group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students exempt from remediation in math, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.

[2]Percentage of students achieving proficiency in math at the end of the first semester (in CS or in CUNY) by taking and passing the COMPASS Math 2 (algebra) assessment exam. For Spring 2011 and later, pass rates reflect the number of students who passed the COMPASS Math 2 exam or passed the last-in-sequence math course (grade C or better).

Table 6.4a Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **BMCC**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	162	14.2	24.7	29.6	31.5
Initial Remedial Need in Two Areas	159		16.4	52.2	31.4
Initial Remedial Need in One Area	91			63.7	36.3
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	162	0.6	15.4	32.1	51.9
Initial Remedial Need in Two Areas	159		10.1	34.6	55.3
Initial Remedial Need in One Area	91			28.6	71.4

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 6.4b Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **Bronx Community College**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	70	24.3	22.9	15.7	37.1
Initial Remedial Need in Two Areas	17		29.4	41.2	29.4
Initial Remedial Need in One Area	0				
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	70	0.0	11.4	24.3	64.3
Initial Remedial Need in Two Areas	17		0.0	5.9	94.1
Initial Remedial Need in One Area	0				

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 6.4c Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **College of Staten Island**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	39	5.1	30.8	25.6	38.5
Initial Remedial Need in Two Areas	31		25.8	45.2	29.0
Initial Remedial Need in One Area	0				
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	39	2.6	17.9	25.6	53.8
Initial Remedial Need in Two Areas	31		0.0	51.6	48.4
Initial Remedial Need in One Area	0				

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 6.4d Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **Hostos**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	162	13.0	28.4	20.4	38.3
Initial Remedial Need in Two Areas	126		10.3	55.6	34.1
Initial Remedial Need in One Area	65			63.1	36.9
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	162	1.9	15.4	23.5	59.3
Initial Remedial Need in Two Areas	126		8.7	45.2	46.0
Initial Remedial Need in One Area	65			15.4	84.6

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 6.4e Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **KBCC**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	108	38.0	27.8	13.0	21.3
Initial Remedial Need in Two Areas	113		67.3	12.4	20.4
Initial Remedial Need in One Area	0				
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	108	0.0	5.6	18.5	75.9
Initial Remedial Need in Two Areas	113		0.9	38.1	61.1
Initial Remedial Need in One Area	0				

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 6.4f Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **LaGuardia**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	196	25.5	32.1	20.4	21.9
Initial Remedial Need in Two Areas	197		45.7	36.0	18.3
Initial Remedial Need in One Area	63			63.5	36.5
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	196	1.0	13.8	33.2	52.0
Initial Remedial Need in Two Areas	197		11.2	46.7	42.1
Initial Remedial Need in One Area	63			33.3	66.7

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 6.4g Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **Queensborough**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	71	21.1	28.2	15.5	35.2
Initial Remedial Need in Two Areas	17		47.1	47.1	5.9
Initial Remedial Need in One Area	0				
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	71	0.0	14.1	23.9	62.0
Initial Remedial Need in Two Areas	17		0.0	35.3	64.7
Initial Remedial Need in One Area	0				

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

The following tables provide postsecondary outcomes data disaggregated by college. For these analyses we created a new comparison group that forced matched students from the same college of degree enrollment (e.g., CUNY Start students who enrolled in a degree program at BMCC were only matched with comparison group students at BMCC). While most CUNY Start students enroll in the same college where they participated in CUNY Start, some students do enroll in degree programs at different CUNY colleges. College-specific results are only shown for the colleges that have a CUNY Start program, because very few CUNY Start students enroll in degree programs at non-CUNY Start campuses. Due to small sample sizes, college by college comparisons should be made with caution, but the results suggest that CUNY Start students attempt and earn more credits in their first semester than comparison group students, regardless of college, and also have higher GPAs.

Table 6.5 Postsecondary Outcomes of CUNY Start Students and Comparison Group Students: **By College of Degree Enrollment**

Entering College		First-Semester Postsecondary Outcomes					
		Credits Attempted	Credits Earned	Equated Credits Attempted	Equated Credits Passed	Proportion of Non-Remedial Credits Attempted	GPA
BMCC	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	177	8.1**	6.7**	12.0	8.9**	0.69**	2.73**
Matched Comparison Group	177	3.7	2.6	12.5	7.3	0.30	2.33
Bronx	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	49	7.3**	5.7**	12.7	8.7	0.59**	2.58**
Matched Comparison Group	49	3.1	1.8	13.2	7.4	0.22	1.81
College of Staten Island	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	36	9.9**	7.6**	12.3	8.8	0.82**	1.89
Matched Comparison Group	36	7.5	4.8	13.3	8.6	0.57	1.85
Hostos	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	104	9.4**	7.3**	11.9**	8.4	0.80**	2.62*
Matched Comparison Group	104	7.3	4.4	13.6	7.7	0.55	2.20
Kingsborough	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	146	13.3**	9.7**	15.0	10.5	0.89**	2.36
Matched Comparison Group	146	8.2	6.0	14.7	9.9	0.55	2.26
LaGuardia	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	242	9.4**	7.4**	12.3*	9.2	0.76**	2.40**
Matched Comparison Group	242	3.4	2.2	13.3	8.3	0.27	2.00
Queensborough	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	40	8.6**	5.2*	12.8	7.1	0.67**	1.70
Matched Comparison Group	40	5.1	3.1	12.3	7.2	0.40	1.78

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

PART SEVEN:

Subgroup Analysis by Race/Ethnicity

The following tables provide proficiency gains disaggregated by initial remedial need and race/ethnicity. For these analyses we created a new comparison group for each of the race/ethnicity categories: Asian, black, Hispanic, and white. This method allows us to estimate the impact of CUNY Start within these categories, taking into account variables that might uniquely impact students within an individual race/ethnicity category.

Tables 7.1a through 7.1d illustrate that the differences in proficiency gains between CUNY Start participants and comparison group students hold across race groups. In other words, for all race/ethnicity groups, CUNY Start participants achieved proficiency in more areas than comparison group students from the same race/ethnicity group.

Table 7.1a Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **Asian**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	90	26.7	25.6	24.4	23.3
Initial Remedial Need in Two Areas	74		60.8	32.4	6.8
Initial Remedial Need in One Area	24			70.8	29.2
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	90	3.3	16.7	21.1	58.9
Initial Remedial Need in Two Areas	74		14.9	44.6	40.5
Initial Remedial Need in One Area	24			41.7	58.3

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 7.1b Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **Black**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	262	15.6	29.8	21.4	33.2
Initial Remedial Need in Two Areas	217		28.1	41.0	30.9
Initial Remedial Need in One Area	70			61.4	38.6
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	262	0.4	10.7	33.2	55.7
Initial Remedial Need in Two Areas	217		6.5	47.5	46.1
Initial Remedial Need in One Area	70			20.0	80.0

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 7.1c Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **Hispanic**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	388	21.1	26.3	19.3	33.2
Initial Remedial Need in Two Areas	285		27.0	45.3	27.7
Initial Remedial Need in One Area	101			63.4	36.6
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	388	0.5	13.7	24.7	61.1
Initial Remedial Need in Two Areas	285		13.0	35.1	51.9
Initial Remedial Need in One Area	101			22.8	77.2

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 7.1d Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **White**

		Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
CUNY Start	N	%	%	%	%
Initial Remedial Need in All Areas	85	28.2	30.6	21.2	20.0
Initial Remedial Need in Two Areas	86		50.0	30.2	19.8
Initial Remedial Need in One Area	21			66.7	33.3
Matched Comparison Group after One Semester[1]	N	%	%	%	%
Initial Remedial Need in All Areas	85	0.0	22.4	30.6	47.1
Initial Remedial Need in Two Areas	86		12.8	39.5	47.7
Initial Remedial Need in One Area	21			38.1	61.9

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 7.2 below present postsecondary outcomes disaggregated by race. For these analyses we created a new comparison group that forced matched students from the same race (e.g., Asian CUNY Start students who enrolled in CUNY degree programs after participating in CUNY Start were only matched with Asian comparison group students).

Again, when disaggregated by race, the data show favorable outcomes for CUNY Start students across race/ethnicity groups when compared to similar students who did not participate. Table 7.2 shows that, for all race/ethnicity groups, CUNY Start participants attempt and earn more credits than their peers. With the exception of white students, for whom there is no statistical difference between groups, CUNY Start students also have higher GPAs, on average, than students in the comparison group.

Table 7.2 Postsecondary Outcomes of CUNY Start Students and Comparison Group Students: **By Race/Ethnicity**

Race/Ethnicity		First Semester Postsecondary Outcomes					
		Credits Attempted	Credits Earned	Equated Credits Attempted	Equated Credits Passed	Proportion of Non-Remedial Credits Attempted	GPA
Asian	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	117	10.4**	8.2**	12.9	9.7	0.78**	2.77*
Matched Comparison Group	117	4.8	3.6	12.9	8.7	0.37	2.34
Black	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	247	9.9**	7.5**	12.7	8.9*	0.76**	2.42**
Matched Comparison Group	247	5.5	3.6	13.3	7.6	0.43	1.90
Hispanic	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	332	9.0**	7.0**	12.5	9.1**	0.73**	2.37**
Matched Comparison Group	332	4.8	2.9	13.1	7.6	0.38	2.02
White	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	122	10.4**	7.9**	12.8	9.3	0.82**	2.49
Matched Comparison Group	122	4.7	3.4	13.8	9.5	0.35	2.38

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

PART EIGHT:

Subgroup Analysis by Gender

Table 8.1 provides proficiency gains disaggregated by initial remedial need and gender. For these analyses we created separate comparison groups for males and females. This method allows us to estimate the impact of CUNY Start for each gender, taking into account variables that might uniquely impact males and females. We found no significant differences in outcomes by gender. The results indicate that CUNY Start participants achieved proficiency in more areas than comparison group students, regardless of gender.

Table 8.1 Total Number of Skill Area Proficiencies Achieved by Initial Remedial Need: **By Gender**

			Achieved Proficiency in **ALL** Areas	Achieved Proficiency in **Two** Areas	Achieved Proficiency in **One** Area	Achieved Proficiency in **No** Areas
Males	**CUNY Start**	N	%	%	%	%
	Initial Remedial Need in All Areas	372	21.8	27.7	19.9	30.6
	Initial Remedial Need in Two Areas	303		37.0	35.6	27.4
	Initial Remedial Need in One Area	89			59.6	40.4
	Matched Comparison Group after One Semester[1]	N	%	%	%	%
	Initial Remedial Need in All Areas	372	0.0	3.5	9.1	87.4
	Initial Remedial Need in Two Areas	303		2.6	10.6	86.8
	Initial Remedial Need in One Area	89			1.1	98.9
Females	**CUNY Start**	N	%	%	%	%
	Initial Remedial Need in All Areas	459	19.6	28.1	21.4	30.9
	Initial Remedial Need in Two Areas	362		31.8	44.5	23.8
	Initial Remedial Need in One Area	130			66.2	33.8
	Matched Comparison Group after One Semester[1]	N	%	%	%	%
	Initial Remedial Need in All Areas	459	0.7	3.3	7.0	89.1
	Initial Remedial Need in Two Areas	362		2.8	9.4	87.8
	Initial Remedial Need in One Area	130			3.8	96.2

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]*Propensity score matched group out of a pool of all full-time, first-time freshmen and advanced transfer students in associate degree programs in Fall 2009 through Spring 2012. Students not needing remediation, students enrolled in ASAP, and transfer students with prior degrees and/or over 24 earned credits are excluded.*

Note: The number of remedial needs and proficiency areas is out of three total: Reading, Writing, and Math. Proficiency gains in each skills area are calculated for all CUNY Start students, including those enrolled part-time.

Table 8.2 presents postsecondary outcomes disaggregated by gender. For these analyses we created a new comparison group that forced matched students from the same gender (e.g., male CUNY Start students who enrolled in CUNY degree programs after participating in CUNY Start were only matched with male comparison group students). Table 8.2 shows that, for both females and males, CUNY Start was associated with a greater number of credits attempted and earned in their first semester than comparison group students. CUNY Start students also earned higher GPAs, although the differences were only statistically significant for females.

Table 8.2 Postsecondary Outcomes of CUNY Start Students and Comparison Group Students: **By Gender**

		First Semester Postsecondary Outcomes					
Semester of CUNY Degree Enrollment		Credits Attempted	Credits Earned	Equated Credits Attempted	Equated Credits Passed	Proportion of Non-Remedial Credits Attempted	GPA
Female	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	459	9.6**	7.7**	12.6**	9.4	0.77**	2.56**
Matched Comparison Group	459	5.3	3.7	13.5	8.9	0.40	2.26
Male	N	Mean	Mean	Mean	Mean	Mean	Mean
CUNY Start Students	365	9.7**	7.2**	12.8	8.8	0.75**	2.32
Matched Comparison Group	365	4.9	3.3	13.1	8.4	0.38	2.14

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches. Certificate students were also excluded from the above analyses.

** p <.05 ** p < .01*

PART NINE:

Falsification Tests

Although propensity score matching attempts to minimize bias, there could still be systematic differences in other factors across the CUNY Start students and matched comparison groups (such as motivation and unobserved academic ability) that could influence the results of our analysis. If these differences between the CUNY Start students and comparison group students are correlated with the outcomes being examined, they will potentially bias our findings.

While it is impossible to exhaustively consider all sources of bias, we can provide evidence to support the general reliability of our findings using a set of falsification tests. The logic of these tests is well illustrated by the following example. Suppose that there are unobserved differences between CUNY Start students and the comparison group students, such as their aptitude for mathematics, and that these differences affect student achievement on math exams but are not well accounted for by any of our matching variables. This would lead to bias in our outcomes for student achievement; however, this bias would not be unique to the years *immediately following* participation in the CUNY Start program. We would expect that such differences between CUNY Start and comparison group students would also affect math achievement *prior* to CUNY Start.

In order to test whether or not unobserved differences have produced potential bias, we examined whether participation in CUNY Start is a significant predictor of performance on English Language Arts (ELA) and math assessments *prior* to students' CUNY Start or CUNY enrollment. For the subset of the CUNY Start and matched comparison group students who recently graduated from NYC public high schools—approximately one-third of all students in both groups— we were able to obtain New York State Grade 8 ELA and math test scores and high school Regents Exam scores. If we were to find a statistically significant association between CUNY Start participation and higher performance on ELA or math assessments prior to CUNY Start, we would have reason to worry that our results were potentially biased. Any correlation between higher exam scores and participation in CUNY Start would indicate that our matching had failed to account for meaningful differences between the two groups, differences that would potentially lead to higher scores on CUNY reading, writing, and math assessment exams and better postsecondary outcomes for CUNY Start students.

Based on our falsification tests, we find no evidence that our results are driven by unobserved differences between the groups. Among students who recently graduated from a NYC public high school, CUNY Start is not statistically associated with performance on prior ELA and math exams. CUNY Start participation has no significant predictive power in estimating student achievement prior to CUNY Start. Table 9.1 shows the estimated "effects" of CUNY Start participation on prior assessment scores. None of the regression coefficients are statistically significant, meaning that they are statistically indistinguishable from zero.

Table 9.1 Falsification Estimates of the Effect of CUNY Start Participation on Prior Exam Scores

	8th Grade NY State ELA Exam (z) Score		8th Grade NY State Math Exam (z) Score		NY Regents ELA Exam (z) Score		NY Regents Math Exam (z) Score	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CUNY Start Participation	-0.116	-0.045	-0.086	0.011	-0.074	-0.003	-0.092	0.107
	(0.071)	(0.054)	(0.067)	(0.052)	(0.060)	(0.062)	(0.060)	(0.067)
Inclusion of Covariates		**X**		**X**		**X**		**X**
Observations	803	779	881	779	1,126	779	1,109	779
R-squared	0.003	0.525	0.002	0.523	0.001	0.415	0.002	0.332

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Notes: Sample includes 587 CUNY Start students who enrolled in the program between Fall 2009 and Spring 2012, and 543 comparison group students who enrolled in CUNY degree programs in the same semester that CUNY Start students entered CUNY Start. All 1,130 students in the sample had graduated from a NYC public high school within 27 months of entering CUNY Start or a CUNY degree program. Covariates include: initial remedial need, initial CUNY assessment exam scores, college and semester of enrollment, race/ethnicity, gender, native language, country of origin, age, borough of residence, median neighborhood income (based on US Census Block), and free/reduced price lunch status. Standard errors are in parentheses.

** p <.05 ** p < .01*

PART TEN:

Discussion

A large percentage of students entering CUNY community colleges nationwide are underprepared for college-level work and are placed into developmental education courses. Many students never successfully complete required developmental courses much less earn a degree. As a response, the CUNY Start program was carefully designed to both minimize the amount of required remedial coursework underprepared students must take and to foster higher levels of persistence and graduation once students start their degree programs.

As the program expands to more students and a new CUNY campus in the fall, it is important to evaluate the impact of CUNY Start. The analyses presented here provide the first comprehensive, rigorous evaluation of CUNY Start and its impact on students' basic skills development and initial postsecondary performance and persistence. By studying a large, diverse sample of students who participated in CUNY Start across multiple time periods and colleges, this report provides a thorough analysis of program outcomes. Propensity score matching methods and regression analyses, coupled with multiple falsification tests, provide solid statistical evidence of the program's impact.

Results of the study are very encouraging. CUNY Start students were significantly more likely to achieve proficiency in reading, writing, and math, in comparison to a similar group of students who did not enroll in the program. Once CUNY Start students began a degree program, they attempted and earned more credits than comparison group students after one semester, and had higher GPAs. These positive effects are evident across subpopulations of student (by race and gender) and program types.

Despite these positive initial findings, CUNY Start is still a relatively new program and we do not yet have clear evidence of the long-term impacts. While our analyses of second- and third-semester retention are encouraging, more time is needed to track students through their degree programs to graduation. Ongoing research is needed to understand the experiences and challenges these students face at CUNY and what programs can help support them along the way. Additional research is also needed to carefully examine the full scope of the benefits of CUNY Start for students from various educational, socio-economic, and cultural backgrounds. While many students clearly benefit from CUNY Start, not all complete the program and others never subsequently enroll in a degree program. Understanding the experiences of *all* students who enroll in CUNY Start – not just those who complete – will be an important part of the ongoing evaluation work moving forward as the program continues to develop and improve. Understanding the transition process from CUNY Start to a degree program should be an important goal of program leaders and evaluators.

Finally, we realize that CUNY Start is one of several programs that help support CUNY students' progress toward a degree. It will be important to clearly understand the pathways and programmatic linkages between CUNY Start and other promising programs, such as ASAP, USIP, SEEK, and College Discovery.

References

Agodini, R. & Dynarski, M. (2004). "Are Experiments the Only Option? A Look at Dropout Prevention Programs." *The Review of Economics and Statistics 86*, 1: 180-194.

Bailey, T., Jeong, D. W. & Cho, S. (2010). "Referral, Enrollment, and Completion in Developmental Education Sequences in Community Colleges." *Economics of Education Review 29*: 255-270.

Bettinger, E. & Long, B.T. (2009). "Addressing the Needs of Underprepared Students in Higher Education: Does College Remediation Work?" *Journal of Human Resources 44*, 3: 736-771.

CUNY Office of Academic Affairs (2011). "Proposals to Improve Success Rates for Students in Developmental Education at CUNY: Report of the Working Group on Remediation." Retrieved from: *http://www1.cuny.edu/mu/academic-news/files/2011/08/ReportoftheRemediationWorkingGroup.pdf*

Edgecombe, Nikki (2011). "Accelerating the Academic Achievement of Students Referred to Developmental Education." Draft CCRC Working Paper.

Jaggars, S. and Hodara, M. (2011). "The Competing Aims of Developmental Education: Assessment, Placement, and Progression at CUNY Community Colleges." Draft CCRC Working Paper.

Thoemmes, F. & Kim, E. (2011). "A Systematic Review of Propensity Score Methods in the Social Sciences." *Multivariate Behavioral Research 46*, 1: 90-118.

Titus, M. (2007). "Detecting Selection Bias, Using Propensity Score Matching, and Estimating Treatment Effects: An Application to the Private Returns to a Master's Degree." *Research in Higher Education 48*, 4: 487-521.

Rosenbaum, P. & Rubin, D. (1983). "The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika 70*: 41-55.

Rutschow, E.Z. & Schneider, E. (2011). *Unlocking the Gate: What We Know About Improving Developmental Education*. New York: MDRC.

Appendix: Additional Retention Analyses

In an attempt to better understand the retention of CUNY Start students at CUNY, the following tables present retention data for CUNY Start students and comparison group students based on two additional methodologies.

- The first method uses Comparison Group Two and calculates CUNY system retention rates for CUNY Start students and comparison group students who entered CUNY degree programs between Spring 2010 and Spring 2012. System retention rates are calculated as the percentage of students who are still enrolled at any CUNY college in the subsequent semester(s) or who have earned a degree. By starting the retention clock at the term of first degree enrollment, one can evaluate CUNY Start and comparison group students as they similarly progress through semesters, degree programs, financial aid disbursements, and college course offerings at the same time. A limitation is that only CUNY Start students who enroll in CUNY degree programs as matriculated students (a subset of all CUNY Start *enrollees*) can be included in this analysis.

- The second method is similar to the method presented in the body of this report (which defines the first semester of enrollment as the semester of initial CUNY Start program participation for CUNY Start students and the semester of CUNY degree enrollment for comparison group students), but includes only completers from both groups. Completers are defined as CUNY Start students who have completed at least 12 weeks of core instruction and have retaken any required CUNY Assessment Tests, and for comparison group students those who have not withdrawn, officially or unofficially, from their first-semester courses as matriculated CUNY students. This required the creation of a new comparison group, matching CUNY Start completers to comparison group completers. The benefit of method three is that it allows for the analysis based on CUNY Start students who received the full treatment. Including only completers in both the CUNY Start and comparison group also attempts to account for unobservable confounding variables, such as motivation, that might be correlated with completion. A limitation of this method is that only completers (a subset of all CUNY Start *enrollees*) can be included in this analysis, and thus the retention rates only reflect outcomes for a subset of students and not all students who initially enrolled in CUNY Start.

The three methodologies for calculating retention are summarized below in Table A.1. Detailed retention results are then shown for the two alternative methods separately in the tables that follow.

Table A.1 CUNY System Retention: Comparison of Methods and Outcomes

		% Retained for Second Semester	% Retained for Third Semester	% Retained for Fourth Semester
Method 1 [1]				
First-Semester Enrollment: Defined as the Semester of CUNY Degree or CUNY Start Enrollment	CUNY Start	68.8%	58.5%	51.6%
	Comparison Group	74.7%	59.0%	49.2%
Method 2				
First-Semester Enrollment: Defined as the Semester of CUNY Degree Enrollment	CUNY Start	79.8%	64.7%	-
	Comparison Group	67.2%	55.6%	-
Method 3				
First-Semester Enrollment: Defined as the Semester of CUNY Degree or CUNY Start Enrollment (Completers Only)	CUNY Start	76.7%	67.6%	59.0%
	Comparison Group	76.6%	61.4%	51.0%

[1] *Method 1 was presented in the main Retention section of this report.*

Method Two

First-Semester Enrollment: Defined as the Semester of CUNY Degree Enrollment

Table A.2 CUNY System Retention of CUNY Start Students and Comparison Group Students

Semester of CUNY Degree Enrollment	Total Students Enrolled	CUNY System Retention[1]			
		Retained for Second Semester		Retained for Third Semester	
		#	%	#	%
Spring 2010 - Spring 2012					
CUNY Start Students	841	671	79.8%	-	-
Matched Comparison Group	841	565	67.2%	-	-
Spring 2010 - Fall 2011					
CUNY Start Students	385	307	79.7%	249	64.7%
Matched Comparison Group	385	277	71.9%	214	55.6%

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1] *System retention rates are calculated as the percentage of students who are still enrolled at any CUNY college in the subsequent semester(s) or who have earned a degree.*

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches.

Table A.3 CUNY System Retention of CUNY Start Students and Comparison Group Students: **By Number of Initial Remedial Needs**

	Semester of CUNY Degree Enrollment	Total Students Enrolled	CUNY System Retention[1]			
			Retained for Second Semester		Retained for Third Semester	
			#	%	#	%
One Remedial Need	**Spring 2010 - Spring 2012**					
	CUNY Start Students	119	101	84.9%	-	-
	Matched Comparison Group	119	80	67.2%	-	-
	Spring 2010 - Fall 2011					
	CUNY Start Students	59	48	81.4%	36	61.0%
	Matched Comparison Group	59	44	74.6%	35	59.3%
Two Remedial Needs	**Spring 2010 - Spring 2012**					
	CUNY Start Students	353	288	81.6%	-	-
	Matched Comparison Group	353	231	65.4%	-	-
	Spring 2010 - Fall 2011					
	CUNY Start Students	190	154	81.1%	127	66.8%
	Matched Comparison Group	190	135	71.1%	103	54.2%
Three Remedial Needs	**Spring 2010 - Spring 2012**					
	CUNY Start Students	369	282	76.4%	-	-
	Matched Comparison Group	369	254	68.8%	-	-
	Spring 2010 - Fall 2011					
	CUNY Start Students	136	105	77.2%	86	63.2%
	Matched Comparison Group	136	98	72.1%	76	55.9%

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]System retention rates are calculated as the percentage of students who are still enrolled at any CUNY college in the subsequent semester(s) or who have earned a degree.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches.

Table A.4 presents the results of two OLS regression models that estimate the impact of CUNY Start participation on second- and third-semester CUNY system retention. The models contain the same main independent variable (whether a student is a CUNY Start or comparison group student) and the same control variables, including initial remedial need and demographic characteristics. The results indicate that CUNY Start students are 11.3% more likely than comparison group students to persist to a second semester, and are 8.4% more likely than comparison group students to persist to a third semester. [16]

Table A.4 OLS Estimates of the Effect of CUNY Start Participation on Second- and Third-Semester Retention

	Second-Semester Retention	Third-Semester Retention
CUNY Start Participation	0.113** (0.021)	0.084* (0.034)
Observations	1,682	770
R-squared	0.103	0.142

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

Notes: Sample includes 841 CUNY Start students and 841 comparison group students who enrolled in CUNY degree programs between Spring 2010 and Spring 2012. All models include the main effect of participating in CUNY Start and a list of covariates including initial remedial need, initial CUNY assessment CUNY enrollment status, race/ethnicity, gender, native language, country of origin, age, high school/GED type, months since high school graduation, borough of residence, NYC resident status (for tuition purposes), median neighborhood income (based on US Census Block), PELL/TAP receipt, college admissions average (CAA), and cumulative credits earned prior to enrolling in a CUNY degree program. Standard errors are in parentheses.

** p <.05 ** p < .01*

[16] We also used logistic regression to estimate the impact of CUNY Start participation on second- and third-semester retention. When estimating second-semester retention, the logit coefficient of the CUNY Start participation variable was 0.641 (with a 0.119 standard error). When estimating third-semester retention, the logit coefficient of the CUNY Start participation variable was 0.396 (with a 0.163 standard error).

Method Three (same as method one, for completers only)

First-Semester Enrollment: Defined as the Semester of CUNY Degree or CUNY Start Enrollment

Method three is similar to method one, but includes only completers from both groups. This required the creation of a new comparison group, matching CUNY Start completers to comparison group completers. Of the 1,654 students who enrolled in CUNY Start between Fall 2009 and Spring 2012, 1,396 completed the program (completers are defined as students who completed at least 12 weeks of core instruction and retook any required CUNY Assessment Tests). The CUNY Start completers were matched, one-to-one, to a group of comparison group students who did not withdraw, officially or unofficially, from their first-semester courses as matriculated CUNY students.

Table A.5 CUNY System Retention of CUNY Start Students and Comparison Group Students (Completers)

Semester Enrolled in CUNY Start or CUNY Degree Program	Total Students Enrolled	CUNY System Retention[1]					
		Retained for Second Semester		Retained for Third Semester		Retained for Fourth Semester	
		#	%	#	%	#	%
Fall 2009 - Spring 2012							
CUNY Start Students	1,396	1,071	76.7%	-	-	-	-
Matched Comparison Group	1,396	1,070	76.6%	-	-	-	-
Fall 2009 - Fall 2011							
CUNY Start Students	1,023	794	77.6%	692	67.6%	-	-
Matched Comparison Group	1,023	815	79.7%	628	61.4%	-	-
Fall 2009 - Spring 2011							
CUNY Start Students	439	330	75.2%	297	67.7%	259	59.0%
Matched Comparison Group	439	335	76.3%	261	59.5%	224	51.0%

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]System retention rates are calculated as the percentage of students who are still enrolled at any CUNY college in the subsequent semester(s) or who have earned a degree.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches.

Table A.6 CUNY System Retention of CUNY Start Students and Comparison Group Students (Completers): **By Number of Initial Remedial Needs**

	Semester Enrolled in CUNY Start or CUNY Degree Program	Total Students Enrolled	CUNY System Retention[1]					
			Retained for Second Semester		Retained for Third Semester		Retained for Fourth Semester	
			#	%	#	%	#	%
One Remedial Need	**Fall 2009 - Spring 2012**							
	CUNY Start Students	170	139	81.8%	-	-	-	-
	Matched Comparison Group	170	134	78.8%	-	-	-	-
	Fall 2009 - Fall 2011							
	CUNY Start Students	128	105	82.0%	97	75.8%	-	-
	Matched Comparison Group	128	105	82.0%	79	61.7%	-	-
	Fall 2009 - Spring 2011							
	CUNY Start Students	63	49	77.8%	45	71.4%	36	57.1%
	Matched Comparison Group	63	50	79.4%	40	63.5%	37	58.7%
Two Remedial Needs	**Fall 2009 - Spring 2012**							
	CUNY Start Students	550	422	76.7%	-	-	-	-
	Matched Comparison Group	550	416	75.6%	-	-	-	-
	Fall 2009 - Fall 2011							
	CUNY Start Students	416	330	79.3%	291	70.0%	-	-
	Matched Comparison Group	416	331	79.6%	257	61.8%	-	-
	Fall 2009 - Spring 2011							
	CUNY Start Students	217	170	78.3%	149	68.7%	130	59.9%
	Matched Comparison Group	217	165	76.0%	127	58.5%	109	50.2%
Three Remedial Needs	**Fall 2009 - Spring 2012**							
	CUNY Start Students	676	510	75.4%	-	-	-	-
	Matched Comparison Group	676	520	76.9%	-	-	-	-
	Fall 2009 - Fall 2011							
	CUNY Start Students	479	359	74.9%	304	63.5%	-	-
	Matched Comparison Group	479	379	79.1%	292	61.0%	-	-
	Fall 2009 - Spring 2011							
	CUNY Start Students	159	111	69.8%	103	64.8%	93	58.5%
	Matched Comparison Group	159	120	75.5%	94	59.1%	78	49.1%

Source: Authors' calculations using CUNY's Institutional Research Database and CUNY Start database.

[1]System retention rates are calculated as the percentage of students who are still enrolled at any CUNY college in the subsequent semester(s) or who have earned a degree.

Note: The comparison group was matched using propensity score methods, using a pool of full- or part-time CUNY students who entered CUNY in the same term that CUNY Start students also entered CUNY. Comparison group students entered CUNY as first-time freshmen or advanced transfer students in Spring 2010 through Spring 2012. Students not needing remediation, students enrolled in the Online BA program or the School of Professional Studies, transfer students with prior degrees and/or over 24 earned credits and students having incomplete assessment exam/exemption data were excluded from the pool of matches.