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MATCHMAKING: ENABLING MANDATORY PUBLIC SCHOOL CHOICE IN NEW YORK AND BOSTON

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Over a warm, sunny weekend last September, 40,000 middle-school students and parents converged on Brooklyn Technical High School, a venerable, Art Deco structure in Fort Greene, to learn about New York City's many high school programs. It was the New York City Department of Education's annual school fair, where representatives of hundreds of high schools large and small throughout the city's five boroughs recruited students and their families from behind folding tables that ringed the hallways of the eight-story building.

Signs welcomed students in languages from Russian to Urdu. A small army of department of education staff in orange T-shirts handed out school directories with the heft of Manhattan phone books. Upstairs, administrators and students from schools with names like Bronx Aerospace High School, Bronx Expeditionary Learning High School, Bronx High School for the Visual Arts, Bronx Latin School, and Bronx School for Law, Government, and Justice touted their schools to visitors seeking everything from Advanced Placement physics to fencing teams to swimming pools. The representatives of Manhattan's Food and Finance High School sported white chefs' hats. The baseball coach at Wings Academy in the Bronx pitched the school's new indoor batting cage, surrounded as he spoke by some of his players in uniform. At nearly every table, conversations ended with students being encouraged to attend open houses that the schools would host in the following months.

The Brooklyn Tech extravaganza is a yearly event in the nation's largest public school system. It is part of a program that permits any rising New York City ninth-grader to attend any high school program in Manhattan, Queens, Brooklyn, Staten Island, or the Bronx. Each year, students choose a dozen schools from among hundreds of high school programs and rank them 1 to 12 in order of preference. This past spring some 63,000 of the city's 81,000 new high school students gained a place at one of their top three choices, and over 80,000 students—99 percent of the incoming high school class—were set to attend a school they selected.¹

From tuition vouchers for private schools to charter schools to voluntary transfer programs within and between public school systems, school choice has been at the center of the school reform debate for two

decades. But with the voucher movement unable to sustain much momentum, charter schools still serving a small percentage of the nation's students with mixed results, and the public school choice system in the federal No Child Left Behind Act plagued by low participation rates, New York City's public high school selection system stands out as a model strategy for harnessing the power of the marketplace to better serve students' diverse educational interests and needs and to stimulate improvement through competition for students.²

The school system has sponsored choice on a scale unprecedented in public education by *requiring* each of its eighth-graders to select schools. And, along with the Boston school system, which has also made choice mandatory, it has adopted computer software that allows it to place students in the schools on their lists far more efficiently and fairly than most public school choice programs.

As a result, the choice systems in New York and Boston, though not without challenges, have stimulated a new entrepreneurialism among many public educators, improved the perception of public education among middle-class families, and served as a catalyst for school reform by providing a rationale for taking action in schools that fail to compete successfully for students. They can be powerful engines of urban school reform and valuable prototypes for other cities working to match more students with schools of choice.

A Flawed System

As with many urban school systems, school choice in New York and Boston evolved out of the difficult process

of desegregating their public school systems. Officials saw increased choice within public education as a way to counter the exodus of more affluent families from public schools in the wake of court-ordered desegregation plans that in Boston involved a fractious system of busing students throughout the city to achieve racial balance in schools.

In the 1970s New York began introducing “exam” schools and “screened” schools, which were open to students borough- or citywide via competitive admissions. These magnet programs proliferated in the city, says Bonnie Gross, the city’s current director of high school enrollment, “as a way of holding [middle-class] kids in public schools, and because schools wanted screened programs to increase their prestige.” Boston introduced a voluntary citywide school choice plan in 1989.

But both cities, like many districts around the nation with school choice, struggled with inadequate systems of matching students with schools, the cornerstones of choice plans. Typically, the matching systems were bureaucratic, encouraged students and schools alike to manipulate the selection process, left many students in schools they hadn’t selected, and, as a result, hurt the district’s reputation among many parents.

Most districts, including those in Boston and New York, relied on what’s called a “priority matching” system. Under this model, the highest priority is to give as many students as possible their first choice. But because popular schools could be filled up by students with priority status (Boston, for example, preserves half of the seats in its elementary and middle schools for students living within a one-mile “walk zone” of schools and gives preference to siblings) or simply by students randomly selected earlier in the matching process, many students and parents sought to outsmart the system to ensure themselves of places in schools they liked. With every student allowed to make five selections, savvy families carefully calculated the popularity of schools and selected less attractive schools as first and second choices to ensure that they wouldn’t end up without any of their picks.

One group of parent activists in Boston, the West Zone Parents Group, used a listserv to communicate details about school openings: “I think there are probably two or three siblings entering K–2 [at Philbrick Elementary School]. I know of two people who are putting it as their first choice. ...”³ The Boston school system even encouraged families to game the matching system in this

way. “For a better chance of your ‘first choice’ school ... consider choosing less popular schools,” it counseled in 2004 materials.⁴

But the fact that many students weren’t picking the schools they really wanted to attend undermined the integrity of the Boston and New York choice systems. And students who were unable or unwilling to try to outsmart the selection system, the majority of whom were from less-affluent families, paid a heavy price: Studies of the Boston program by economist Parag Pathak of the Massachusetts Institute of Technology found that a third of the city’s elementary and middle school students listed a popular school as their second or third choice and ended up not getting any of their top five selections and being randomly assigned to schools throughout the city. A quarter of those students, Pathak found, could have landed in a school they selected merely by making their third choice their second choice.⁵ “There were people who figured it out,” concluded Pathak, “and people who didn’t.”

In New York City, the problem was exacerbated by the fact that the growing number of “exam” and “screened” schools had the final say in which students they enrolled (while the city’s “zoned” schools continued to be required to take every student within their attendance boundaries). The schools were given applicants’ grades, test scores, and attendance records, and many of the schools received so many qualified applicants among those who had ranked the schools as their first choices that they wouldn’t look at students who ranked them lower. Unopened boxes of applications were routinely returned to the school system’s central office.

Worse, schools routinely under-reported their vacancies to city officials in order to have greater control over admissions.⁶ There was an admissions process “on paper, and a process off paper,” says Gross, the enrollment director. Parents sought to influence the systems any way they could. “Connections were essential and, not surprisingly, the more sophisticated parents and middle school guidance counselors would make the system work for them,” says Gross. (See sidebar “A Look Back,” page 3.)

The New York and Boston student-school matching systems were also tremendously inefficient. The New York system involved three rounds of selection over several months, lengthy waiting lists, multiple offers for thousands of students, and no placements for many

more. So problematic was the system that as late as 2003 the city's department of education had to find high school seats through "administrative assignment" for nearly 35,000 students who had struck out under the priority matching program. "The system was appalling," says Clara Hemphill, author of *New York City's Best Public High Schools*.⁷

A New Model

The problems plaguing New York's high school selection system prompted a consultant to the department of education to, in 2003, contact Al Roth, a Harvard professor of economics and business administration, who had a lot of experience with matching systems. Roth had written extensively about the National Resident Matching Program, a system devised in the middle of the last

century to more efficiently and fairly pair medical students with residency programs. In the mid-1990s, he wrote a mathematical formula to help the NRMP cope with the growing number of couples seeking residencies in the same geographic areas—work that led him to studies of matching markets in kidney donations, sororities, law clerkships, and Internet auctions. New York education officials asked him to adopt these models for the city's high school choice program. Roth and Pathak, who was one of Roth's graduate students at the time, reworked the New York matching system, and they had a new model in place for ninth-graders entering high school in fall 2004.⁸

The *Boston Globe* was the catalyst for changing Boston's matching system. In the spring of 2003, two economists, Atila Abdulkadiroglu of Columbia University and Tayfun Sönmez, an academic affiliated with Harvard at the time and now an economics professor at Boston College,

A Look Back: New York City's High School Choice in 1985



New York City's high school choice process has struggled to distribute scarce school seats for years. A 1985 report, "Public High Schools: Private Admissions: a Report on New York City Practices," by Advocates for Children of New York, Inc., a nonprofit organization, found that, because of high demand for few spots, "school system officials [were] under pressure to circumvent the usual admissions procedures and give seats to individual students at the behest of politicians, church leaders, board members, community school district personnel, etc." And it found that "students from impoverished, segregated minority neighborhoods have a much poorer chance of obtaining acceptance to a selective school than those in more affluent, integrated or predominantly white neighborhoods."^{**}

The cover of the report, reproduced above, depicts the fictional "Charles Darwin High School of Natural Selection" with a red carpet open to only a few students and a stop sign given to the masses.

^{**}*Public High Schools: Private Admissions* (New York: Advocates for Children of New York, Inc., 1985).

published a paper in the *American Economic Review* highlighting the problems with Boston's matching mechanism. Several months later, *Globe* reporter Gareth Cook wrote a lengthy account of the economists' critique. When schools superintendent Thomas Payzant read it, he invited Abdulkadiroglu, now an economics professor at Duke, and Sönmez to help design a new matching system for the 60,000-student Boston district. Roth and Pathak also worked with Abdulkadiroglu and Sönmez on the Boston project.

In December 2003, Payzant, Boston Mayor Thomas Menino, and the Boston School Committee commissioned a taskforce to study the city's entire student assignment system, and the taskforce recommended changing the mathematical formula for matching the students to schools. Under the guidance of Roth, Abdulkadiroglu, Sönmez, and Pathak, the city abandoned its priority matching system and introduced a new model in the spring of 2006 that broke Boston into three K–8 choice zones of about 30 schools each and a citywide high school zone.

The new matching systems in Boston and New York differ in key ways from the old systems. They have made choice mandatory for every student, including for those wanting to attend their neighborhood schools. The mathematical formulas that drive the computerized matching systems have been rewritten to eliminate the advantages (and stresses) of trying to calculate schools' popularity. They have increased a student's chance of attending schools they've selected. And, in New York, schools now play a reduced role in admissions decisions. (See sidebar, "Matching Methodologies," page 8.)

In Boston, there are lotteries in the three K–8 zones with preferences programmed into the city's matching software for siblings and walk-zone students. In New York, political compromise retained vestiges of the exam school and screened school models, but the new system gives different types of schools varying degrees of say in the selection process. Some 28,000 students applying to Brooklyn Tech and seven other exam schools must take separate admissions tests, and what was traditionally the most-sought-after group of the city's screened schools—so-called education options programs—can submit preferences for up to 50 percent of their vacancies from their applicant pools, based on the students' grades, test scores, and attendance records. But students ranked by schools in this way must reflect the range of scores

on the city's middle-school reading tests. And under the new system, the schools don't know how they stack up among a student's school selections, so schools have an incentive to look at every applicant. But students are offered only a single placement under the new system, and it comes from the school system, not individual schools.

Far higher percentages of students are attending schools they've selected under the new matching models. In New York, the number of students without schools after the completion of the formal matching process who were then assigned seats by city officials or found a placement through a "gray market" that required families to negotiate with schools reached 35,000 in 2003, the last year under the city's previous matching system. By 2009, under the new matching system, city officials had to assign only 791 students to schools, and the gray market had been eradicated. Notably, the increase in the number of schools that students rank under the new system (from five under the old system to a dozen) wasn't a significant factor in the change—only 5 percent of students received placements in schools they ranked sixth through 12th. (See Figure 1.) In Boston, where some 12,000 kindergartners and sixth- and eighth-graders make up the bulk of the students in the choice program, the percentage of administratively assigned students dropped from 12.9 percent in 2005, under the city's priority matching system, to 4.9 percent in 2009.

There are no waiting lists under the new matching system in New York. And because the new matching models eliminate the advantages of successfully strategizing about one's top choices, they allow students to list their true preferences. As Payzant says, "Your best chance is to rank them the way you really want." In both Boston and New York, as a result, connections play a far smaller role in school assignments than in the past. "The process now is 98 percent transparent," says Gross. Adds Deputy Chancellor Chris Cerf: "We get calls all the time from politicians and CEOs asking for student assignments for constituents and employees, but we don't do favors as a matter of policy." One consequence of having the city's department of education register students under the new system rather than individual schools, says Neil Dorosin, the executive director of the Institute for Innovation in School Choice, a nonprofit consulting company, and a former director of the New York program, is that "the number of seats in these schools miraculously expanded, because principals can't override the match."

The changes have made school choice far fairer to families without the wherewithal to influence the school matching systems in New York and Boston, and they have allowed the cities' school officials to more confidently use trends in students' school preferences to inform their creation of new programs. "You can't put in a new art or band program without knowing the demand," says Craig Chin, an assistant chief operating officer in Boston. Evaristo Jimenez, a former director of high school enrollment in New York, says the city has replicated several high school programs in high demand, including Frederick Douglass Academy and the Bronx Leadership Academy, two programs recognized for excellence in preparing students for college.

Popularity doesn't always equate to quality in school choice, Dorosin cautions. And it was clear at the Brooklyn Tech fair last September that not every student was in pursuit of academic rigor. To the questions of what they wanted in a high school or what they liked about a school, a number of students offered up answers like, "I want a school that's cool" or "The school has a track; I like to run." But just as frequently were answers like that of Angel Lopez, a 12th-grader at a screened pre-engineering program at Samuel Gompers Career and Technical Education High School in the Bronx, where students build go-carts from scratch: "I picked it because I wanted hands-on engineering." And the popularity of some schools that are unknown outside of New York is striking. Pace High School in Manhattan, for example, had nearly 4,000 applicants in 2007 for 108 openings in a specialized humanities program. And the 130 ninth-grade seats at a health sciences program at Life Sciences Secondary School in East Harlem attracted 2,250 applicants that year.⁹

Meanwhile, under Chancellor Joel Klein, New York school officials have shut down nearly two dozen large, under-performing high schools in recent years and have pointed to low student demand as a factor in targeting the schools for closure. When South Shore High School in Brooklyn was shuttered in 2006, it was the least popular school in the city.¹⁰ And the expanded competition for students under the new student-school matching system has led many principals to pursue new and often smaller and more specialized high school programs to make themselves more attractive to students. "It requires schools to step up," says Dorosin. In Boston, says Payzant, the new matching model "creates incentives for schools to get better, to compete for families' support."

Essential Ingredients

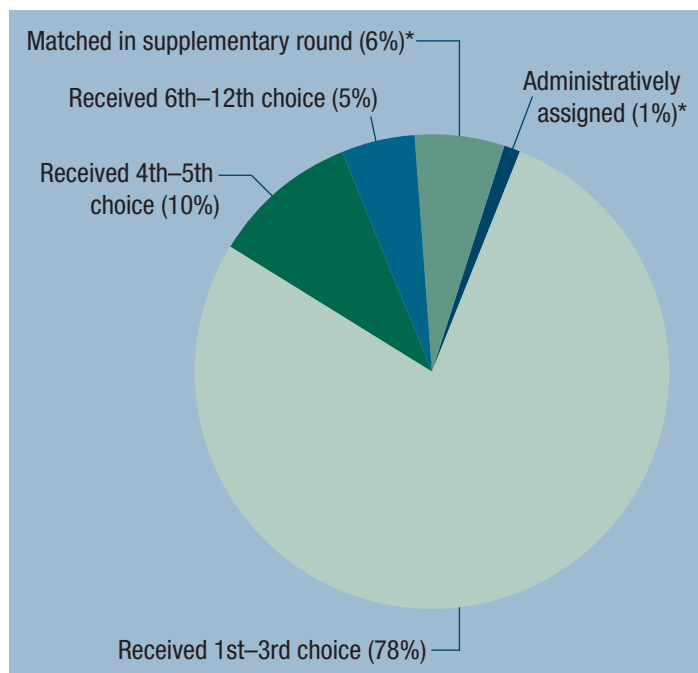
Perhaps the most important lesson to be learned from the new Boston and New York assignment plans is that school choice requires meaningful choices. "A new choice system doesn't by itself make people want to go to school X," says Cerf. "It doesn't mean anything if everybody still has to go to [ineffective] zoned schools."

In New York, the new matching mechanism has been combined with the introduction of many more high school options. While student enrollment has stayed roughly constant in the city over the past two decades, student options have increased significantly. In 1985, there were 261 New York City high school programs.¹¹ By 2004, the number had reached 463.¹² But in the five years since the introduction of the new matching mechanism, the number of high schools, many of them sharing the same buildings, has expanded to 693.¹³

As of 2009, New York sponsors schools focused on animal science, architecture, communications, computer science and technology, cosmetology, culinary arts, engineering, environmental science, film and video, health, hospitality and tourism, humanities, law and government, performing arts, science and math, teaching, and visual art and design. Among the many options available to students are the Bronx High School for Performance and Stagecraft, Sports Professions High School, the Academy of Urban Planning, the NYC Museum School, and the Environmental Maritime Math and Science Institute inside Flushing High School in Queens. In closing failing comprehensive high schools in recent years, some with enrollments of over 4,000 students, officials have deliberately created in their place smaller, more innovative programs designed to appeal to a wide range of students. "We had to redesign the high schools, not just fix the choice system," says Michele Cahill, who led the city's high school reform initiative as senior counsel to Chancellor Klein and who is now a vice president at the Carnegie Corporation of New York.¹⁴ "Fundamental to change was increasing the supply of good schools. Choice has to be an integral part of high school reform; high school reform has to be an integral part of choice."

Researchers at the Center for New York City Affairs at The New School, a Manhattan university, report in a recently released study, *The New Marketplace: How Small-School Reforms and School Choice Have Reshaped New York City's High Schools*, that the creation of many

Figure 1. Results of the 2009 New York City High School Admissions Process, Eighth-Grade Applicants



Source: Personal correspondence with Andrew Jacob, deputy press secretary at NYC Department of Education.

*In New York, students can submit up to 12 school choices in the first round. Those who are not placed in this round can submit up to 12 additional choices in a supplementary round, which includes schools with remaining seats and new schools that are enrolling students for the first time. Students who are unmatched after both of these rounds are administratively assigned to the nearest available school.

new, smaller high schools has led to overcrowding and declining attendance and graduation rates at a number of the city's remaining large neighborhood schools. But the city's collective high school graduation rate increased substantially since the introduction of the city's new high schools and new choice matching system—from 41 percent in 2002 to 56 percent in 2008—and achievement gaps between the city's white and African American and white and Latino students narrowed during the same period.¹⁵ (See Figure 2.)

It's not a revelation that markets with informed consumers tend to work more efficiently, rewarding the best products and providing buyers with the most value. The same is true in school choice. While some students may be drawn to schools by batting cages and swimming pools, and for some parents a school's proximity to home or work may trump test scores, both New York and Boston have provided ways for students and parents to judge the quality of the schools that they're selecting. There are common standards for schools in both cities. In

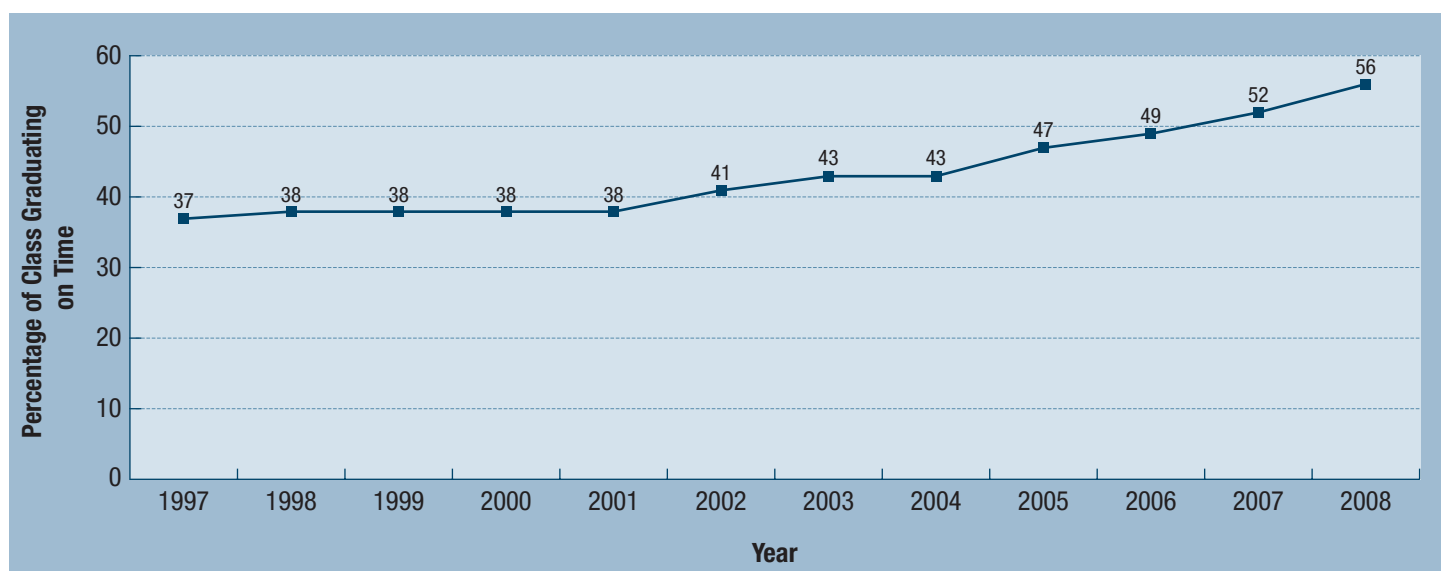
New York, high school students must pass five New York State Regents examinations to graduate. And Klein has introduced report cards that grade schools A to F using several measures of school success. The grades matter: "There's a correlation of F's to the number of applications schools have received in recent years," says Cerf, the deputy chancellor. In Boston, students and parents have information on how students from school to school perform on Massachusetts' rigorous statewide achievement tests. To successfully create portfolios of many different types of schools the way New York City and Boston have, Cahill cautions, school districts must establish high minimum standards that every school is expected to meet, or risk creating a highly stratified system of strong and weak schools.

Equally important, New York and Boston officials say, is working hard to inform students and parents of the mechanics of mandatory school choice and the range of schooling options that are available to them. Even though the new matching models in the two cities greatly reduce the ability to game their school choice systems, it's still important (and difficult) to reach the city's many poor and non-English-speaking families (nearly 50 percent of New York City's 1.1 million students speaks a language other than English at home), they say.¹⁶

In addition to the citywide fair at Brooklyn Tech, New York officials sponsor five borough-wide fairs and nearly three dozen parent workshops during the school selection season. It prints 200,000 copies of the 584-page Directory of the New York City Public High Schools and a separate Specialized High Schools Student Handbook, and distributes CD-ROMs of the directory. Students can also search for schools at the department's Web site, and the department's staff work closely with middle-school guidance counselors, who, says Gross, are key players. As a result, the department reports that 98 percent of eligible middle-schoolers participate in the city's choice program. Still, the Center for New York City Affairs concludes in its recent report that "many students lack adequate support in choosing and ranking their schools, and guidance counselors are under-equipped to support them."¹⁷

The success of the New York and Boston choice systems—which, by requiring students to select their schools, puts so many students in motion—depends heavily on the presence of extensive transportation systems. Because the New York choice program serves high school students, it can provide them with

Figure 2. New York City Four-Year Graduation Rates, Classes of 1997–2008



Source: New York State Education Department, compiled data class of 1997 to 2008.

passes for the city’s sprawling public transportation system. The challenge is greater in Boston, where young children are involved. The city supplies high school students with pre-paid public transportation passes. But students in kindergarten through eighth grade ride a fleet of 600 yellow school buses that consumes 8 percent of the school system’s budget and is inherently less efficient than if students attended their neighborhood schools. School officials field many complaints from the public about nearly empty buses traversing the city every day, says Chin, the Boston Public Schools’ assistant chief operating officer. Transportation, says Payzant, is “the big conundrum. It’s tremendously expensive.”

Mandatory public school choice doesn’t guarantee school improvement. A host of other factors—including school leadership, teacher quality, funding, and curricula—also influence student success. Despite significant increases in New York City’s graduation rates in recent years, and an 11 percent increase in students earning state-test-based Regents diplomas from 2005 to 2008, nearly half of the city’s students continue to fail to graduate.¹⁸ In Boston, in the three years since the city introduced the new student-school matching model, the percentage of students scoring proficient on state standardized tests has risen by 3 percent in English and by 7 percent in math. But only about a quarter to a half of Boston’s students meet Massachusetts’ proficiency standards at different grade levels. “The algorithm is vital and has made a huge

difference for NYC and Boston,” says Dorosin, “but there are operations—data management, communications, admissions priority policies, to name a few—that must be sound for the algorithm’s [positive] effects to be most broadly realized.” And because of the importance of providing students a range of school options and a significant transportation system, mandatory school choice plans aren’t realistic options in many rural and sprawling exurban school systems.

Still, they can be effective catalysts of innovation and improvement in urban education and dramatically increase the educational alternatives for many students. Mandatory school choice systems using the new student-school matching models created by Roth and his colleagues would be an attractive addition to any system attempting to allocate scarce seats in good schools in an equitable way, and they could improve both the quality and equity of court-ordered school choice programs in place in Denver, Minneapolis, Seattle, and other cities that continue to use the priority matching model.

More broadly, the mandatory school choice that has emerged in New York and Boston could be the cornerstone of a different model of public school governance, one featuring an entrepreneurial system of schools run by a range of organizations vying for students under a fair and efficient system for matching students to schools. Cities like New Orleans and Washington, D.C., for example, have large segments of their students

Matching Methodologies

The new mathematical formulas for matching students and schools that Harvard economist Al Roth and his colleagues created for the New York and Boston school systems differ from the troublesome models they replaced in subtle but important ways.

The priority matching strategies that both cities abandoned—but that many other school districts still use—begins, reasonably enough, by trying to match students with their first-choice schools. Students listing a school as their first choice are placed on a list. In some districts, a student's rank on the list is merely a matter of random selection. In other places, including Boston, students are moved up the list if they live near the school or have a sibling already in the school. Students are then assigned to the school from the list until it is full. The assignments are final. If there are more students on the first-choice list than there are seats in the school, as is routinely the case, unmatched students are then added to the lists of their second-choice schools. But because they are ranked below students who have made these schools their first choice, they often fail to get seats in these schools either. As this process repeats itself, many students fail to get assignments in any of the schools they've selected under the priority matching model.

The key difference between the priority matching model and the algorithm that Roth and his colleagues introduced in New York and Boston is that under Roth's model (also called the Gale-Shapley algorithm, for mathematicians David Gale and Lloyd Shapley) school assignments are temporary—that is, they are deferred—until the computerized matching process is completed.

The process begins the same way as the priority matching model. Every student is given a ranking by every school. In Boston, the ranking is based on a combination of sibling and walk-zone preferences and a random lottery number that's given to every student in the school choice system—primarily the city's kindergartners and sixth- and eighth-graders. In New York as well, each of the city's nearly 80,000 eighth-graders is given a random lottery number, but, in deference

to a recent past where individual high schools had much freedom in selecting their students, New York allows for certain schools to rank students. Depending on their method for selecting students, some schools are allowed to “screen” students based on the student's academic record and their attendance at school-based fairs. At the city's roughly 200 “educational options” schools (a vestige of the city's earlier experience with school choice), schools can rank students based on where they fall in the citywide distribution of scores on the seventh-grade reading test (every educational option school must have a bell-curve-like distribution of high, middle, and low achievers). These schools can express their priorities for individual applicants to fill half their seats, but both the ranked and unranked halves must meet the bell-curve distribution.

Next, students' rankings and schools' priorities are loaded into computers. Students are then matched to their first-choice schools. If the schools are filled with higher-priority students, the unmatched students are moved by the computers to the pool for their second-choice schools. But, because all seat allocations under the Gale-Shapley model are temporary, the second choices of unmatched students are compared to the schools' first-choice matches. The computers then reshuffle the assignments to the schools to give seats to students who have listed the schools as their second choice, if those students rank higher in the citywide priority lists than students who have selected the schools as their first choices. These bumped students are then added to the pools of their second-choice selections.

This process continues until student choices are completely exhausted or all schools are full. Only then are the matches finalized and sent out to students. Because it's centralized and computerized, the entire process takes only a few minutes once students' preferences and schools' priorities are entered.

New York permits students and parents to appeal placements and uses the same methodology for placing students under the appeals process. But the city has sought to discourage transfers by students already enrolled in high school programs.

voluntarily attending schools of choice, but no centralized system to place them. Instead, schools are trusted to recruit and enroll students independently, while parents are left to navigate the choice process alone, circumstances that increase the likelihood of only the most active and knowledgeable parents getting their child placed in one of their top choice schools. Such conditions resemble Boston and New York before they changed their choice matching systems.

Importantly, the replication of the New York and Boston choice models in other cities would strengthen public

education's relationship with a constituency that gets short shrift in policy debates—parents. They become much more engaged in and loyal to public education, the overflow crowds at last fall's fair at Brooklyn Tech suggest, when they're made to feel like valued customers. “Parents leave public schools because they don't get what they want,” says Dorosin. “But these programs show that you can give them what they want.”

Endnotes

- ¹ Personal correspondence with Andrew Jacob, deputy press secretary at NYC Department of Education.
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- ³ Atila Abdulkadiroglu, Parag A. Pathak, Alvin E. Roth, and Tayfun Sönmez, *Changing the Boston School Choice Mechanism*, (Cambridge, MA: National Bureau of Economic Research, January 2006).
- ⁴ Atila Abdulkadiroglu, Parag A. Pathak, Alvin E. Roth, and Tayfun Sönmez, "The Boston Public School Match," *American Economic Review, Papers and Proceedings* 95 no. 2 (May 2005): 368–371.
- ⁵ Atila Abdulkadiroglu, Parag A. Pathak, Alvin E. Roth, and Tayfun Sönmez, "The Boston Public School Match."
- ⁶ In 2004, for example, the *New York Times* reported that prestigious Stuyvesant High School had held 100 seats off of the roster it gave New York City school officials. See, David Herszenhorn, "Empty Seats Go Unfilled at Top City High Schools," *The New York Times*, June 23, 2004.
- ⁷ See David Herszenhorn, "New Policy for Admissions Is Bringing New Headaches," *The New York Times*, October 4, 2003, for a discussion of how New York city officials announced the program to the public.
- ⁸ David Herszenhorn, "Revised Admission for High Schools," *The New York Times*, October 3, 2003.
- ⁹ *Directory of the NYC Public High Schools 2008–2009* (New York, NY: NYC Department of Education).
- ¹⁰ See, Elissa Gootman, "Lafayette Among 5 High Schools to Close," *The New York Times*, December 12, 2006.
- ¹¹ *Public High Schools: Private Admissions* (New York: Advocates for Children of New York, Inc., 1985).
- ¹² Aaron M. Pallas and Carolyn Riehl, "The Demand for High School Programs in New York City," Prepared for the Inaugural Conference of the Research Partnership for New York City Schools, October 5, 2007.
- ¹³ *Directory of the NYC Public High Schools 2008–2009* p. 352 and 382.
- ¹⁴ The Carnegie Corporation of New York is an Education Sector funder.
- ¹⁵ See Clara Hemphill and Kim Nauer, *The New Marketplace: How Small-School Reforms and School Choice Have Reshaped New York City's High Schools* (New York: Center for New York City Affairs, The New School, June 17, 2009) or "Graduation Rate Data—June 22, 2009," New York State Department of Education Press Release, June 22, 2009, available online at: <http://www.emsc.nysed.gov/irts/pressRelease/20090622/>.
- ¹⁶ Ibid.
- ¹⁷ Clara Hemphill and Kim Nauer, *The New Marketplace: How Small-School Reforms and School Choice Have Reshaped New York City's High Schools* (New York: Center for New York City Affairs, The New School, press release, June 17, 2009).

- ¹⁸ To receive a high school diploma, students must pass five Regents exams sanctioned by the Board of Regents of the University of the State of New York. The state offers three levels of diplomas (local, Regents, or Advanced Regents) based on how high the student scores and how many academic credits they've earned. Higher required scores are being phased in over time, and students entering high school in September 2008 or later will not be eligible for the less-demanding "local" diploma.

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