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Demographics and Work Experience:

A Statistical Portrait of New York City's Public School Teachers

Summary

In recent years, the role of kindergarten through 12th grade teachers in improving student performance and closing the achievement gap between students of different racial and ethnic backgrounds has been a prime topic of discussion and study. While the state continues to develop a system to assess individual teachers' contributions to meeting these goals, it is important to have a basic picture of the teacher workforce in terms of demographics and work experience.

In this report, IBO examines New York City's Department of Education human resources data for public school teachers for school years 2000-2001 through 2011-2012 (the data does not include charter school teachers because they are not city employees). Over this 12-year period, the report looks at data on teachers' age, gender, self-reported race or ethnicity, and experience working in the city's public schools—how long teachers continue teaching at their first school and whether they transfer to another school or leave the public school system entirely.

The data is presented in terms of the city's public school system as a whole as well as categorized by instruction level (elementary, middle, and high schools) and concentration of poverty (low-, medium-, or high-poverty schools) based on student eligibility for free- or reduced-price lunch. Among our findings:

- The share of the city's public school teachers who are female has gradually increased from 73 percent in school year 2000-2001 to 76 percent in 2011-2012. Over the same period the share of teachers who are white has gradually declined from nearly 63 percent to about 59 percent while the share of teachers who are black has slipped from about 21 percent to just below 20 percent.
- When schools are subdivided in terms of poverty, the percentage of white teachers is considerably lower and the percentage of black and Hispanic teachers higher, in high-poverty schools compared with low-poverty schools.
- Teachers in low-poverty high schools were more likely to be older and more experienced than teachers in medium- and high-poverty high schools.

Additionally, the share of teachers quitting the school system soon after their start has been declining. Of the nearly 9,000 teachers hired in 2000-2001, 41 percent had quit the school system within three years. Of the 6,000 teachers hired in 2008-2009, the share that left within three years dropped to 30 percent.

The total number of teachers in the city's public schools has declined over the period studied, from 77,088 to 73,373. While the number of general education teachers fell by more than 9,100 to 54,778 over the 12-year period, the number of special education teachers grew by more than 5,400 to 18,595.



Introduction

Research over the last 10 years has highlighted the important role of teachers in K-12 education, both in increasing student performance and in closing achievement gaps. For example, some researchers argue that teachers represent the most significant resource schools contribute to academic achievement and recent studies have also highlighted the value of having good teachers for students' future labor market outcomes.¹ For this report IBO analyzed recent trends in various measurable characteristics of teachers in New York City's public schools, the distribution of teachers with these characteristics across different types of schools in the city, and teachers' patterns of turnover and mobility.

This fiscal brief is organized in four sections. The next section documents the sources of data that have been used. It also describes how schools are classified—first on the basis of student poverty and then on the basis of level of instruction. The brief then analyzes demographic and work-related characteristics of teachers in New York City's public schools and how these have evolved over the last 12 years. The analysis is conducted separately for high-poverty, medium-poverty, and low-poverty schools, and further broken down into elementary and middle schools on the one hand, and high schools on the other hand. The last section of the brief investigates turnover and mobility decisions. Successive cohorts of newly employed New York City public school teachers are followed over subsequent years as they remain in their current teaching jobs, choose other teaching (or nonteaching) jobs within the system, or leave New York City public schools altogether.

It is particularly instructive to document recent trends in these various indicators as earlier literature has found significant disparities in the distribution of teachers across schools, and the period studied in the brief encompasses a period of rapid change in the organization and management of New York City's public schools. In a study of schools in New York State from 1984–1985 through 1999–2000 (all years in this report refer to school years), researchers had found systematic differences in teacher qualifications across schools with different characteristics—some types of schools employed substantially more qualified teachers than others did.² The New York City region stood out from other regions in employing a considerably larger percentage of less-qualified teachers than the rest of New York State and exhibiting large differences across student groups in the qualifications of their teachers. Further, the researchers concluded that transfer and quit behavior of teachers in New York is

consistent with the hypothesis that more qualified teachers seize opportunities to leave difficult working conditions and move to more appealing environments.

Children First refers to the group of policies that has been implemented in New York City public schools since 2002-2003 to improve student performance and close achievement gaps. Though there were many important policy changes, including expanding principal autonomy, setting a common curriculum, and systemizing school choice for middle schools and high schools, the reforms targeted teachers as perhaps the most important component.³ There were new policies to improve teacher recruitment and assignment, school working conditions and teacher retention, teacher evaluation processes and supports for teachers, among other things.⁴ Although not technically a part of the Children First reforms, there was also a considerable increase in average teacher salaries in the city's public schools in the first part of last decade.⁵ Overall, there were considerable efforts to improve the quality of the teaching force in public schools and also to improve its distribution, so that schools serving disadvantaged children are not disproportionately burdened with less-effective teachers.

Data

This brief looks at teachers in New York City's public school system; teachers in charter schools are not included, as they are not directly employed by the city's Department of Education (DOE). Trends relating to teachers over a 12-year period are analyzed, beginning with 2000-2001 and ending in 2011-2012.

The demographic variables that are analyzed in the brief include age, gender, and self-reported race or ethnicity. The two work experience indicators used are ones that measure the time teachers have spent within New York City public schools, either as a teacher or in any capacity.⁶ Since the DOE files do not identify 'new' teachers as such, the variable "Teacher Active Years" from the annual human resources data files provided by DOE to IBO are used to identify new teachers. Any person who has been teaching in the system for less than one year is defined as a new teacher in that year and included in this sample.

Schools are classified into three groups, high-, medium-, and low-poverty schools, based on the percentage of their students living in poverty in 2011-2012.⁷ Note that even low-poverty schools in New York City serve mostly impoverished children. For example, the share of students in poverty ranges from 4 percent to 65 percent in low-poverty schools (the

mean share is 46 percent), from 66 percent to 80 percent in medium-poverty schools (with a mean of 74 percent) and from 81 percent to 100 percent (the mean is 88 percent) in high-poverty schools. Student poverty is determined by eligibility for free or reduced-price school lunch.

To further classify schools based on their level of instruction, a simple two-way classification is used—elementary and middle schools on the one hand, and high schools on the other hand. This is done for simplicity and also the fact that few high schools have middle grades and few middle schools offer grades 9-12. However, such overlap is much more common across schools offering elementary and middle grades, making a distinction between elementary schools and middle schools more problematic.

Characteristics of Teachers and Their Distribution Across Schools

Trends over the last decade in various demographic and work-related characteristics of teachers in New York City’s public schools are documented in Table 1 below. In 2011-2012, 76.0 percent of the teachers in New York City public schools were female. This share has slowly increased in each of the last 11 years, from 73.2 percent in 2000-2001.

In terms of racial and ethnic composition, about three-fifths of teachers are white, though the share has fallen over the last decade. The share of black teachers has also declined and now stands at less than one-fifth, while the share of Hispanic teachers has mostly ranged from 13 percent to 14 percent. There has been a steady increase in the share of Asian teachers, although their overall presence is still quite low; 5.9 percent of all New York City public school teachers in 2011-2012 were Asian, nearly double their share in 2000-2001.

The median age of teachers has declined over the years. In 2011-2012 the median age of teachers was 40, lower than that of the median in 2000-2001 by four years. However, the decrease is not due to a disproportionate number of very young teachers in recent years; the 10th percentile of the age distribution of teachers has actually moved up to 28 years in 2011-2012 from 26 years in 2000-2001. There has also been a slight increase at the upper end of the distribution. The age of the teacher at the 90th percentile has increased from 57 years in 2000-2001 to 59 years in 2011-2012.

In terms of work experience within the New York City public school system, the average teacher in 2011-2012 had

	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Teacher Demographics												
Percentage Female	73.2	73.7	74.2	74.3	74.6	74.8	75.0	75.2	75.5	75.8	75.9	76.0
Percentage White	62.6	60.2	59.5	60.2	59.6	59.9	60.0	59.9	59.8	59.6	59.3	58.6
Percentage Black	21.1	22.1	22.3	21.6	21.6	20.9	20.6	20.4	20.2	20.2	20.0	19.6
Percentage Hispanic	12.8	13.9	14.0	13.6	13.6	13.5	13.6	13.8	13.9	14.1	14.3	14.4
Percentage Asian	3.2	3.5	3.9	4.4	5.0	5.3	5.5	5.7	5.8	5.9	5.9	5.9
Median Age	44	43	43	42	41	40	40	39	39	40	40	40
10 th percentile (age distribution)	26	26	26	26	26	25	25	25	26	26	27	28
90 th percentile (age distribution)	57	56	56	56	57	57	57	58	58	58	59	59
Average Work Experience in New York City Public Schools												
Years Working as a Teacher	10.9	10.3	9.9	9.3	9.1	9.0	9.1	9.2	9.4	10.0	10.4	10.6
Total Years in School System	11.0	10.4	10.0	9.4	9.2	9.1	9.2	9.3	9.5	10.1	10.5	10.7
Number of Teachers	77,088	78,048	78,132	75,361	77,056	76,934	77,886	78,816	78,882	76,543	74,680	73,373
General Education Teachers	63,905	64,743	64,421	61,448	62,641	62,111	62,522	62,867	62,374	59,402	56,825	54,778
Special Education Teachers	13,183	13,305	13,711	13,913	14,415	14,823	15,364	15,949	16,508	17,141	17,855	18,595
SOURCE: IBO calculations of Department of Education data												

New York City Independent Budget Office

spent 10.6 years teaching in the system, very similar to 10.9 years for teachers in 2000-2001. Although average experience was similar at the beginning and end of the period, the figure had trended downward in the early years of the decade before reversing in recent years. From school year 2000-2001 through 2005-2006, average teaching experience within city public schools of a public school teacher fell from 10.9 years to 9.0 years, before moving up to 10.6 years in 2011-2012. The same pattern—including a similar dip and recovery—holds if one looks at total active time in city public schools, which includes time employed in other capacities. The average teacher in 2000-2001 had been in the system for 11.0 years, just slightly more than the average teacher working in 2011-2012.

The total number of teachers rose gradually for the first three years (2000-2001 to 2002-2003). Then, after a decline in the mid-2000s, it increased again, reaching a high of 78,882 teachers in 2008-2009. Since then, there has been a large fall. The number of teachers in 2011-2012 was 73,373, a decline of nearly 5 percent over the whole period. During the same time, enrollment in New York City public schools declined by 6 percent, from 1,105,240 students to 1,041,437 students.⁸

One important trend in the city’s public schools over the last 11 years has been the large increase in both the number and the share of teachers in special education, who comprised only 17.1 percent of all teachers in 2000-2001 but 25.3 percent in 2011-2012.

The number of general education teachers has actually declined over the past decade—from 63,905 in 2000-2001 to 54,778 in 2011-2012—with the share of general education teachers falling from 82.9 percent to 74.7 percent.⁹

A recurring theme in analyses of the K-12 teaching force is its uneven distribution across schools, particularly across schools serving disadvantaged children compared with those serving children from more affluent and middle-class families. Table 2 on this page documents the distribution of demographic and professional characteristics across high-poverty, medium-poverty, and low-poverty public schools in New York City.

The percentage of female teachers is higher in high-poverty schools, at 81.3 percent, compared with the share of female teachers in either low-poverty schools (74.3 percent) or medium-poverty schools (74.5 percent). The differences are sharper in terms of racial and ethnic composition. For example, the share of white teachers is lowest in high-poverty schools, comprising less than half of all teachers; black and Hispanic teachers together make up more than half the teaching force in these schools, even though the two groups are about a third of all teachers citywide. There is a remarkably steady increase in the share of both black teachers and Hispanic teachers as one moves from low-poverty schools to medium-poverty schools, and then to high-poverty schools.

There is little difference across the schools in terms of the age-distribution of teachers; the median age of teachers is close to 40 years in each case. Teachers in all three groups of schools have on average spent more than 10 years in the city’s public schools. Teachers in low-poverty schools have spent slightly more time teaching and working in the system, but the difference in experience compared with teachers in either high-poverty or medium-poverty schools is small (about 0.4-0.5 years).

Comparing the distribution of these characteristics in 2011-2012 with the distribution in 2006-2007, there are generally only small changes over this time period in terms of demographic characteristics, but more significant

Table 2. Basic Characteristics of Teachers: Demographics and Work History, By School Poverty Levels

	All Schools	High-Poverty Schools	Medium-Poverty Schools	Low-Poverty Schools
Teacher Demographics				
Percentage Female	76.0	81.3	74.5	74.3
Percentage White	58.6	44.2	58.0	72.5
Percentage Black	19.6	25.2	20.9	12.0
Percentage Hispanic	14.4	23.7	13.1	8.2
Percentage Asian	5.9	5.2	6.5	6.1
Median Age	40	40	40	39
10th percentile (age distribution)	28	27	28	28
90th percentile (age distribution)	59	58	58	59
Work Experience in New York City Public Schools				
Years Working as a Teacher	10.6	10.3	10.2	10.7
Total Years in School System	10.7	10.4	10.3	10.8
Number of Teachers	73,373	20,933	21,769	22,855
SOURCE: IBO calculations of Department of Education data				
New York City Independent Budget Office				

Table 3. Changes in Basic Characteristics of Teachers: Demographics and Work History, By School Poverty Levels, 2006-2007 and 2011-2012

	2006-2007			2011-2012		
	High-Poverty Schools	Medium-Poverty Schools	Low-Poverty Schools	High-Poverty Schools	Medium-Poverty Schools	Low-Poverty Schools
Teacher Demographics						
Percentage Female	80.7	73.9	71.4	81.3	74.5	74.3
Percentage White	46.1	60.4	72.7	44.2	58.0	72.5
Percentage Black	27.1	21.0	13.3	25.2	20.9	12.0
Percentage Hispanic	21.6	12.3	8.0	23.7	13.1	8.2
Percentage Asian	4.8	6.0	5.6	5.2	6.5	6.1
Median Age	39	38	40	40	40	39
10th percentile (age distribution)	25	25	26	27	28	28
90th percentile (age distribution)	57	57	57	58	58	59
Work Experience in New York City Public Schools						
Years Working as a Teacher	8.4	8.5	9.7	10.3	10.2	10.7
Total Years in School System	8.5	8.6	9.8	10.4	10.3	10.8
Number of Teachers	23,489	23,162	23,915	20,933	21,769	22,855

SOURCE: IBO calculations of Department of Education data

New York City Independent Budget Office

differences in terms of teaching experience.¹⁰ Although there are more female teachers in schools at every income level, the increase was greatest at schools with the lowest levels of poverty. There were few changes, though, in racial and ethnic composition of teachers across schools with different levels of income. The share of black and Hispanic teachers at low-poverty schools remains small, together accounting for only about 20 percent of all teachers. Moreover in both 2006-2007 and 2011-2012, less than half of teachers in high-poverty schools were white. There is some evidence that the youngest teachers in the system, as measured by the 10th percentile of the age distribution, are a little older than was the case five years earlier—this is true in each type of school. However, that is more likely caused by the overall slower pace of new hires in recent years (see Table 5, page 8). Overall, there is little change in the distribution of teachers by age across different types of schools.

There has been an across-the-board increase in teachers' average work experience during the last five years. The increase is particularly striking in high-poverty schools. The average teacher in a high-poverty school in 2011-2012 had almost two extra years' worth of teaching experience compared with the average teacher in these schools in 2006-2007 (10.3 years versus 8.4 years). As mentioned previously when discussing the trend for all schools, part of the increase is due to the DOE hiring much larger numbers

of teachers in the early 2000s compared with later in the decade, so that the median age of the teaching force has also risen.

There were also differences in teacher demographic measures when looking at schools in terms of level of instruction and poverty status (Table 4, page 6). Comparing teachers in elementary and middle schools with those in high schools, there is a large gap in the share of female teachers: 84.5 percent in the former compared with 57.6 percent in the latter. The differences, however, are relatively small in terms of racial and ethnic composition: both sets of schools have about the same percentages of white, black, and Hispanic teachers. The median ages of teachers are very similar across elementary/middle schools and high schools; this is also true of the youngest teachers in either group. Teachers in elementary and middle schools have spent somewhat more time on average in New York City public schools, a difference of about one year, or 10 percent.

These patterns generally hold if schools are broken down further in terms of student poverty. However, within high-poverty schools the share of white teachers is higher at the high school level than at the elementary/middle school level, while the converse is true for low-poverty schools. For high-poverty schools, the percentage of Hispanic teachers is lower at the high school level than at the elementary/middle school level—the converse is the case for Hispanic

Table 4. Different Types of Schools and Some Basic Characteristics of Their Teachers, 2011-2012

	All Schools		High-Poverty Schools		Medium-Poverty Schools		Low-Poverty Schools	
	Elementary & Middle Schools	High School	Elementary & Middle Schools	High School	Elementary & Middle Schools	High School	Elementary & Middle Schools	High School
Teacher Demographics								
Percentage Female	84.5	57.6	83.8	57.8	83.5	57.7	86.3	57.3
Percentage White	58.8	58.4	41.5	49.8	57.6	54.4	77.4	66.4
Percentage Black	19.6	18.1	26.7	20.2	22.5	21.7	9.2	14.3
Percentage Hispanic	15.5	13.1	25.2	18.9	3.7	13.4	7.6	9.5
Percentage Asian	4.9	8.3	5.0	8.4	5.0	8.4	4.7	8.2
Median Age	40	39	41	37	40	39	39	41
10th percentile (age distribution)	28	27	28	26	28	27	28	28
90th percentile (age distribution)	58	59	58	58	58	58	58	59
Work Experience in New York City Public Schools								
Years Working as a Teacher	10.8	9.7	10.5	8.4	10.9	9.3	10.9	10.7
Total Years in School System	10.8	9.8	10.6	8.5	10.9	9.4	10.9	10.8
Number of Teachers	46,359	19,198	15,032	4,987	16,359	5,976	14,968	8,235

SOURCE: IBO calculations of Department of Education data

New York City Independent Budget Office

teachers in medium-poverty and low-poverty schools. Within low-poverty schools, the shares of both black and Hispanic teachers in elementary and middle schools is pretty low—less than 10 percent each—even lower is the share of Hispanic teachers in medium-poverty elementary and middle schools.

In terms of age, there is little difference across elementary/middle school teachers and high school teachers. Within high-poverty schools, teachers in high schools are considerably younger than teachers in elementary/middle schools, but there is not much difference elsewhere. Regarding work experience in New York City public schools, elementary and middle-school teachers have about a year’s extra experience compared with high-school teachers (10.8 years versus 9.8 years). This pattern also holds within each of the three groups of schools defined by poverty, with the widest gap in experience between elementary/middle schools and high schools for teachers in high-poverty schools.

Why Teacher Characteristics Matter

As many commentators have pointed out, it is difficult to correctly assess how well individual teachers will perform in the classroom. In recent years, with student-level longitudinal data becoming more readily available, concurrent with noteworthy developments in statistical

techniques, some researchers have tried to separate out the contribution that each teacher makes to the academic gains of their students—the teacher’s “value-added.” The motivation for looking at actual classroom performance is that variation in the traditional teacher quality measures (such as teacher qualifications) can only explain a fraction of the total variation in teacher quality as measured by gains in student test scores.¹¹ Although the value-added methodology holds promise, at present there are both conceptual and practical difficulties with estimating value-added for individual teachers.¹² Researchers more commonly employ readily available measures of individual teacher’s observable and pre-service attributes as proxies for teacher quality, though they are increasingly going beyond the usual indicators (like whether or not the teacher holds a master’s degree, whether or not the teacher is certified, and years of teaching experience).¹³

At first glance the implications of teachers’ race, ethnicity, and gender on students in general, and student achievement in particular, may not be obvious. But these might have important consequences depending on the students a teacher is matched with. Many researchers believe that minority students are more likely to excel educationally when matched with teachers who share their race or ethnicity. Among the positive impacts are “role-model” effects, where the simple presence of

a demographically similar teacher raises a student's academic motivation and expectations.

Conversely, under what is called “stereotype threat” effects students perceive stereotypes (for example, female students with male teachers or black students with white teachers) that may impede their academic achievement. There can also be effects working through unintended biases in teachers' expectations of and interactions with students who have different demographic traits. An analysis of data from Tennessee's Project STAR randomized class-size experiment indicates that assignment to a racially similar teacher is associated with substantive gains in achievement for both black and white students.¹⁴ Another study finds that the racial, ethnic, and gender dynamics between students and teachers have consistently large effects on teacher perceptions of student performance. The effects associated with race and ethnicity, however, were mostly concentrated among students of low socioeconomic status and those in the South.¹⁵

Interactions between teachers and students with respect to gender are also often found to be important. An earlier study had used a large, nationally representative dataset to argue that assignment to a same-gender teacher significantly improves the achievement of both boys and girls as well as teacher perceptions of student performance and student engagement. The estimated effects were large—for example, just one year with a male English teacher was found to eliminate nearly a third of the gender gap in reading.¹⁶ A more recent study, using data from a randomized experiment, found that having a female teacher lowers the math test scores of female primary school students in disadvantaged neighborhoods. However, there is no effect of having a female teacher on male students' test scores (math or reading) or female students' reading test scores.¹⁷

There is consensus among educational researchers that the experience level of a teacher is an important factor in teacher effectiveness. There is disagreement, though, as to whether the impacts are only concentrated in the first few years. The conventional wisdom used to be that additional years of experience, after the initial three years, do not lead to any significant benefits for the children concerned. But this is being challenged by recent analyses. A study from New Jersey finds the impact of teacher experience to vary by subject matter—the effect of experience on reading comprehension and vocabulary achievement went on increasing much beyond the third year of teaching.¹⁸ Another study of students and teachers in North Carolina finds that the benefit of experience on student performance

in reading and math rises very sharply in the first few years. Thereafter, it continues to increase throughout a teacher's career, but only at marginal rates.¹⁹

Teacher Turnover

Research on teacher quality has paid particular attention to the issue of teacher mobility, out of concern that the most disadvantaged students are often left with the most inexperienced and less-qualified teachers. This recognition is reflected in the federal No Child Left Behind Act, which stipulates that there should be a “qualified” teacher in every classroom in the country. While researchers agree that some amount of turnover might actually be healthy for schools to be dynamic and effective, teacher mobility unrelated to improving the school-teacher match is likely to be detrimental and impose considerable costs in terms of both time and effort.

Turnover rates among New York City public school teachers—distinguishing between transfers to teaching or nonteaching jobs in other schools within the system, and leaving the system—have declined during the period studied in this brief. About 50 percent of the new teachers hired in 2008-2009 left their original school within three years, a lower three-year attrition rate than for teachers hired in 2000-2001. The share of the 2008-2009 cohort of teachers quitting New York City public schools entirely after three years is 30 percent, and here again the attrition rate has been declining in recent years. Looking at teacher turnover in schools disaggregated by poverty, there is a steady decline in attrition as one moves from high-poverty schools to medium-poverty schools to low-poverty schools. Teachers in high-poverty schools transfer to other New York City public schools in larger numbers, suggesting that student characteristics might be an important factor in turnover decisions.

IBO followed successive cohorts of new teachers in New York City, starting with those who began teaching in the city's public schools in 2000-2001, and ending with those starting out in 2010-2011 (who are followed for just one year). Table 5 (on page 8) summarizes the turnover status after each year, disaggregated by cohort. The top panel shows the percentages of teachers that left teaching at their original schools, while the bottom panel shows the percentages of teachers who left the entire New York City public school system.²⁰

Looking at the first cohort of 8,872 new teachers in 2000-2001, the following trends stand out. First, a large number of these new teachers quit teaching at their original schools after the first, second, and third years; by the start

Table 5. Turnover Rates of New Teachers, New York City Public Schools, 2000-2001 Through 2011-2012*All rates as of October 31 of each year*

New Teachers in:	Number of Teachers	Percent That Left Their Teaching Jobs at Their First School Assigned										
		Within 1 Year	Within 2 years	Within 3 Years	Within 4 Years	Within 5 Years	Within 6 Years	Within 7 Years	Within 8 Years	Within 9 Years	Within 10 Years	Within 11 Years
2000-2001	8,872	32	46	58	65	70	74	77	78	79	80	81
2001-2002	9,437	30	49	58	64	69	72	74	76	77	79	
2002-2003	8,375	31	47	58	65	70	73	75	77	79		
2003-2004	8,552	27	44	56	63	68	71	74	76			
2004-2005	7,763	25	41	53	59	63	67	70				
2005-2006	7,769	24	41	51	58	63	68					
2006-2007	7,305	23	40	50	57	63						
2007-2008	7,497	21	37	48	56							
2008-2009	6,013	24	39	50								
2009-2010	2,595	19	37									
2010-2011	3,031	20										

New Teachers in:	Number of Teachers	Percentage That Left New York City Public School System										
		Within 1 Year	Within 2 years	Within 3 Years	Within 4 Years	Within 5 Years	Within 6 Years	Within 7 Years	Within 8 Years	Within 9 Years	Within 10 Years	Within 11 Years
2000-2001	8,872	21	29	41	44	49	51	54	55	55	56	57
2001-2002	9,437	18	34	39	44	48	50	52	53	54	55	
2002-2003	8,375	19	30	40	44	49	52	53	54	55		
2003-2004	8,552	13	27	37	42	47	48	50	51			
2004-2005	7,763	14	26	36	41	44	46	48				
2005-2006	7,769	12	26	36	40	43	46					
2006-2007	7,305	13	25	32	37	42						
2007-2008	7,497	12	22	29	35							
2008-2009	6,013	11	21	30								
2009-2010	2,595	8	19									
2010-2011	3,031	9										

SOURCE: IBO calculations of Department of Education data

New York City Independent Budget Office

of year four, less than half of the cohort (42 percent) was teaching at their original schools. Presumably many of the new teachers who leave during the first few years are disenchanted with the profession, the school environment, or both. Conversely, many of the teachers who remain may develop an attachment to the school with the passage of time and teach there until retirement.

Second, the quit rate from the system, defined as the rate of leaving the city's public school system and shown in the bottom panel of Table 5, closely mirrors the trends in leaving one's original teaching job. The quit rate is quite high in the first few years of employment but then stabilizes. Roughly 21 percent of the original cohort had left New York City public schools after their first year, and almost half had left after the fifth year. But the overwhelming majority of those who remain for five years

also continue to serve after 10 years. Taken together, the trends in the top and bottom panels suggest that fewer and fewer teachers leave their schools after the first year or two of teaching and that the rate of attrition declines sharply over the first three years.

Third, transfers to jobs at other schools within the system—either in teaching or otherwise—or to nonteaching jobs at the original school increase during the first few years but stabilize by the fourth year or so.²¹ Finally, of the various nonteaching jobs, assistant principalship—often at the original school—is among the most common, though most new teachers who eventually become assistant principals (or principals) do not become so for some years.

The results for the successive cohorts are very similar, with relatively large quit rates in the beginning followed by a

leveling out. But looking across the cohorts an important trend stands out: there has been a striking decline in the propensity to leave. This is true whether looking at the propensity to leave one’s original teaching job or looking at the propensity to leave the system altogether.

For example, for teachers who had newly started teaching in 2000-2001, about a third (32 percent) left after the first year, and almost half (46 percent) had left after two years. In contrast, for teachers who started teaching in 2009-2010, only 19 percent left their current school after one year and 37 percent had left after two years. The steady decline across the years suggests that this is not a temporary blip but rather a longer-term phenomenon. The rate of leaving one’s initial school within three years has declined from 58 percent for new teachers in 2000-2001 to 50 percent for new teachers in 2008-2009. The picture is the same when looking at quit rates out of New York City public schools; for example, compared with new teachers in 2000-2001, new teachers in 2010-2011 left at less than half the rate (9 percent compared with 21 percent) after one year.

It is interesting to note that this decline in the rate of leaving one’s original teaching job was occurring at the same time that the New York City Department of Education was implementing an ambitious program of closing ‘failing’ schools and opening up new—often smaller—schools, thereby creating many new openings for existing teachers. Between 2002-2003 and 2011-2012, the DOE closed 98 traditional public schools and opened 402 new schools. In addition, the number of charter schools operating in the city increased from 17 in 2002-2003 to 135 in 2011-2012. All else equal, the closing of some schools and the creation of many more new ones would by itself be expected to increase ‘churning’ of teachers within and outside the system.

One of the well-documented facts regarding teacher mobility is the higher rate of teacher attrition from schools serving disadvantaged children. Based on data on student poverty from 2006-2007, New York City public schools are divided into three groups: high-poverty schools, medium-poverty schools, and low-poverty schools. IBO then measured the turnover status of new teachers—in this case, those starting out in 2006-

2007—across these three groups of schools. Once again, the top panel in Table 6 (below) shows the incidence of leaving one’s original teaching job while the bottom panel shows the incidence of quitting New York City public schools. Also, for comparison, the turnover rates for all new teachers in 2006-2007 are reproduced from Table 5.

Looking first at the propensity to quit teaching at one’s original school, new teachers in high-poverty schools quit at slightly higher rates than their peers in medium-poverty and low-poverty schools. In fact, there is a steady decline in the quit-rate as one goes from high-poverty schools to medium-poverty schools to low-poverty schools, and it is true regardless of whether one is looking at one-year quit rates or quit rates for any of the subsequent years. Note also that the gap between high-poverty and low-poverty schools in the percentage of teachers who leave their current schools widens significantly with time. After five years, more than two-thirds of new teachers in high-poverty schools had left compared with roughly half of those in low-poverty schools. It is also interesting to note that attrition rates for teachers in medium-poverty schools are much closer to rates for teachers in high-poverty schools than to rates for teachers in low-poverty schools, as far as their attrition is concerned.

The same pattern holds for quit rates out of the New York City public school system. One interesting aspect is that the difference between new teachers in high-poverty and

Table 6. Turnover Rates of New Teachers, New York City Public Schools, High-Poverty, Medium-Poverty and Low-Poverty Schools
New teachers as of October 31, 2006; All rates as of October 31 of each year

	Number of Teachers	Percent That Left Their Teaching Jobs at Their First School Assigned				
		Within 1 Year	Within 2 Years	Within 3 Years	Within 4 Years	Within 5 Years
All New Teachers	7,305	23	40	50	57	63
New Teachers in:						
High-Poverty Schools	2,555	23	44	55	63	68
Medium-Poverty Schools	2,302	22	40	51	59	65
Low-Poverty Schools	1,908	18	30	39	46	52
	Number of Teachers	Percentage That Left New York City Public School System				
		Within 1 Year	Within 2 Years	Within 3 Years	Within 4 Years	Within 5 Years
All New Teachers	7,305	13	25	32	37	42
New Teachers in:						
High-Poverty Schools	2,555	14	30	37	43	47
Medium-Poverty Schools	2,302	13	26	33	38	42
Low-Poverty Schools	1,908	11	20	26	30	34

SOURCE: IBO calculations of Department of Education data
New York City Independent Budget Office

in low-poverty schools in the rate of leaving one's original teaching job is higher than the corresponding difference in the rate of leaving the system, so that some of the difference is accounted for by transfers within the system. In other words, teachers in high-poverty schools transfer to other New York City public school teaching jobs in larger numbers. This suggests that student demographics can be an important factor in turnover decisions, in so far as other districtwide factors such as leadership, bureaucracy, curriculum, and various district or state policies are likely to affect all schools in the system more or less equally.

Conclusion

In this brief IBO analyzed recent trends in various measurable characteristics of teachers in New York City's public schools, including their distribution across different types of schools, and their patterns of turnover and mobility. IBO finds that the school system's teaching force has become slightly more diverse over the last 12 years, and the share of teachers who are female has gradually increased. The median age of teachers has fallen, but the average years of experience were just slightly lower in 2011-2012 than in 2000-2001. There were fewer teachers overall in 2011-2012 than in 2000-2001, though the number of special education teachers has significantly increased.

The percentage of white teachers is considerably lower, and the percentages of black and Hispanic teachers higher, in high-poverty schools compared with both low-poverty and medium-poverty schools. But there has been a considerable increase in average experience of teachers in high-poverty schools over the last five years. IBO also finds that a much lower share of high school teachers are female, compared with elementary and middle school teachers.

In addition, IBO's examination of human resources data finds that attrition rates for teachers have been declining in recent years—for example, attrition after the first year of teaching has declined by half or more over the last decade. Roughly half of the new teachers hired by the school system each year leave their original school within three years, and about a third quit New York City public schools entirely by that time. While the rate of turnover is highest in the first year, it gradually declines thereafter. Many of those who leave their initial teaching jobs either remain in the same school in another capacity— most typically becoming an assistant principal—or transfer to another New York City public school. There is a steady decline in attrition in going from schools that serve more low-income students to schools that serve fewer low-income students—teachers in high-poverty schools also transfer to other New York City public schools in larger numbers than those in low- or medium-poverty schools.

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Endnotes

¹Works by Rivkin, Hanushek and Kain (2005) and Rockoff (2004) highlight the importance of teacher quality and equitable distribution of good teachers. See Steven G. Rivkin, Eric A. Hanushek and John F. Kain, "Teachers, Schools, and Academic Achievement," *Econometrica*, Vol. 73, No. 2, March, 2005, pp. 417-458; Jonah E. Rockoff, "The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data," *The American Economic Review* 94, 2004, pages 247-252. Subsequent work has found that students who had been assigned to teachers with high estimated value-added, as measured by students' test scores, are more likely to attend college, attend higher-ranked colleges, and earn higher salaries. See Raj Chetty, John N. Friedman and Jonah E. Rockoff, "The Long-Term Impacts of Teachers: Teacher Value-Added and Student Outcomes in Adulthood," *National Bureau of Economic Research Working Paper 17699*, December 2011.

²See Hamilton Lankford, Susanna Loeb and James Wyckoff, "Teacher Sorting and the Plight of Urban Schools: A Descriptive Analysis," *Educational Evaluation and Policy Analysis*, Spring 2002, Vol. 24, No. 1, pp. 37-62.

³This importance given to teachers is reflected in this extract from a commentary by then-Chancellor Joel Klein in 2010: "No reform is more critical to closing the nation's shameful achievement gap than boosting the quality of teachers in high-poverty schools." See Joel Klein, "Grading teachers: Value-added test is indispensable," *Houston Chronicle*, February 20, 2010.

⁴For a discussion of these policies, see Margaret Goertz, Susanna Loeb and Jim Wyckoff, "Recruiting, Evaluating and Retaining Teachers: The Children First Strategy to Improve New York City's Teachers," in Jennifer A. O'Day, Catherine S. Bitter, and Louis M. Gomez (eds.) *Education Reform in New York City: Ambitious Change in the Nation's Most Complex School System*, Harvard Education Press, 2011.

⁵Salaries for a teacher with a BA and no prior experience increased by over 13 percent in real terms between 2000 and 2008, with most of the increase occurring earlier in the decade. See Donald Boyd, Hamilton Lankford, Susanna Loeb, Jonah Rockoff and James Wyckoff, "The Narrowing Gap in New York City Teacher Qualifications and Its Implications for Student Achievement in High-Poverty Schools," *Journal of Policy Analysis and Management*, Vol. 27, No. 4, 2008, pages 793-818.

⁶Information is only available regarding the time spent in these respective activities within New York City public schools. It is possible that many of these teachers have had long careers in other school districts, or in private schools or charter schools, so that the time in New York City public schools is an underestimate of their total time as educators.

⁷As is the convention, eligibility for free or reduced-price lunches is used as a proxy for poverty. Data on the percentage of students by school eligible for such lunches are derived from the New York City Department of Education's School Allocation Memorandums (SAMs) produced by the Division of Financial Management and Planning (<http://schools.nyc.gov/Offices/DBOR/AM/default.htm>). Each year's SAM is based on information from the prior year's audited register.

⁸See Table 2.10, Public School Enrollment Trends, 1999-2000 Through 2011-2012, *New York City Public School Indicators: Demographics, Resources, Outcomes*, May 2013, New York City Independent Budget Office.

⁹There has been a concurrent increase in the number and share of special education students. In 2000-2001, there were 83,764 special education students in the city's public schools. By 2011-2012, the figure had more than doubled, reaching 183,831. Overall, 17 percent of all students (pre-K through grade 12) are now enrolled in special education. See *New York City Public School Indicators: Demographics, Resources, Outcomes*, New York City Independent Budget Office, May 2013.

¹⁰The brief uses a five-year window to focus on more recent changes. If indeed there have been such changes then one might expect some of the trends to continue.

¹¹See Steven G. Rivkin, Eric A. Hanushek and John F. Kain, March, 2005, pages 417-458; Jonah E. Rockoff, *The American Economic Review* 94, 2004, pages 247-252.

¹²These include nonrandom assignment of teachers to students which may yield biased estimates of teacher quality; inability to calculate classroom-level value-added estimates for teachers who are either teaching in nontested grades and subjects or are new teachers; an inability of many standardized tests to capture the skills that society cares about; absence of consensus on the proper value-added model; instability of the value-added measures from year to year; and possible gaming of the system, like teaching to the test or even outright cheating.

¹³Some studies that employ richer datasets have found evidence that certain indicators, including teacher test scores and teaching experience, might be related to student outcomes. In a recent paper exploring teacher mobility in North Carolina, Clotfelter, Ladd and Vigdor (2011) find that teachers' average licensure test scores, whether they graduated from a very competitive undergraduate institution, years of teaching experience and whether they are certified by the National Board for Professional Teaching Standards are each predictive of student achievement. See Charles T. Clotfelter, Helen F. Ladd and Jacob L. Vigdor, "Teacher Mobility, School Segregation, and Pay-Based Policies to Level the Playing Field," *Education Finance and Policy*, 2011, Summer, pages 399-438.

¹⁴See Thomas Dee, "Teachers, Race, and Student Achievement in a Randomized Experiment," *The Review of Economics and Statistics*, February 2004.

¹⁵See Thomas Dee, "A Teacher Like Me: Does race, ethnicity or gender matter?" *The American Economic Review*, May 2005, Volume 95, Issue 2, 158-165. Note that Dee does not find any significant effects for the Northeast. However, the absence of an overall effect for the Northeast does not preclude effects for individual states or districts within the region.

¹⁶See Thomas Dee, "Teachers and the Gender Gaps in Student Achievement," *Journal of Human Resources* 42(3), Summer 2007, pages 528-554.

¹⁷See Heather Antecol, Ozkan Eren, and Serkan Ozbeklik, "The Effect of Teacher Gender on Student Achievement in Primary School," forthcoming in *The Journal of Labor Economics*. This study also contains a review of existing literature on the effect of having a female teacher on different academic outcomes, including performance in math and the decision to major in math or science.

¹⁸See Jonah E. Rockoff, "The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data," *The American Economic Review* 94, 2004, pages 247-252.

¹⁹See Charles T. Clotfelter, Helen F. Ladd, and Jacob L. Vigdor, "Teacher-Student Matching and the Assessment of Teacher Effectiveness," *Journal of Human Resources*, XLI (4), 2006, 778-820; and Charles T. Clotfelter, Helen F. Ladd, and Jacob L. Vigdor (2010). "Teacher Credentials and Student Achievement in High School: A Cross-Subject Analysis with Student Fixed Effects," *Journal of Human Resources*, 45(3), 2010, 655-81.

²⁰The difference between the top and bottom panels is accounted for by individuals who either remain in their original schools in some other professional capacity (for example, as assistant principals) or transfer to other New York City traditional public schools.

²¹For the sake of brevity the brief does not separately show the break down, in terms of job assignments, of those who take up another job (either teaching or nonteaching) within the system. The share of people who left teaching at their original school but did not leave the New York City public schools is equal to the difference between the numbers in the top and bottom panels of the table. For example, 32 percent of the new teachers hired for 2000-2001 were not teaching at the same school the next year, but only 21 percent had entirely left the system. The remaining 11 percent were either working in a different capacity in the same school (for example, as an assistant principal) and/or in a different school within the system.