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## Separate and Unequal – Title I and Teacher Quality

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**Abstract:** Research has shown that Title I's "comparability" provision causes gaps in noncategorical per pupil teacher funding. Using a unique dataset that merges 2009-2010 New York City (NYC) Department of Education value-added scores, school finance data, and school demographic data, this study not only confirms that NYC Title I elementary schools received less noncategorical per pupil teacher funding than non-Title I elementary schools, but these schools also had lower quality teachers. This paper provides the first evidence of a negative relationship between noncategorical per pupil teacher funding and the percentage of below average teachers even when controlling for certain school demographics. If Title I elementary public schools in New York City have lower quality teachers, then the students that are served by these schools are not receiving the same quality of education as their peers. Changing the comparability provision in Title I funding would result in more equitable funding.

**Keywords:** Title I; teacher quality; value-added; New York City; equitable funding

### Separado y desigual - Título I y calidad docente

**Resumen:** La investigación ha demostrado que la disposición de "comparabilidad" del Título I causa brechas en la financiación no docente por profesor por alumno. Al utilizar un conjunto de datos único que combina las puntuaciones de valor agregado del

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Departamento de Educación de la Ciudad de Nueva York (NYC, por sus siglas en inglés) de 2009-2010, los datos de finanzas escolares y los datos demográficos de las escuelas, este estudio no solo confirma que las escuelas primarias de Título I de la Ciudad de Nueva York recibieron menos fondos no docentes por alumno por profesor en comparación con las escuelas primarias que no pertenecen al Título I, pero estas escuelas también tenían maestros de menor calidad. Este documento proporciona la primera evidencia de una relación negativa entre la financiación no docente por alumno y el porcentaje de docentes por debajo del promedio, incluso cuando controlan ciertos datos demográficos escolares. Si las escuelas públicas primarias de Título I en la ciudad de Nueva York tienen maestros de menor calidad, entonces los estudiantes a los que asisten estas escuelas no reciben la misma calidad de educación que sus compañeros. Cambiar la disposición de comparabilidad en el financiamiento del Título I resultaría en un financiamiento más equitativo.

**Palabras-clave:** Título I; calidad docente; valor añadido; Nueva York; financiación equitativa

### **Separado e desigual - Título I e qualidade de ensino**

**Resumo:** A pesquisa mostrou que a provisão de "comparabilidade" do Título I causa lacunas no financiamento não docente por professor por aluno. Ao usar um conjunto de dados exclusivo que combina as pontuações de valor agregado do Departamento de Educação de Nova York (NYC) para 2009-2010, dados de finanças escolares e dados demográficos escolares, este estudo não apenas confirma que as escolas de ensino fundamental do Título I de Nova York receberam menos financiamento não docente por aluno por professor em comparação com as escolas de ensino fundamental não pertencentes ao Título I, mas essas escolas também tinham professores de baixa qualidade. Este documento fornece a primeira evidência de uma relação negativa entre o financiamento não docente por aluno e o percentual de professores abaixo da média, mesmo quando se controla determinados dados demográficos da escola. Se as escolas públicas de Title I, na cidade de Nova York, têm professores de baixa qualidade, então os alunos dessas escolas não recebem a mesma qualidade de educação que seus colegas. Mudar a provisão de comparabilidade no financiamento do Título I resultaria em financiamento mais equitativo.

**Palavras-chave:** Título I; qualidade de ensino; valor acrescentado; Nova York; financiamento equitativo

## Introduction

Title I of the Elementary and Secondary Education Act (ESEA) provides federal funds to state and local education agencies in order to increase funding for high-poverty students in order to help break the cycle of poverty (Jennings, 2000). Initially, Title I funds were not reaching high-poverty students so two provisions, “supplement, not supplant” and “comparability,” were added as the foundations to the Title I funds allocation. The two provisions were meant to ensure that federal funds would make school spending higher in schools with high-poverty students than in neighboring schools in the same district. The “supplement, not supplant” requirement aims to ensure that Title I funds provide additional money to schools with high-poverty students, while the “comparability” provision requires that school districts must equalize local and state funding before Title I money can be distributed by the federal government (U.S. Department of Education, 2011).

Through the “comparability” and “supplement, not supplant” provisions, students who are eligible for Title I funds are supposed to get more funding which should translate into better teachers, smaller classes, more instructional time, or extra programs that would help to close the achievement gap. However, there is evidence that Title I’s comparability provision is not ensuring that students in Title I schools are receiving equal funding prior to the distribution of Title I funds (Roza, Miller, & Hill, 2005).

The use of average district salary instead of using actual labor costs is one of the reasons why funding is not equitable prior to the distribution of Title I funds. This is especially true in a district that covers such a large area like the New York City Department of Education (NYC DOE) that operates on a salary schedule that includes years of experience and level of education completed when calculating each teachers’ salary. In addition, there are several programs that service the NYC DOE in alternate route teacher certifications such as the New York City Teaching Fellows Program and Teach for America. These programs allow for teachers to teach with a bachelor’s degree during this time and receive a lower salary. These teachers are most often placed in high needs schools and therefore, these schools are paying significantly less for their teachers than schools that are not using teachers who are entering with a master’s degree (Ingersoll, 2004).

Title I’s “comparability” provision allows school districts to exclude teacher salary differences from calculations and instead use district average for teacher salaries. Schools in the same district with the same number of teachers will report the same amount of money spent in terms of teachers’ salaries even if there are differences based on teacher experience (Luebchow, 2009). As a result, Title I schools with novice teachers are at a financial disadvantage because funding is not equalized prior to the distribution of Title I funds (Roza, Miller, & Hill, 2005). This “comparability loophole” allows districts to make it look as if all teachers make the same amount of money even though there are huge disparities.

On average, schools with low-income students have fewer veteran teachers who are at the top of the salary scale. Veteran teachers often transfer to more affluent schools with better funding. As a result, higher paid, more experienced teachers wind up in more affluent schools and lower-paid, less experienced teachers wind up at low income schools, triggering a cycle of inequity in regards to teacher experience. Researchers have found that teacher effectiveness increases during the first five to seven year of teaching (Fetler, 1999; Murnane & Phillips, 1981); however, it is not possible to accurately judge a teachers’ effectiveness by his or her salary. This paper aims to look at the relationship between teacher spending gaps and teacher quality gaps across New York City public

schools by Title I status and the percentage of free and reduced price lunch eligible students. In particular, this paper looks at the noncategorical<sup>1</sup> overall and teacher<sup>2</sup> per pupil spending gap.

In 2012, the NYC DOE released a list of individual value-added scores for thousands of its fourth through eighth grade public school teachers for the 2007-2008 through 2009-2010 school years. The 2009-2010 school year had 11,497 teachers in 1,060 public elementary and secondary schools. Within this dataset, 4,640 teachers taught in 602 elementary schools in the NYC DOE. Value-added scores aim to provide unbiased estimates of teacher quality using school and parent characteristics that are not controlled for in traditional student growth estimates (Chetty, Friedman, & Rockoff, 2014).

This was the first and only release of identifiable teacher quality data in NYC and provides a unique opportunity to explore the relationship between teacher quality and equitable funding in Title I schools due to Title I's "comparability" provision in NYC's elementary schools. The final dataset study used in this study had 4,640 teachers in 526 elementary schools across the five boroughs in the NYC DOE. During the 2009-2010 school year, there were 602 elementary schools in the NYC DOE with 27,937 teachers. Therefore, the final dataset used in this study represents 17% of the teachers in 97% of the elementary schools in the NYC DOE during the 2009-2010 school year. This is not surprising since there were over 66,804 teachers in the 1,474 schools in the NYC DOE during the same year. This occurs because only teachers who taught testable subjects and grades received a value-added rating. Furthermore, teachers only received a value-added score if they taught at least 20 students in a year and were teachers for at least three years (Value-Added Research Center, 2010).

Using the 2009-2010 value-added ratings of elementary public school teachers in the NYC DOE as a measure of teacher quality, school report card data, and school finance data, this paper explores the disparities in teacher quality at the school-level between Title I and non-Title I elementary schools while controlling for the percentage of free and reduced priced lunch students and links the teacher quality gap back to issues of school finance in the NYC DOE for the 2009-2010 academic year. The first question that this paper investigates is: did Title I elementary schools in New York City receive less noncategorical per pupil teacher funding than non-Title I elementary schools in New York City. This paper shows that Title I elementary schools in New York City received \$214.49 less in noncategorical per pupil teacher funding than non-Title I elementary schools during the 2009-2010 school year. The analysis dives a little deeper and looks at differences between Title I schools while controlling for the percentage of free and reduced price lunch students. On average, Title I elementary schools received \$673.94 less noncategorical per pupil teacher funding than non-Title I elementary schools while controlling for the percentage of free and reduced price lunch students. This implies that schools with the most amount of socioeconomically disadvantaged students receive the least amount of per pupil teacher funding prior to the distribution of Title I funds.

The paper also investigates the disparities in teacher quality between Title I and non-Title I elementary in New York City. The analysis shows that there was a gap in teacher quality between Title I and non-Title I schools in New York City. The average teacher value-added score is 4.26

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<sup>1</sup> Noncategorical spending is intended to cover the basic costs of education and categorical funding is targeted to specific purposes like Title I funding and programs for English language learners.

<sup>2</sup> Teacher per pupil spending is defined as expenditures that cover teacher salaries. Noncategorical teacher per pupil spending is defined as expenditures that cover teacher salaries that is intended to cover the basic costs of education. Overall teacher per pupil spending is defined as expenditures that cover teacher salaries that is intended to cover the basic costs of education and targeted to specific purposes like Title I funding and English language learners.

points lower for teachers in Title I elementary schools in New York City, which translates into a .05 standard deviation difference by Title I status.<sup>3</sup> In addition, free and reduced price lunch students in Title I elementary schools have a higher exposure rate to low and below average teachers than free and reduced price lunch students in non-Title I schools.

Since there is per pupil teacher spending gap and a teacher quality gap between Title I and non-Title schools, this paper also examines the relationship between funding gap and the teacher quality gap. This paper provides the first evidence that there is a negative relationship between the proportion of low and below average teachers in a school and noncategorical per pupil teacher funding, while controlling for the percentage of English language learners, the percentage of free and reduced price lunch students, and borough effects. On average, schools with more low and below average teachers also had less noncategorical per pupil teacher funding in the 2009-2010 school year.

The rest of the paper proceeds as follows. The next section reviews the relevant literature on Title I and teacher quality. Section 3 describes the data used in the analyses. Then, Section 4 discusses the results in three parts: (1) the gap in per pupil funding between Title I and non-Title I schools while looking at the percentage of free and reduced priced lunch; (2) the teacher quality gap between Title I and non-Title I elementary schools; and (3) the relationship between school funding and teacher quality in Title I elementary schools. Section 5 is devoted to concluding remarks.

## **Literature Review**

### **Title I**

Title I was first enacted as part of the ESEA of 1965. Congress has reauthorized ESEA several times since then, with the most recent reauthorization occurring in 2015 as the Every Student Succeeds Act (ESSA). Title I provides funding and guidelines for providing an education to “educationally disadvantaged” children. Title I focuses on providing funding to school districts and schools with high concentrations of students who are typically from poor families (McLaughlin, 1974).

In the 2009-2010 school year, over 56,000 public schools in the United States used Title I funds for 21 million children in kindergarten through fifth grade (U.S. Department of Education, 2005) During the same year, 98% of the 4,817 public schools in the NYC DOE were Title I schools. In order for a school to be eligible to receive Title I funds, the percentage of students who are free and reduced lunch eligible must meet a certain threshold. Eligibility for free and reduced lunch is determined through the completing of a free lunch form or if the student is receiving public assistance that has similar income requirements such as food stamps. NYC DOE has a County Provision that requires that Title I funds be allocated among the five boroughs based on each county’s share of poverty county in the federal census and due to this, there are separate Title I poverty cutoffs for each borough. In order for an entire school to qualify for Title I funds in four of the five boroughs – the Bronx, Brooklyn, Queens and Manhattan – at least 40% of students must be enrolled in the free or reduced lunch program. In order for an entire school to qualify for Title I funds in Staten Island, the lowest poverty rate for designating a school eligible is used and 35% of

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<sup>3</sup> Teacher value-added scores ranged from 0 to 100. Based on these scores, teachers were given a rating: teachers with scores from 0-4 were rated Low; teachers with scores from 5-24 were rated Below Average; teachers with scores from 25-74 were rated Average; teachers with scores from 75-94 were rated Above Average; and teachers with scores from 95-99 were rated High (Value-Added Research Center, 2010).

students must be enrolled in the free or reduced lunch program (New York City Department of Education, 2009).

Not only are there different poverty cutoffs for each borough, there are different per capita amounts provided by borough. The city-wide public school allocation per capita was \$1,123.05 during the 2009-2010 school year. However, each borough has a different amount. Staten Island and Queens received the least amount of per capita funding at \$768.81 and \$788.54, respectively. Public schools in Manhattan received close to the city-wide average at \$1,206.82. The Bronx and Brooklyn received the most at \$1,418.83 and \$1,443.73, respectively (New York City Department of Education, 2009). Differences in Title I determination and allocations by borough may account for some of the differences that are observed across boroughs in the results; however, the fixed effects regression models that look at the impact of per pupil funding on teacher quality does control for borough effects. Therefore, the final results should not be impacted by these differences.

In order to close the achievement gap, it is necessary to provide low income students with higher per pupil spending than their peers (Reschovsky & Imazeki, 1997). Students from disadvantaged backgrounds are more expensive to educate because they bring different challenges and needs to classrooms and schools. This evidence should demonstrate that districts should provide additional funding to enable students within high-poverty districts to master challenging academic standards (Roza & Lake, 2015). In fact, several districts calculate their per pupil formula based on student needs and give extra funding based on student need (Carey, 2002). In fact, New York State's per pupil index provides higher weights for students who qualify for free and reduced priced lunch and English language learners (The State Department of Education, 2009).

In the NYC DOE, a school could receive Title I funds through a school-wide program (SWP) or receive targeted assistance. A SWP is based on a school-wide plan designed to improve instruction at the school level. In addition, there must also be a plan to provide intensive professional development for staff and parents (New York City Department of Education, 2009). Since the data used in this study is at the school level, the findings only focus on SWPs.

## **Funding Gap**

The "comparability" provision of Title I requires that school districts equalize educational services that local and state sources fund before Title I funds can be issued by the federal government. This ensures that high needs schools receive more funds than other schools. However, the comparability provision allows for schools to use the average teacher salary for the district instead of reporting the actual salaries. As a result, two schools in the same district to be considered monetarily comparable even if the teacher salaries in one school is higher than the other due to differences in teacher experience (Luebchow, 2009).

Because teacher salary schedules are based on years of teaching experience and education credentials, the difference in salaries between an inexperienced and experienced teacher within the same district is usually large. For example, in 2010 in the NYC DOE, a first-year teacher with a master's degree was paid \$51,425, while a veteran teacher with 10 years of experience and the same credentials was paid \$72,990, a difference of \$21,565 (New York City Department of Education, 2008). Therefore, schools with less experienced teachers actually spend less than schools with more experienced teachers and this difference is not accounted for through the comparability provision loophole (Luebchow, 2009).

Roza and Hill (2004) found that four out of five urban districts spent less on schools in the highest poverty quartile than those in the lowest poverty quartile with disparities ranging from 10% to 23% of a school's budget. In addition, 42 of the largest 50 school districts spent less on teachers

in high-poverty schools than low-poverty schools within the same district by an average of \$2,576 per teacher (Hall & Ushomirsky, 2010). Large districts, like the NYC DOE, that serve diverse neighborhoods and student populations have increased intra-district spending disparities (Roza, Miller, & Hill, 2005). These disparities put students in Title I schools at a disadvantage in terms of funding as they are being educated by more novice teachers.

There tends to be an accumulation of higher-paid, more senior teachers working in low-poverty schools. As a result, more schools with less poor students have a financial advantage that is linked to the qualifications and experience of their teachers (Roza, Miller, & Hill, 2005; Roza & Hill, 2004). So while Title I elementary schools are supposed to have similar quality teachers as those in non-Title I elementary schools, this is not the case and low-income students are not receiving the same quality education as their peers (Bireda, 2011). The funding imbalance created by this situation can amount to significant amounts of dollars between schools.

Several studies have found Title I funds do not play a significant role in increasing student achievement (Matsudaira, Hosek, & Walsh, 2012). The majority of studies have indicated Title I has not fulfilled its original expectation of closing the achievement gap between economically disadvantaged students and more advantaged students (Van der Klaauw, 2008). This is in addition to other factors that contribute to the uneven distribution of qualified teachers.

### **Teacher Quality**

Exposure to high quality teachers can provide major long-term advantages to academic success and future earning potential of students (Chetty, Friedman, & Rockoff, 2011). Unfortunately, there are obstacles that prevent all children from having a high quality teacher or attending a high quality school. High poverty students have less access to effective teachers which contributes to sizable achievement gaps (Reardon, 2011; U.S. Department of Education, 2015). When children from low-income families are provided with lower pupil-to-teacher ratios and a more equitable distribution of staffing, they experience better academic outcomes and exhibit a smaller gap in achievement with their peers (Roza & Lake, 2015).

One of the most important resources in education is teachers. There is a disproportionate distribution of qualified teachers throughout school districts, especially when looking at Title I school status. Boyd, Lankoff, Loeb, and Wyckoff (2013) found that all teachers preferred having smaller proportions of students who are poor. In addition, white teachers preferred having lower African American and Latino poor students. Teachers also prefer a school close to home.

Sass, Hannaway, Xu, Figlio, and Feng (2012) found differences in the distribution of teacher quality to be driven by the performance of the least effective teachers in high poverty schools. The least effective teachers in high poverty schools are less effective than those in lower poverty schools. Additionally, teachers who switch from high to low poverty schools are more productive following the switch.

Several solutions have been proposed by researchers who focus on the uneven distribution of qualified teachers. Sass et al. (2012) suggested changing the quality of new recruits may not be enough. Instead, he proposed measures in which teachers' skills would be improved over time. He believed this would be critical in promoting retention of the most effective teachers already in high poverty schools. Glazer and Max (2011) also suggested policymakers move away from teacher credentials to measures based on classroom performance. This could assist with the distribution of qualified teachers to where they are most needed. Boyd et al. (2013) found some initiatives put forth by New York City schools yielded some improvements. For example, changes in the qualifications of newly hired teachers such as replacing temporarily licensed teachers with certified teachers and

considerable increases in salaries aided recruitment and retention of more qualified teachers. The biggest factor was policies enabling school leaders to better understand the strengths and weaknesses of every teacher so they can target development to improve the teacher workforce.

As districts continue to release teacher quality data at either the teacher level or the school level, the unintended consequences of this must be considered as well. For instance, several studies have found that housing prices and neighborhood resorting are influenced by neighborhood school quality (Bayer, Ferreira, & McMillian, 2005; Bayer, Ferreira, & McMillian, 2007; Figlio & Lucas, 2004). Not only that, but the housing market responded significantly to this teacher quality data release in NYC. Home prices increased 3.7% with every 10 percentage point increase in the weighted multi-year teacher quality average for elementary schools (Rivera Rodas, 2019). This is especially problematic when looking at Title I schools if they do indeed have lower quality teachers.

Researchers continue to find the same disparities across high poverty schools. Policymakers and employers will have to adjust their hiring requirements to better fulfill the needs of students who continue to be at a disadvantage. Title I funds are not enough to correct the issue that continues to contribute to less qualified teachers in high poverty schools. This study not only investigates the funding and teacher quality disparities by Title I status, but also examines a relationship between the funding gaps and the teacher quality gaps in the New York City Department of Education for the 2009-2010 school year.

## Data

### Teacher Quality Data

In February 2012, the NYC DOE for the first time publicly released a list of individual value-added scores for thousands of its fourth through eighth grade public school teachers. Overall, there were value-added scores for 8,486 fourth through eighth grade English/Language Arts (ELA) teachers and 9,316 fourth through eighth grade math teachers from 1,054 elementary and middle schools in New York City.<sup>4</sup> The value-added model in NYC used a set of student and classroom variables to estimate the impact that teachers have on student achievement outcomes in their classrooms. Teachers received single-year value-added measures that reflect student growth in 2007-2008, 2008-2009, 2009-2010 as well as multiple-year value-added measures that reflected student growth over as many as four years. The value-added model in NYC measured average student achievement, controlling for prior achievement in both math and ELA and a large number of student and classroom characteristics (Value-Added Research Center, 2010).

The *New York Times* published this data on its School Book website at the end of February 2012, and a sample snapshot of the data produced on the website is provided in Figure 1. Table 1 shows that over half of the teachers in the dataset are in elementary school grades, serving grades four and five. Teachers received a score between 0 and 99 that is meant to indicate where they stood compared to other teachers in the same grade with similar experience. Based on these scores, teachers were given a rating: teachers with scores from 0-4 were rated Low; teachers with scores from 5-24 were rated Below Average; teachers with scores from 25-74 were rated Average; teachers with scores from 75-94 were rated Above Average; and teachers with scores from 95-99 were rated High (Value-Added Research Center, 2010). These scores reflect a teachers rating in comparison to teachers across all schools in the NYC DOE.

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<sup>4</sup> Some of these teachers are counted twice because in some grades, teachers are in self-contained classrooms and are responsible for teaching both Math and ELA.





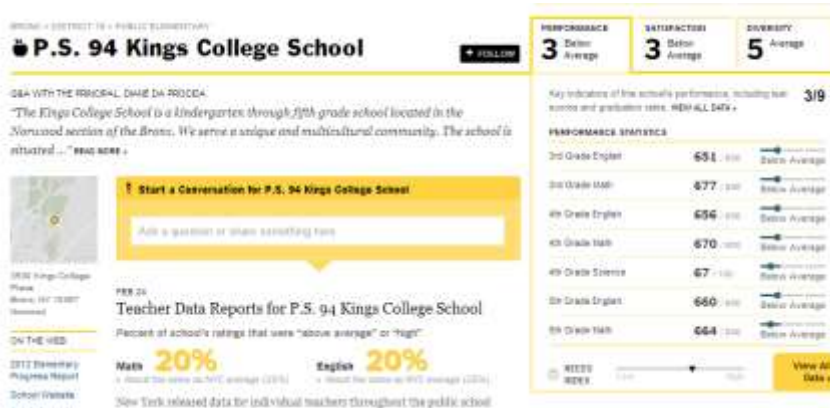


Figure 1. Snapshots of New York Times School Book Website

Table 1  
Teacher Value-added Descriptive Statistics

	All Teachers in the Data Release (N=11,793)	Elementary School Sample (N=6,088)
% Teaching ELA	47.85	49.56
% Teaching Math	52.15	50.44
% Teaching 4 <sup>th</sup> Grade	29.92	49.59
% Teaching 5 <sup>th</sup> Grade	28.94	48.01
% Teaching 6 <sup>th</sup> Grade	14.72	2.40
% Teaching 7 <sup>th</sup> Grade	13.06	0.00
% Teaching 8 <sup>th</sup> Grade	13.36	0.00
% in the Bronx	21.85	21.73
% in Brooklyn	32.49	31.80
% in Queens	27.84	28.73
% in Manhattan	12.01	11.04
% in Staten Island	5.84	6.70
% in Title I Schools	93.96	92.23
Average VAM	50.77	50.26
% Low VAM	4.28	4.59
% Below Average VAM	19.25	19.81
% Average VAM	50.03	49.55
% Above Average VAM	20.74	20.53
% High VAM	5.70	5.52

Not all elementary and middle schools have teacher quality scores for all of their teachers because value-added scores were calculated using student growth on standardized test scores.<sup>5</sup> In

<sup>5</sup> Teachers who teach non-tested grades (i.e.: pre-kindergarten-second grade), teachers who teach students who do not have prior test scores to measure growth (i.e.: third grade), and teachers who do not teach Math or ELA (i.e.: science, gym, art teachers) do not have value-added scores. In addition, some of the teachers

order to ensure that these nonrandom missing teacher value-added scores did not impact the overall results, the weighted average of teacher quality value-added scores were created by assigning a weight based on the percentage of teachers in a school represented in the value-added score in order to eliminate biased results for schools with a lot of teacher turnover. In addition, since the majority of the teachers in the teacher quality dataset were in elementary school, this study focuses on teachers who are in elementary schools.

This study looks at only elementary schools because teachers will most likely only have two value-added scores in the 2009-2010 school year – one for mathematics and one for English Language Arts. In K-8 and middle schools, it is more likely that teachers have multiple value-added scores because they teach several mathematics or English language arts courses. This limits double counting in the value-added average. The final dataset represents 4,640 teachers at 526 public elementary schools in the NYC DOE. The final dataset represented elementary schools across the five boroughs in the NYC DOE with 21.2% (N=120) in the Bronx, 32.0% (N=181) in Brooklyn, 14.5% (N=82) in Manhattan, 25.0% (N=141) in Queens and 7.3% (N=41) in Staten Island. The analyses for this study was conducted at the school level.

Teaching quality gap were calculated for the 2009-2010 school year following the approach of Clotfelter et al. (2005), Goldhaber et al. (2015), and Goldhaber et al. (2018). Using the value-added measures,  $X_{itb}$  is the proportion of teachers with value added ratings of low and below average in school  $i$  with Title I status of  $t$  in borough  $b$ .<sup>6</sup>  $FRPL_{itb}$  is the number of free and reduced price lunch students in school  $i$  with Title I status if  $t$  in borough  $b$  and  $NFRPL_{itb}$  is the number of non-free and reduced price lunch students in school  $i$  with Title I status of  $t$  in borough  $b$ . The school-level exposure rate of free and reduced price lunch students to low quality teachers is calculated as the following weighted average:

$$(1) E_{FRPL}(\hat{X}_{itb}) = \frac{1}{\sum_{it} \sum_b FRPL_{itb}} \sum_{it} \sum_b X_{itb} FRPL_{itb}.$$

Similarly, the school-level exposure rate of non-free and reduced price lunch students to low quality teachers is calculated as the following weighted average:

$$(2) E_{NFRPL}(\hat{X}_{itb}) = \frac{1}{\sum_{it} \sum_b NFRPL_{itb}} \sum_{it} \sum_b X_{itb} NFRPL_{itb}.$$

The number of free and reduced price lunch students is used, rather than say the percentage of free and reduced price lunch students because teacher quality gaps investigate the exposure to low-quality teachers for students who qualify for free and reduced price lunch. Using the percentage of students who qualify would not get the same results.  $E_{FRPL}(\hat{X}_{itb})$  is the measure of the average school-level proportion of low-quality teachers for free and reduced price lunch students.

$E_{NFRPL}(\hat{X}_{itb})$  is the measure of the average school-level proportion of low-quality teachers for non-free and reduced price lunch students.  $E_{FRPL}(\hat{X}_{itb})$  and  $E_{NFRPL}(\hat{X}_{itb})$  are proportions bounded by zero and one (Goldhaber, Quince, & Theobald, 2018).

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who did teach these testable grades and subjects may not have teacher quality value-added scores because they either did not teach the minimum number of students to be included in the model or they did not teach the same subject and grade for a minimum of three years as the NYC model required.

<sup>6</sup> There are three classifications for Title I schools in the New York City Department of Education – schoolwide program, targeted I, and no Title I program.

Stated another way,  $E_{FRPL}(\hat{X}_{itb})$  uses a weighted average to measure the school-level share of low-quality teachers for students who qualify for free and reduced price lunch. Similarly,  $E_{NFRPL}(\hat{X}_{itb})$  measures the school-level share of low-quality teachers for students who do not qualify for free and reduced price lunch. Therefore, teacher quality gaps would indicate the difference in the share of low-quality teachers for students who do and do not qualify for free and reduced price lunch.

Three teacher quality gaps were calculated for all schools, Title I schools, and non-Title I schools by looking at the difference in the average school-level exposure rates to low-quality teachers between free and reduced price lunch students and non-free and reduced price lunch students,  $E_{FRPL}(\hat{X}_{itb}) - E_{NFRPL}(\hat{X}_{itb})$ . In addition, teacher quality gaps were calculated by looking at the difference in the average school-level exposure rates to low-quality teachers of free and reduced price lunch student by Title I status,  $E_{FRPL}(\hat{X}_{ITb}) - E_{FRPL}(\hat{X}_{INTb})$ , when T is schoolwide program, and NT is no Title I status.

### School Finance Data

The NYC DOE School Based Expenditure Report for the 2009-2010 (FY10) was used to estimate the gap between Title I and non-Title I per pupil non-categorical spending on teachers. Using the FY10 School Based Expenditure Report data, budgets for individual schools with salaries paid on site were calculated by stripping out all categorical expenditures at each school (e.g., ELLs, Title I, disability). The FY10 School Based Expenditure Report data and the data from the School Progress Reports was merged onto the teacher quality data using the district borough number (DBN), which is a unique number for each school in the NYC DOE.

The New York State Department of Education defined overall noncategorical funding per pupil funding as school funding from the city and from state operating aid divided by the total enrollment in the school. Federal, state and private grants are considered categorical funding. Noncategorical teacher per pupil funding is funding from the city and state operating aid divided by the total enrollment in the school targeted for teachers' salaries and fringe benefits, such as health insurance.

As previously mentioned, New York State uses a weighted formula to calculate per pupil costs through the pupil need index (PNI). PNI is calculated using the following:

$$(3) \text{ PNI} = 1 + \text{Extraordinary Needs (EN)\%},$$

where

$$\text{EN\%} = \frac{((.65 * \text{Lunch Count}) + (.65 * \text{Census Count}) + (\text{Limited English Proficiency Count} * .5) + \text{Sparsity Count})}{2008 - 2009 \text{ K} - 12 \text{ Public School Enrollment}},$$

$$\text{Lunch Count} = \frac{2005-06+2006-07+2007-08 \text{ K-6 Free and Reduced Price Lunch Applicants}}{2005-06+2006-07+2007-08 \text{ K-6 Public School Enrollment}} * 2008 - 2009 \text{ K} - 12 \text{ Public School Enrollment};$$

Census Count is the number of 5-17 year olds enrolled in the public school district and whose families had income below the poverty level divided by the number of total 5-17 year olds in the district multiplied by the 2008-2009 K-12 public school enrollment, based on the 2000 Census as tabulated by the National Center on Education Statistics; Limited English Proficiency Count was calculated using the 2008-2009 enrollment of students scoring at or below the 40<sup>th</sup> percentile on a standardized test of English proficiency and receiving limited English proficient (LEP) services; and

Sparsity Count is the 2008-2009 school enrollment multiplied by  $\frac{25.0 - (2008 - 2009 \text{ Enrollment per square mile})}{50.9}$  (The State Department of Education, 2009).

As seen in Table 1, 92% of teachers are in elementary schools that were designated as Title I schools when the teacher quality data was released, which is in line with the NCES data that states that 98% of all public schools in NYC are Title I. For an entire school to qualify for Title I funds in the Bronx, Brooklyn, Queens and Staten Island at least 40% of students must be enrolled in the FRPL program and 35% in Staten (New York City Department of Education, 2009). Due to this, the analysis controls for the percentage of free and reduced price lunch students and borough effects.

## Results

### Teacher Funding Gap by Title I Status

This study does find evidence that Title I elementary schools in the NYC DOE received less noncategorical per pupil teacher funding than non-Title I elementary schools in New York City during the 2009-2010 school year. A Welch's t-test was conducted to compare noncategorical per pupil teacher funding between Title I elementary schools in all five boroughs ( $M = \$6,304.5$ ,  $SD = \$996.97$ ) and non-Title I elementary schools in all five boroughs ( $M = \$6,518.07$ ,  $SD = \$745.03$ );  $t(65.22) = 1.84$ ,  $p = 0.04$  (one-tailed). These results suggest that Title I elementary schools in the NYC DOE received significantly less (\$214.49) in noncategorical per pupil teacher funding than non-Title I elementary schools (Table 2).

Table 2

Welch T-test Results for Average Per Pupil Teacher Noncategorical Funding by Title I School Status

	Title I Schools			Non-Title I Schools			Difference	<i>t-stat</i>	<i>P-value</i>
	<i>Mean</i>	<i>SD</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>N</i>			
All Elementary Schools	\$6,303.58	\$996.97	478	\$6,518.07	\$745.03	48	-\$214.49	1.84	0.04
Bronx	\$5,906.40	\$974.90	117	\$6,743.06	-	1	-\$836.65	-	-
Brooklyn	\$6,261.50	\$905.67	163	\$6,261.50	\$507.96	9	-\$35.02	0.19	0.43
Manhattan	\$6,675.42	\$1,243.17	59	\$6,140.94	\$406.53	17	\$534.48	2.82	0.00
Queens	\$6,439.11	\$739.20	112	\$6,638.04	\$690.20	12	-\$198.92	0.94	0.18
Staten Island	\$7,116.00	\$1,131.07	27	\$7,302.04	\$960.10	9	-\$186.72	0.48	0.31

These differences are not uniform in each borough of New York City. Title I elementary schools in Manhattan ( $M = \$6,675.42$ ;  $SD = \$1,243.17$ ) received \$534.48 more in noncategorical per pupil teacher funding than non-Title I schools ( $M = \$6,140.94$ ;  $SD = \$406.53$ );  $t(72.73) = 2.82$ ,  $p < 0.00$  (one-tailed). There are not enough non-Title I elementary schools in the Bronx to look at the differences in noncategorical per pupil teacher funding. The results for Queens, Brooklyn and Staten Island are not statistically significant (Table 2).

Welch's t-tests were conducted looking at overall noncategorical per pupil funding by Title I status to see if the differences seen in noncategorical teacher per pupil funding were reflected in the overall. There is no evidence that shows that Title I elementary schools received more or less overall noncategorical per pupil funds than non-Title I elementary schools. Title I elementary schools ( $M = M = \$16,370.42$ ,  $SD = \$3,036.93$ ) received \$362.42 more in overall noncategorical funds

than non-Title I elementary schools ( $M=\$16,008.01$ ,  $SD=\$2,285.79$ );  $t(64.94)=1.01$ ,  $p=0.16$  (one-tailed). These results are not statistically significant. However, there are significant differences for Brooklyn and Manhattan. Brooklyn Title I elementary schools ( $M=\$16,256.36$ ,  $SD=\$3,088.62$ ) received \$1,582.49 more than Brooklyn non-Title I elementary schools ( $M=\$14,673.87$ ,  $SD=\$1,372.38$ );  $t(13.05)=3.05$ ,  $p<0.00$  (one-tailed). Manhattan Title I elementary schools ( $M=\$17,723.23$ ,  $SD=\$3,514.28$ ) received \$2,567.85 more than Manhattan non-Title I elementary schools ( $M=\$15,155.38$ ,  $SD=\$1,404.38$ );  $t(64.51)=4.50$ ,  $p<0.00$  (one-tailed). The results for Queens and Staten Island are not statistically significant and there are not enough non-Title I elementary schools in the Bronx to examine the differences in overall noncategorical per pupil funding (Table 3).

Table 3

*Welch T-test Results for Average Per Pupil Overall Noncategorical Funding by Title I School Status*

	Title I Schools			Non-Title I Schools			Difference	<i>t-stat</i>	<i>P-value</i>
	<i>Mean</i>	<i>SD</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>N</i>			
All Elementary Schools	\$16,370.42	\$3,036.93	478	\$16,008.01	\$2,285.79	48	362.42	1.01	0.16
Bronx	\$16,381.45	\$3,054.88	117	\$17,529.21	-	1	-\$1,147.76	-	-
Brooklyn	\$16,256.36	\$3,088.62	163	\$14,673.87	\$1,372.38	9	\$1,582.49	3.05	0.00
Manhattan	\$17,723.23	\$3,514.28	59	\$15,155.38	\$1,404.38	17	\$2,567.85	4.50	0.00
Queens	\$15,540.53	\$2,255.63	112	\$16,583.75	\$3,209.60	12	-\$1,043.22	1.10	0.15
Staten Island	\$17,497.66	\$3,217.49	27	\$18,016.00	\$1,354.08	9	-\$518.34	0.68	0.25

These differences could have occurred because the County Provision determines separate cutoffs for Title I funding for each borough. For an entire school to qualify for Title I funds in the Bronx, Brooklyn, Queens, and Manhattan at least 40% of the students must be enrolled in the free and reduced lunch program. However, in Staten Island only 35% of the students must be enrolled. In addition, public school allocations differ by borough. Title I elementary schools in both Brooklyn and Manhattan received more overall noncategorical per pupil funding than non-Title I elementary schools. Since a higher percentage of students need to be classified as free and reduced price lunch students in Manhattan and Brooklyn in order for the school to be classified as a Title I school and these schools receive more money per capita than schools in other boroughs, it is plausible that the percentage of free and reduced price lunch students in Title I schools in Manhattan and Brooklyn increased the per pupil funding due to the funding formula.

Since the majority of the schools (98%) in New York City are Title I schools and Title I elementary schools make up 91% of the sample, the analyses were also conducted looking at the percentage of free and reduced priced lunch students. The following fixed effects robust regression was conducted to explore the impact that Title I school ( $TitleI_i$ ) had on noncategorical per pupil teacher funding ( $PerPupilTeacherNonCat_i$ ) in school  $i$  while controlling for the percentage of free and reduced price lunch students ( $perFRPL_i$ ) in school  $i$  and for the borough ( $\delta_i$ ) in which the school was located:

$$(4) PerPupilTeacherNonCat_i = \beta_0 + \beta_1 TitleI_i + \beta_3 perFRPL_i + \delta_i + \varepsilon_i.$$

By controlling for borough effects, issues such as the County Provision for determining which schools qualify for Title I status and differences in Title I per capita amounts are controlled for in equation (4). The results show that while noncategorical per pupil teacher funding decreases by \$578.53 when a school has Title I status, when controlling for the percentage of free and reduced price lunch students. However, there is a positive relationship between the percentage of free and reduced price lunch students and per pupil teacher noncategorical funding when controlling for borough and Title I status is a negative relationship. For every percentage point increase in the percent of free and reduced price lunch students, there is a \$10.85 increase in noncategorical per pupil teacher funding (Table 4). This would mean that when a school had 53.32% or more of its students qualify for free and reduced lunch that the negative impact of being a Title I school is cancelled out. As previously mentioned, the threshold for a school to qualify as a Title I school was 40% for the Bronx, Brooklyn Queens, and Manhattan, and 35% for Staten Island. Therefore, in all boroughs except Staten Island, if a school has Title I status then more than 53.32% of its students would qualify for free and reduced price lunch and the results from the robust fixed regression would indicate that controlling for the percentage of free and reduced price lunch students reverses the impact that Title I status has on noncategorical per pupil teacher funding.

Table 4  
*Effect of Title I status on noncategorical per pupil teacher finding (N=526)*

	Fixed effects - Boroughs	
Title I Status	-578.53** (-2.26)	-673.94*** (-2.61)
% Free and Reduced Price Lunch Students	10.85*** (2.89)	14.49*** (3.54)
% English Language Learners		-8.24*** (-2.64)
Constant	5972.85*** (42.09)	5912.33*** (40.36)
R-squared	0.12	0.13

*Note:* Fixed effect regression estimates of the effect of Title I school status on noncategorical per pupil teacher funding. The dependent variable is noncategorical per pupil teacher funding. Estimates are at the school level with borough fixed effects. Robust t-stats are in parentheses. \*p<0.10; \*\*p<0.05; \*\*\*p<.01.

Since it is plausible that school demographics that impact the school funding formula may impact noncategorical per pupil teacher funding, the robust fixed regression was conducted once again while controlling for the percentage of students who qualified for English language services. While controlling for borough effects, the percentage of free and reduced price lunch students, and the percentage of English language students, an elementary school that is designated as a Title I school receives \$673.94 less noncategorical per pupil teacher funding on average than a non-Title I elementary school. However, noncategorical per pupil teacher funding increases by \$14.49 for every one percentage point increase in the percentage of free and reduced price lunch students. Although, the percentage of free and reduced does increase noncategorical per pupil teaching funding on average, the percentage of English language learners decreases noncategorical per pupil teacher

funding by \$8.24 for every one percentage point increase in the percentage of English language learners (Table 4).

These findings would indicate that the NYC DOE was supplanting not supplementing funds since funding prior to categorical funds were provided were less in Title I schools on average. Title I schools in this study receive less noncategorical per pupil teacher funding on average than non-Title I schools. While the findings thus far are in line with the Title I research that has previously shown that Title I schools have received less noncategorical per pupil funding prior to receiving their Title I funds, this paper also shows that the funding gap may be higher for Title I schools that just meet the cutoff for full school Title I status.

### Teacher Quality Gap by Title I Status

The analysis shows that there is a gap in teacher quality between Title I and non-Title I elementary schools in New York City. A Welch's t-test was conducted to compare average 2010 teacher value-added scores Title I elementary schools in all five boroughs ( $M=49.51$ ,  $SD=14.37$ ) and non-Title I elementary schools in all five boroughs ( $M=53.77$ ,  $SD=14.87$ );  $t(54.91)=1.91$ ,  $p=0.03$  (one-tailed). The average teacher value-added score was 4.26 points lower for teachers in Title I elementary schools in New York City. This trend of Title I elementary schools having teachers with lower value-added scores was consistent in each of the five boroughs but was not statistically significant for the Bronx and Staten Island (Table 5). In addition, a Welch's t-test was conducted to compare the percentage of teachers who were rated low or below average by Title I school status. On average, Title I elementary schools had a higher percentage of teachers who were rated below average and low ( $M=24.78$ ,  $SD=17.58$ ) by 3.6 percentage points than non-Title I elementary schools ( $M=21.21$ ,  $SD=17.34$ );  $t(57.15)=1.36$ ,  $p=0.09$  (one-tailed) (Table 6).

Table 5

*Welch T-test Results for Average 2010 Teacher Value-add Scores by Title I School Status*

	Title I Schools			Non-Title I Schools			Difference	t-stat	P-value
	Mean	SD	N	Mean	SD	N			
All Elementary Schools	49.51	13.37	478	53.77	14.87	48	-4.26	1.91	0.03
Bronx	51.39	12.17	117	56.55	-	1	-5.16	-	-
Brooklyn	49.20	14.28	163	58.47	15.47	9	-9.28	1.76	0.06
Manhattan	52.77	12.69	59	56.81	9.52	17	-4.03	1.42	0.08
Queens	48.54	12.41	112	55.84	15.79	12	-7.30	1.55	0.07
Staten Island	40.16	14.04	27	40.28	16.69	9	-0.11	0.02	0.49

Table 6

*Welch T-test Results for the Percentage of Teachers Rated Below Average and Low by Title I School Status*

	Title I Schools			Non-Title I Schools			Difference	t-stat	P-value
	Mean	SD	N	Mean	SD	N			
All Elementary Schools	24.78	17.58	478	21.21	17.34	48	3.58	1.36	0.09
Bronx	20.25	15.59	117	15.00	-	1	5.25	-	-
Brooklyn	26.63	17.81	163	16.98	17.68	9	9.66	1.59	0.07
Manhattan	20.33	16.44	59	18.44	11.08	17	1.89	0.55	0.29
Queens	25.89	16.68	112	19.64	16.26	12	6.25	1.26	0.11
Staten Island	38.43	21.52	27	33.43	25.15	9	5.00	0.53	0.30



In order to examine school-level teacher quality gaps while controlling for the percentage of free and reduced price lunch students, equations (1) and (2) were calculated in order to obtain the school-level exposure rate of free and reduced price lunch students to teachers who were rated low and below average. The school-level exposure rate of free and reduced price lunch students to teachers who were rated low or below average for Title I elementary schools was 0.24. In contrast, the school-level exposure rate of free and reduced price lunch students to teachers who were rated low or below average in non-Title I elementary schools was 0.22. Therefore, the teacher quality gap between Title I and non-Title I elementary schools while controlling for free and reduced price lunch was 0.03 – effectively a 3 percentage point difference. Furthermore, the teacher quality gap ranges from 0.01 in Manhattan to 0.10 in Brooklyn (Table 7).

Table 7

*School-level Exposure Rates of Free and Reduced Price Lunch Students to Teachers Rated Below Average and Low by Title I School Status*

	Title I	Non-Title I	Difference
All boroughs	0.25	0.22	0.03
Bronx	0.2	0.15	0.05
Brooklyn	0.28	0.18	0.1
Manhattan	0.2	0.19	0.01
Queens	0.26	0.21	0.05
Staten Island	0.36	0.33	0.03

### Relationship between Teacher Quality and Teacher Funding Gap

Since there is per pupil teacher spending gap and a teacher quality gap, this paper also examines the relationship between the noncategorical per pupil teacher funding and the teacher quality as measured by the percentage of teachers who were rated Above Average or Low in 2010. In order to look at this relationship, while controlling for Title I school status, the percentage of free and reduced price lunch students, the percentage of English language learners, and borough effects, a fixed-effects regression was conducted:

$$(5) PerPupilTeacherNonCat_i = \beta_0 + \beta_1 TitleI_i + \beta_2 teacherquality_i + \beta_3 teacherquality_i^2 + \beta_4 perfrpl_i + \beta_5 perell_i + \delta_i + \varepsilon_i$$

where  $teacherquality_i$  is the percentage of teachers who were rated as below average or low for the 2009-2010 school year in school  $i$ ;  $TitleI_i$  is a dummy variable that is equal to 1 when the school is designated as a Title I elementary school and 0 otherwise for school  $i$ ;

$PerPupilTeacherNonCat_i$  is the noncategorical per pupil teacher funding for school  $i$ ;  $perfrpl_i$  is the percentage of free and reduced price lunch students in school  $i$  during the 2009-2010 school year;  $perell_i$  is the percentage of English language learners in school  $i$  during the 2009-2010 school year; and  $\delta_i$  is the borough fixed effects. By controlling for borough effects, issues such as the County Provision for determining which schools qualify for Title I status and differences in Title I per capita amounts are controlled for in equation (5).

There is a quadratic relationship between the percentage of below average or low teachers in a school and noncategorical per pupil teacher funding, so the squared version of the percentage of below average or low teachers in a school is included in the equation (5). As the noncategorical per pupil teacher funding increases, there should be a decrease in the percentage of below average and low quality teachers. The increase in noncategorical per pupil teacher funding should attract higher quality teachers and provide schools with the resources they need to keep their higher quality teachers. However, as per pupil teacher funding increases a certain point, it would indicate that schools are receiving extra funding for other areas, such as a high percentage of English language learners.

The results from this equation show that when you control for the percentage of free and reduced price students, percentage of English language learners, Title I status, and borough effects, there is a negative effect of the percentage of below average or low on noncategorical per pupil teacher funding. On average, when the percentage of low and below average teachers increases from 5–10%, noncategorical per pupil teacher funding decreases by \$48.14. These results decrease as we look at higher percentages of low and below average teachers. On average, when the percentage of low and below average teachers increases from 20–25% percent, noncategorical per pupil teacher funding decreases by \$18.88. As Table 8 shows, these results are statistically significant.

Table 8

*The Relationship Between Noncategorical Per Pupil Teacher Funding and Teacher Quality (N=526)*

Fixed effects – Boroughs	
	-646.63**
Title I Status	(-2.19)
	-1256.48**
% of Below Average or Low Teachers	(-2.02)
	1950.77**
% of Below Average or Low Teachers Squared	(2.05)
	14.13***
% Free and Reduced Price Lunch Students	(3.10)
	-8.17**
% English Language Learners	(2.34)
	6046.13***
Constant	(30.69)
R-squared	0.13

*Note:* Fixed effect regression estimates of the effect of Title I school status and teacher quality on noncategorical per pupil teacher funding. The dependent variable is noncategorical per pupil teacher funding. Estimates are at the school level with borough fixed effects. Robust t-stats are in parentheses. \* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < .01$ .

Noncategorical per pupil teacher funding continues to decrease as the percentage of below average and low teachers increases until the total percentage of below average and low teachers reaches 64%. It is important to note that 97.34% of the sample are schools with 64% or less of below average and low teachers. These 14 school are outliers as the average school had 24% of its teachers rated as below average or low.

These results imply that the Title I comparability loophole is allowing schools across the New York City Department of Education to not equitably fund schools prior to receiving Title I funds. In addition, the lack of equitable funding may be leading to the hiring of more novice teachers who are not receiving high teacher value-added scores.

## **Conclusion & Policy Implications**

This study not only confirms previous research findings literature (Roza & Lake, 2015; Roza, Miller, & Hill, 2005;) about the gap in noncategorical per pupil teacher funding based on Title I school status in elementary schools in New York City, but it also provides the first evidence of the teacher quality gaps based on Title I elementary school status, while controlling for the percentage of free and reduced price lunch students. This study also shows that there is a gap in the rate of exposure to low and below average teachers for free and reduced price lunch students by Title I status in these elementary schools. Not only that, but there is a negative relationship between the proportion of teachers who are rated low and below average in a school and noncategorical per pupil teacher funding. These findings may imply that that equalizing noncategorical per pupil funding prior to the receipt of Title I funds may cause a reduction in the proportion of low and below teachers.

The results in this study provide the first evidence of the effects of teacher quality gaps based on Title I elementary school status. On average, students in Title I elementary schools in New York City had a higher exposure rate to low and below average teachers, while controlling for the percentage of free and reduced price lunch students. Therefore, even after controlling for the proportion of free and reduced price lunch students, the typical student in a Title I elementary school had a higher likelihood of having a low or below average teacher during the 2009-2010 school year in comparison to non-Title I elementary school students.

If Title I elementary public schools in New York City have lower quality teachers, then the students that are served by these schools are not receiving the same quality of education as their peers. Since Title I elementary schools are predominately African American and Latino and the majority of the students qualify for free and reduced priced lunch, this becomes a civil rights issue because Title I and non-Title I elementary were not equal based on noncategorical per pupil teacher funding or teacher quality. Changing the comparability provision in Title I funding would result in more equitable funding. Several policy reports have suggested that the Title I comparability provision needs to be revised to require equity of actual school-level funding (Hall & Ushomirsky, 2010; Luebchow, 2009; Miller, 2010).

Attracting and retaining high quality veteran teachers is one of the key issues in ensuring equality in distributing school resources, especially in Title I schools. There are several programs across the country that are aimed at attracting and retaining high quality teachers in underperforming schools that could be used as a model to ensure that Title I schools are spending comparable amount of money on teachers prior to Title I funds being distributed. One approach has been to change compensation rules to pay teachers more for working in low-performing schools. In Indiana, salaries are based in part on teacher performance and the academic needs of the students. In Tennessee, teachers can additional pay by working in high-need schools. And finally, in Florida, teachers in Title I schools and those in the bottom two categories of school improvement are eligible for salary supplements (Reform Support Network, 2014).

There have been several recommendations on how to recruit and retain teachers that could be applied in Title I schools that could improve the distribution of school resources. In addition to

increasing teacher salaries in high-needs schools, districts could increase funding for professional development activities that would provide differential pay on the salary schedules. Furthermore, districts should take advantage of the weighted student funding formulas to help equalize access to better qualified teachers and districts could revise timelines for voluntary transfers or resignations so schools have more time to fill empty positions with highly qualified teachers (Podolsky, Kini, Bishop, & Darling-Hammond, 2016).

One limitation of this study is the inability to identify Title I teachers in the teacher value-added data. Although there are whole schools that are considered Title I, there are other schools that have Title I programming called Title I Targeted schools where teachers are designated as Title I teachers based on the students that are in their classrooms. Elementary and middle schools that had some Title I teachers but were not considered Title I elementary or middle schools were not included in the Title I versus non-Title I comparisons.

Including these teachers could have provided more thorough results. Future research should look at this data at the teacher level or if possible, the student level so that findings could be targeted at all students who receive Title I funding regardless if they are in a Title I school. For instance, any student who is in temporary housing is automatically provided with Title I funding when the per pupil funding formula is calculated in the NYC DOE. If these students were not in a SWP Title I school, they were not considered to be part of the Title I group.

Student level data would shed light on issues for all Title I students in the NYC DOE. Nevertheless, these findings provide evidence that students in Title I elementary and middle schools not have teachers who have lower value-added scores. Changes to the Title I comparability provision must be made to ensure that students at all schools are able to attract high quality teachers.

## References

- Bayer, P., Ferreira, F., & McMillian, R. (2005). *Tiebout sorting, social multipliers and the demand for school quality*. [NBER Working Paper 11087]. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.3386/w10871>
- Bayer, P., Ferreira, F., & McMillian, R. (2007). A unified framework for measuring preferences for schools and neighborhoods. *Journal of Political Economy*, 115(4), 588-638. <https://doi.org/10.1086/522381>
- Bireda, S. (2011). *Funding education equitably: The 'comparability provision' and the move to fair and transparent school budgeting systems*. Washington, DC: Center for American Progress.
- Boyd, D., Lankford, H., Loeb, S., & W. J. (2013). Analyzing the determinants of the matching of public school teachers to jobs: Disentangling the preferences of teachers and employers. *Journal of Labor Economics*, 31(1), 83-117. <https://doi.org/10.1086/666725>
- Carey, K. (2002). *State poverty-based education funding: A survey of current programs and recommendations for improvement*. Washington, DC: Center on Budget and Policy Priorities.
- Chetty, R., Friedman, J. N., & Rockoff, J. E. (2011, December). *The long-term impacts of teachers: Teacher value-added and student outcomes in adulthood*. Cambridge, MA: National Bureau of Economic Research.
- Chetty, R., Friedman, J. N., & Rockoff, J. E. (2014). Measuring the impacts of teachers I: Evaluating bias in teacher value-added estimates. *American Economic Review*, 104(9), 2593-2632. <https://doi.org/10.1257/aer.104.9.2593>

- Clotfelter, C. T., Ladd, H. F., & Vigdor, J. (2005). Who teaches whom? Race and the distribution of novice teachers. *Economics of Education Review*, 24(4), 377-392. <https://doi.org/10.1016/j.econedurev.2004.06.008>
- Fetler, M. (1999). High school staff characteristics and mathematics test results. *Education Policy Analysis Archives*, 7(9). <https://doi.org/10.14507/epaa.v7n9.1999>
- Figlio, D. N., & Lucas, M. E. (2004). What's in a grade? School report cards and the housing market. *American Economic Review*, 94(3), 591-604. <https://doi.org/10.1257/0002828041464489>
- Glazerman, S., & M. J. (2011). *Do low-income students have equal access to the highest-performing teachers?* Washington, DC: National Center for Education Evaluation and Regional Assistance.
- Goldhaber, D., Lavery, L., & Theobald, R. (2015). Uneven playing field? Assessing the teacher quality gap between advantaged and disadvantaged students. *Educational Researcher*, 44(5), 293-307. <https://doi.org/10.3102/0013189X15592622>
- Goldhaber, D., Quince, V., & Theobald, R. (2018). Has it always been this way? Tracing the evolution of teacher quality gaps in U.S. public schools. *American Educational Research Journal*, 55(1), 171-201. <https://doi.org/10.3102/0002831217733445>
- Hall, D., & Ushomirsky, N. (2010). *Close the hidden funding gaps in our schools. K-12 policy*. Washington, D.C.: Education Trust.
- Ingersoll, R. M. (2004). *Why do high-poverty schools have difficulty staffing their classrooms with qualified teachers?* Washington, DC: Center for American Progress.
- Jennings, J. F. (2000). Title I: Its Legislative History and Its Promise. *Phi Delta Kappan*, 81(7), 516-52.
- Luebchow, L. (2009). *Equitable resources in low income schools: Teacher equity and the federal Title I Comparability requirement*. Washington, DC: New America Foundation.
- Matsudaira, J. D., Hosek, A., & Walsh, E. (2012). An integrated assessment of the effects of Title I on school behavior, resources, and student achievement. *Economics of Education Review*, 31(3), 1-14. <https://doi.org/10.1016/j.econedurev.2012.01.002>
- McLaughlin, M. W. (1974). *Evaluation and reform: The Elementary and Secondary Education Act of 1965, Title I*. Santa Monica, CA: The Rand Corporation.
- Miller, R. (2010). *Comparable, schmomparable: Evidence of inequity in the allocation of funds for teacher salary within California's public school districts*. Washington, D.C.: Center for American Progress.
- Murnane, R. J., & Phillips, B. R. (1981). Learning by doing, vintage and selection: Three pieces of the puzzle relating teaching experience and teaching performance. *Economics of Education Review*, 1(4), 453-465. [https://doi.org/10.1016/0272-7757\(81\)90015-7](https://doi.org/10.1016/0272-7757(81)90015-7)
- New York City Department of Education. (2008, May 19). *Certified teachers salary schedule*. Retrieved from Salary step and differential schedules: <http://schools.nyc.gov/NR/ronlyres/72DE1FF1-EDFC-40D7-9D61-831014B39D1E/0/TeacherSalarySchedule20083.pdf>
- New York City Department of Education. (2009, May 20). School allocation memorandum No. 10, FY10. *Title I school allocations*. New York: New York City Department of Education.
- Podolsky, A., Kini, T., Bishop, J., & Darling-Hammond, L. (2016). *Solving the teacher Shortage: How to attract and retain excellent educators*. Palo Alto, CA: Learning Policy Institute.
- Reardon, S. (2011). *The widening academic-achievement gap between the rich and the poor: New evidence and possible explanations*. Stanford, CA: Stanford University.
- Reform Support Network. (2014). *Recruiting and retaining highly effective turnaround teachers*. Washington, DC: Reform Support Network.

- Reschovsky, A., & Imazeki, J. (1997). The development of school finance formulas to guarantee the provision of adequate education to low-income students. *Developments in School Finance 1997* (pp. 121-148). Washington, DC: National Center for Education Statistics.
- Rivera Rodas, E. I. (2019). Which New Yorkers vote with their wallets? The impact of teacher quality data on household sorting, and residential and school demographics. *Economics of Education Review*, 68, 104-121. <https://doi.org/10.1016/j.econedurev.2018.12.001>
- Roza, M., & Hill, P. T. (2004). *How within-district spending inequities help some schools fail*. Washington DC: Brookings Papers on Education Policy.
- Roza, M., & Lake, R. (2015). *Title I: Time to get it right*. Seattle, WA: Center on Reinventing Public Education.
- Roza, M., Miller, L., & Hill, P. (2005). *Strengthening Title I to help high-poverty schools: How Title I funds fit into district allocation patterns*. Seattle, Washington: Center on Reinventing Public Education.
- Sass, T. R., Hannaway, J., Xu, Z., Figlio, D. N., & Feng, L. (2012). Value added of teachers in high poverty schools and lower poverty schools. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2020368>
- The State Department of Education. (2009). *2009-10 state aid handbook: State formula aids and entitlements for schools in New York state as amended by chapters of the laws of 2009*. Albany, NY: The University of the State of New York.
- U.S. Department of Education. (2005). *Improving basic programs operated by local educational agencies (Title I, Part A)*. Washington, DC: U.S. Department of Education.
- U.S. Department of Education. (2011). *The potential impact of revising the Title I comparability requirement to focus on school-level expenditures*. Washington, DC: U.S. Department of Education.
- U.S. Department of Education. (2015). NAEP Data Explorer. Retrieved January 24, 2015, from <http://nces.ed.gov/nationsreportcard/naepdata/dataset.aspx>
- Value-Added Research Center. (2010). *NYC teacher data initiative: Technical report on the NYC value-added model*. New York: New York City Department of Education.
- Van der Klaauw, W. (2008). Breaking the link between poverty and low student achievement: An evaluation of Title I. *Journal of Econometrics*, 142(2), 731–756. <https://doi.org/10.1016/j.jeconom.2007.05.007>

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