INSTITUTE FOR EDUCATION AND SOCIAL POLICY
Steinhardt School of Education, New York University

Using Census Data to Allocate Title I Funds to Schools

A Feasibility Study Using Data from the New York City Public School System

February 2004

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Executive Summary

To allocate Title I funds to its schools, a school district first needs to determine individual student eligibility for Title I services through some measure of individual student poverty. After determining student eligibility, the district aggregates the number of eligible students in each school. To be eligible for Title I funds, schools must have at least the number of eligible students needed to pass a threshold. Schools that do not meet that threshold receive no Title I funds.

Many districts, including the New York City Department of Education (NYCDOE), currently use free lunch eligibility forms as an indicator of individual student poverty. Administrative costs associated with collection of these forms, along with proposed changes in the U.S. Department of Agriculture's verification requirements, have led to increased interest in developing alternative methods of determining individual student poverty.

An alternative method that has been proposed would use U.S. Census data and student residential and demographic data already collected by the district as the basis for determining a student's eligibility for Title I funds. This approach involves mapping home addresses for all public school students in New York City and matching these addresses to Census measures of poverty at the block group level. Under this approach, the NYCDOE could supplement the Census poverty measure with student-level administrative data, such as eligibility for free lunch determinations based on Direct Certification, to determine student eligibility. As is currently done under NYCDOE guidelines, the district would calculate the total percentage of students eligible for Title I services at each school to compute school-level eligibility for Title I funding.

This paper reports the efforts of NYU's Institute for Education and Social Policy to develop such a Census-based approach. We conducted analyses using both median household income by race/ethnicity at the block group level and the ratio of income in 1999 to poverty level of families at the tract level. The results of these analyses were compared to the percent of students eligible for free and reduced price lunch as determined by the New York

City Department of Education's free lunch forms as well as by Direct Certification through public-assistance records. Our analysis indicates that the Census-based methods do not provide individual, student-level poverty status that is reliable enough to determine a student's eligibility for free and reduced price lunch. Even when combined with other information on student poverty, these methods are not sufficiently reliable to determine student eligibility for Title I services or provide an approximation of school poverty levels sufficiently robust to allocate Title I assistance at the local level. For example, no Census-based method that we tested would qualify more than 50% of students receiving public assistance for Title I assistance, despite the fact that this group is known to have incomes below the eligibility level.

Introduction

The NYU Institute for Education and Social Policy (IESP), in coordination with New York City Department of Education Office of the Auditor General (OAG), undertook this project to develop a measure of student poverty that could be used in lieu of free lunch forms as a means of allocating Title I resources to schools. The proposed measure involves assigning a poverty status to individual students based on data from the U.S. Census, and then aggregating the number of poor students to determine their percentage at a given school. This approach was tested by comparing the Census-based individual poverty determination with each student's poverty status, as determined by the current New York City Department of Education (NYCDOE) method using parent-completed free lunch forms and Direct Certification. Our findings are that the Census-based method, even when used in conjunction with other student-level information routinely collected by the NYCDOE, does not provide a viable alternative to the current method of estimating poverty used to determine student- and thus school-level eligibility for Title I funding.

Methodology

Data

The sources of data used for this project were a student-level data set provided by NYCDOE, which included 2002-03 students' home addresses and demographic data and the 2000 U.S. Census data.

Our approach involved assigning an estimated household income or poverty status to each student, based on data from the 2000 Decennial Census, and then determining the percentage of students eligible for Title I services in each school. Using the Title I funding guidelines established by the DOE for the 2002-03 school year, schools above a certain threshold percentage of eligible students would then qualify for Title I funds.

Selecting an Appropriate Census Income or Poverty Variable

The first step in our analysis was to select the appropriate measure of household income or poverty from Census data. Three potential measures were considered – the percentage of children aged 5-17 in poverty, the percentage of children in households with incomes at 130% and 185% of the poverty level, and median household income. Considerations in selection of a poverty measure included data availability for smaller areas (block groups as opposed to tracts, for example) and the level of variation in the measure for each area. Our primary concern was that the selected measure should reflect as accurately as possible the income or poverty status for public school students residing in that area.

Method 1: Probability Estimate

One approach we considered was estimating each student's income, based on the percentage of children aged 5-17 in poverty or the percentage of children at certain income levels. The Census provides data sufficient to calculate the percentage of school-aged children in poverty in 1999 at the block group level. Data regarding the percentage of children at different income levels (in this case, up to 130% of the federal poverty line and between 130-185% of poverty) are available only at the larger Census tract level. The use of either of these measures involves assigning students to income groups based on the percentage of children in each group in the student's neighborhood, as defined by either block groups or tracts. For example, if a student lives in a block group where 30% of children aged 5-17 are below the poverty line, that student is given a 30% chance of being coded as being below the poverty line.

Method 2: Median Household Income

An alternative to the probability-based approach outlined above is to estimate a student's income level based on the median household income in the student's Census block group. This approach assumes that incomes within a block group are homogenous enough to provide a reasonable estimate of a student's income, based on residence in a particular block group. This is a reasonable assumption with regard to many, but not all, block groups in New York City. With this limitation in mind, there are two advantages to using median household income rather than poverty percentages to assign poverty status to students. One is that median household income allows us to capture disparities in income based on

race/ethnicity. For example, the citywide household income is 30% lower for blacks than it is for whites, while in Manhattan, black households typically earn nearly 60% less than white households. The second advantage is that changes in median income are somewhat easier to estimate between Census years, due to the availability of sub-borough-level median income estimates provided by the New York City Housing and Vacancy Survey.

The following charts illustrate the variability of incomes both within and between Census block groups and show the number of households in given income ranges in individual block groups in different boroughs.

Table 1: Block Group 360810273002 (Queens; Median Household Income: $29,464)

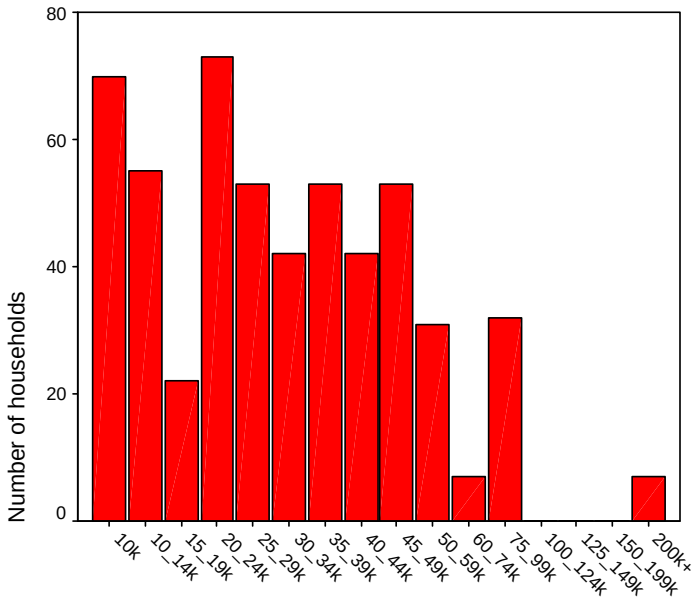


Table 2: Block Group 360610265003 (Manhattan; Median Household Income $102,688)

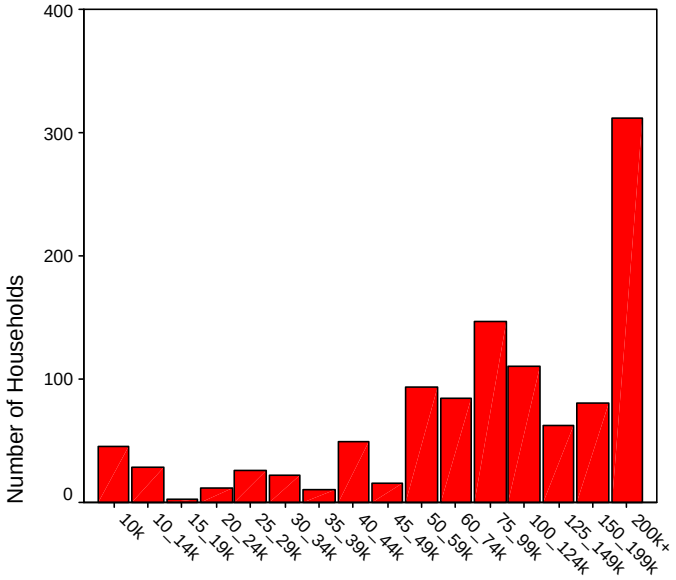
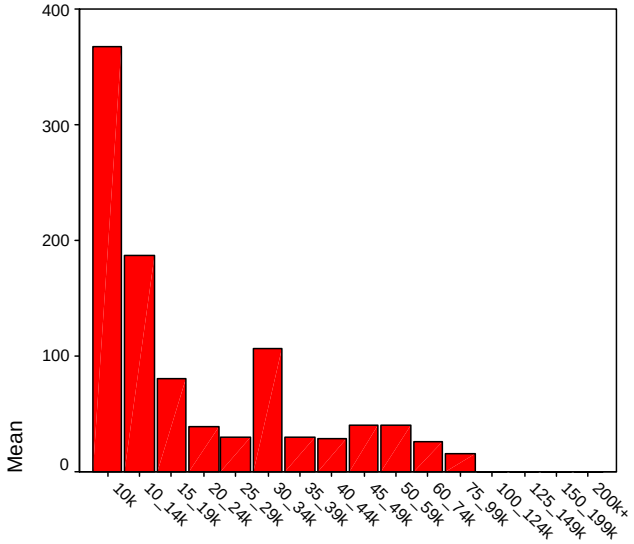


Table 3. Block Group 360470381002 (Brooklyn; Median Household Income $12,311)



Technical Steps

The following are the steps required to conduct Census-based analyses of student poverty using either the median household income or probability estimate method:

- Geocode student addresses
- Overlay Census data for block groups
- Determine Title I eligibility for each student
- Aggregate the percent of students eligible for Title I services for each school

Geocode student addresses

OAG provided IESP with a student-level dataset that included all students enrolled in the New York City public school system as of October 31, 2002. For each student, the dataset included student address, race/ethnicity, and current free or reduced price lunch status; and the borough, district, and school codes for the school of enrollment. We geocoded all student addresses that were within the five boroughs of New York City.[1] Through a series of steps designed to standardize the format of the addresses, we were able to match approximately 91% of the addresses to a location on New York City's street map.

Overlay census data for block groups

A map overlay of Census block groups allowed each student address to be matched to Census income data for that block group. Thus, we assigned each student with a valid address a household income figure based on the median household income for that student's race/ethnicity in the block group. We also assigned each student to the category of below or above certain income thresholds based on the percentages of children in each income category in the student's Census tract. We made this probability-based assignment independent of the median household income determination.

Determine Title I eligibility for each student based on Census data

Once we assigned students a probability of poverty value and a median household income value, we determined eligibility for Title I funding based on each of the variables. The methodology for determining eligibility for each approach is described below.

[1] "Geocoding" refers to using desktop GIS software to locate all student addresses on a New York City street map.

Method 1: Probability Estimate

The probability estimate involved assigning each student to one of the following categories: having a household income below 130% of poverty, between 130-185% of poverty, or greater than 185% of poverty, based on the percentage of children aged 5-17 with incomes in these ranges in each Census tract in the 2000 Census. For example, if a student lived in a tract in which 75 percent of children are below 130% of poverty, 10 percent are between 130-185%, and 15 percent are above 185%, then the student would have a 75 percent chance of being coded as being below 130% of poverty, and so on. This probability-based assignment was conducted for each student whose address could be matched. Each student was then classified as being eligible for free lunch if coded as being below 130% of poverty, eligible for reduced-price lunch if coded as being between 130-185% of poverty, or not eligible if above 185% of poverty.

Method 2: Median Household Income

Of the students who could be matched to a Census block group, we could not assign a median household income for almost 6%. Reasons included difficulty of matching race/ethnicity between DOE data files and Census data, or no median household income available at the block group level. In certain cases, the Census does not report disaggregated data where individuals could be identified. In these cases, we assigned students the median household income for the aggregate block group. Findings showed little difference if these students were excluded from the analysis.

The next issue was to decide where to set eligibility thresholds to determine what maximum household income would allow a student to qualify for Title I funding. The current NYCDOE guidelines for determining eligibility for free and reduced price lunch is based on family income as well as the number of people in each family. As data on family size for individual students would not be available without the free lunch forms, we had to select an income limit to serve as the threshold for eligibility determination.

Census data shows that the mean household size by borough ranged from 2.77 in Manhattan to 3.12 in Queens. However, the households included in this analysis are not limited to those with children and may underestimate household size when the analysis is limited to

only households with children. The income level used to determine whether or not a household is considered poor is contingent on the number of people within that household. For example, from July 2002 through June 2003, the income level for 100% of poverty for a household size of three is equal to $15,020, $18,100 for a household size of four and $21,180 for a household size of five.[2]

The size of a household has important implications for poverty thresholds that are based on the median household income variable. Our analysis of household size data from a nonrandom sample of lunch forms submitted to NYCDOE revealed a mean household size of 4.1. We decided to use a household size of four, a decision that may account for some of the differences we found between the percentages of students who qualify under the current NYCDOE method and those who would qualify under any of the proposed models.

In most cases, under this model, the percent of students eligible for reduced price lunch is higher using the median household income data, compared to the current NYCDOE method, while the percent of students eligible for free lunch is lower than the NYCDOE method. Therefore, given the limitations of the Census data, when using median household income data, we report the combined percent of students eligible for free and reduced price lunch to determine the total percentage of students eligible for Title I services, rather than relying solely on free lunch eligibility as is currently done.

[2] The poverty thresholds are set by the Census Bureau and updated each year. Income eligibility for free and reduced price lunch is determined by the federal poverty levels.

Table 4: Student Level Eligibility Calculations, SY 2002-03

	Household Size = 4	Household Income
Eligible for free lunch	130% or less of poverty level	Less than or equal to $23,530
Eligible for reduced price lunch	> 130% and <=185% or less of poverty level	Greater than $23,530 but less than or equal to $33,485
Not eligible	> 185% of poverty level	Greater than $33,485

Aggregate the percent of students eligible for Title I services for each school

Once we determined eligibility for Title I services for each student, we aggregated the number of eligible students at each school. By law, each school must have a concentration of eligible students to receive *any* Title I funds. This threshold of eligible students is determined each year by the NYCDOE. In the 2002-03 school year, the school-level Title I thresholds were set at 62.0% for all boroughs.

Comparison of Current DOE Method to Alternative Methods

As Table 5 indicates, the percent of students eligible for free and reduced price lunch differs across the three methods. The current DOE method certifies almost two-thirds of NYC public school children for free lunch and an additional 6% for reduced price lunch. Under either of the methods using data from the Census, less than 40% of students would qualify for free lunch and 12% to 21% would qualify for reduced price lunch.

Table 5: Comparison of Free and Reduced Price Lunch Eligibility Using Current DOE Method and Census Based Methods

	Current DOE Method	Probability Estimate*	Median Household Income
Not Eligible**	31.5	47.7	50.9
Eligible for Free Lunch***	62.5	39.7	28.0
Eligible for Reduced Price Lunch	6.0	12.6	21.1

n = 1,058534
*Probability estimate is based on ratio of income to poverty level data available at Census tract level.
**Students with missing Census data were coded as not eligible
***Includes those eligible through Direct Certification

Testing of Student-Level Analysis

We conducted tests using both median household income and probability estimates on two populations of students, Direct Certification and recent immigrant students, to see how closely the Census data aligns with the NYCDOE's current method of determining free or reduced price lunch eligibility. Direct Certification students are eligible for free lunch, and therefore, Title I funding, because they receive TANF, food stamps, or Medicaid. We believe this data provides the best measure of how well the Census can estimate Title I eligibility because students had to have their household incomes verified in order to receive these benefits.

We also compared eligibility rates among recent immigrants, for two reasons. First, Census data have been criticized for undercounting minority populations and may not be as a reliable indicator of poverty status for this group of students. Second, schools with lower percentages of Direct Certification students may be at a disadvantage in qualifying for Title I funds, compared to those schools with higher percentages. Schools that have a small percent of students eligible under Direct Certification have a larger number of students who

need to be certified by other methods, which are more susceptible to missing or incomplete data. Additionally, these schools may be further disadvantaged if they have high numbers of immigrant students who are not eligible under federal law for TANF or Medicaid, two of the primary categories for Direct Certification.

Direct Certification Students

Approximately 25% of the NYC student population is eligible for free lunch, based on Direct Certification. As Table 6 indicates, of the Direct Certification students for whom we could assign a poverty status or median household income, fewer than 50% would have been certified for free lunch using either of the alternative Census-based methods.

While this is not surprising, given that the Census-based methods provide only a best guess of poverty levels in a block group, it is troublesome since fewer than half of the eligible students would be eligible for services based on these alternative methods.

Table 6: Percent of Direct Certification Students Eligible for Title I Services Based on Census Data

	Current DOE Method	**Probability Estimate***	**Median Household Income**
Not eligible**		38.2	34.3
Eligible for free lunch	100.0	48.6	41.1
Eligible for reduced price lunch		13.2	23.6

n=269,364
*Probability estimate is based on ratio of income to poverty level data available at Census tract level.
**Students with missing Census data were coded as not eligible

Recent Immigrant Students

Among recent immigrants, 62.0% are currently qualified for free lunch – 56.2% based on lunch forms and 5.7% based on Direct Certification. An additional 5.7% qualify for reduced price lunch. Similar to the Direct Certification sample, the Census data qualifies

significantly fewer recent immigrant students than are currently eligible for free or reduced price lunch. Using Census-based methods may have severe implications for many schools, particularly those located in Brooklyn and Queens, where the greatest concentrations of recent immigrant students attend schools (32.6% and 36.7%, respectively).

Table 7: Percent of Recent Immigrant Students Eligible for Title I Services Based on Census Data

	Current DOE Method	**Probability Estimate***	**Median Household Income**
Not eligible**	33.4	54.6	54.0
Eligible for free lunch	61.0	33.5	20.7
Eligible for reduced price lunch	5.6	11.9	25.3

n=80,0071
*Probability estimate is based on ratio of income to poverty level data available at Census tract level.
**Students with missing Census data were coded as not eligible

Based on our findings from the above analyses, we developed three models for assessing student-level eligibility for Title I services.

We decided that the median household income variable would be more appropriate than the percent of children in poverty for two reasons. The most significant reason is that we could find no data source to update poverty status between the decennial Census years. As neighborhood composition is likely to change over a ten-year period, estimates of student poverty status become less reliable over time. Most estimates of poverty that are conducted between Census years are for larger areas, such as counties or cities, and are based on much smaller samples. Adjustments to block group data based on these broader surveys are unlikely to accurately reflect changes in income levels within such small areas. Since median household income by race/ethnicity is readily available from the Census data at the block

group level and could possibly be updated using data from the New York City Housing and Vacancy Survey (NYCHVS), this variable was used in our analysis.

Second, while the probability estimate may provide a better estimation of student poverty for the entire New York City public school system, the random assignment of particular students in a particular block group or Census tract has an implication at the school level. The probability estimation method could be expected to work best when the students in the same age group from a given area attend the same school. Where this may not be the case, such as for high school students, there may be a selection bias among students who attend particular schools. For example, if many of the higher-income students from a relatively poor neighborhood attend schools outside the neighborhood, the random-assignment process would tend to overstate their poverty levels. This would benefit the school that they attend, to the disadvantage of their neighborhood school.

Model 1

This model is based on student eligibility calculated from the median household variable. Students who could not be assigned a median household income were categorized as not eligible.

Model 2

Model 2 qualifies students who are eligible through Direct Certification as automatically eligible for Title I services. The remaining students are then assigned eligibility status based on the same criteria used in Model 1.

Model 3

In model 3, students who are eligible through Direct Certification or are considered recent immigrants by the DOE are automatically qualified for Title I services. The remaining students are then assigned eligibility status based on the same criteria used in Model 1.

Findings

Student-Level Analyses

As Table 8 indicates, Census-based Model 1 would qualify only 51% of students for Title I Services, compared to 64% who are eligible under the current DOE method based on free lunch eligibility.

Table 8: Percent of Students Eligible by Current DOE Method and Model 1

	Current DOE Method	**Model 1**
Not Eligible	36.2	49.0
Eligible for Title I Services	63.4	51.0

n = 1,022,740

Under either Model 2 or Model 3, the percent of students eligible for Title I services is similar to the percent of students eligible by current DOE Methods.

Table 9: Percent of Students Eligible by Current DOE Method and Model 2 and Model 3

	Current DOE Method	**Model 2**	**Model 3**
Not Eligible	35.6	40.1	36.9
Eligible for Title I Services	63.4	59.9	63.1

As Tables 10 and 11 show, the percent of students eligible for Title I services also differs by borough. The Census data best approximates current DOE eligibility among students who reside in Manhattan, and underestimates Title I eligibility in the Bronx and Brooklyn by 5-10% of students. In Queens and Staten Island, however, almost 50% fewer students would be eligible for Title I services under any of the Census-based models.

Table 10: Percent of Students Eligible for Title I Services by DOE and Model 1 by Borough

	Current DOE Method		Model 1	
	Eligible for Title I Services	*Not Eligible*	*Eligible for Title I Services*	*Not Eligible*
Bronx	78.3	21.7	68.9	31.1
Brooklyn	65.3	34.7	59.4	40.7
Manhattan	67.4	32.6	68.8	31.3
Queens	53.1	46.9	24.1	75.9
Staten Island	34.2	65.8	16.1	83.9

Table 11: Percent of Students Eligible by Current DOE Method and Model 2 and Model 3 by Borough

	Current DOE Method		Method 2		Method 3	
	Eligible for Title I Services	*Not Eligible*	*Eligible for Title I Services*	*Not Eligible*	*Eligible for Title I Service*	*Not Eligible*
Bronx	78.3	21.7	76.8	23.2	78.6	21.4
Brooklyn	65.3	34.7	67.5	32.6	70.4	29.6
Manhattan	67.4	32.6	74.2	25.8	76.0	24.0
Queens	53.1	46.9	34.8	65.2	42.3	57.7
Staten Island	34.2	65.8	23.9	76.1	26.2	73.9

This pattern persists when we analyze the data by school level. The current DOE method qualifies a larger number of students for Title I services than any of the three Census models. Only 50% of elementary/middle school students and 52.9% of high school students would be eligible for Title I services under Model 1, compared to 66.5% and 56.1% under the current DOE method.

Table 12: Percent of Students Eligible by DOE and Model 1 by School Level

	Current DOE Method		**Model 1**	
	Eligible for Title I Services	*Not Eligible*	*Eligible for Title I Services*	*Not Eligible*
Elementary/ Middle School	66.5	26.9	50.2	49.8
High School	56.1	39.0	52.9	47.1

While the number of elementary/middle school students who would be eligible for Title I services increases under Model 2 or Model 3, there are still fewer eligible students when compared to the current DOE method. However, under either Model 2 or Model 3, more high school students would be eligible for services than under the current DOE method.

Table 13: Percent of Students Eligible by Current DOE Method and Model 2 and Model 3 by School Level

	Current DOE Method		Model 2		Model 3	
	Eligible for Title I Services	*Not Eligible*	*Eligible for Title I Services*	*Not Eligible*	*Eligible for Title I Services*	*Not Eligible*
Elementary/ Middle School	66.5	26.9	58.9	41.1	62.4	37.6
High School	56.1	39.0	60.4	39.5	64.5	35.5

School-Level Analyses

The analysis shows that the number of schools that would meet DOE eligibility requirements for Title I funding would vary, depending on the model used for the analysis. As Table 14 indicates, 730 schools are eligible under current DOE guidelines. The largest decrease in eligible schools occurs using Model 1, where the number of eligible schools drops to 610. Under Model 2, 721 schools would be eligible for Title I funds, while under Model 3 an additional 25 schools would be eligible to receive Title I Funds.

Table 14: Number of Schools Eligible Under Each Model

	Schools	
	N	**%**
Current DOE Method	730	60.2
Model 1	610	50.3
Model 2	721	59.5
Model 3	755	62.3

Of the 1212 schools that were included in our analyses[3], 517 (42.7%) of the schools that received Title I funds under the 2002-03 DOE guidelines remained eligible under all three of the models, while 322 (26.6%) schools that were not eligible would remain ineligible. Of the remaining schools, 93 (7.7%) that were not eligible under DOE guidelines would become eligible under all of the three proposed models, 135 schools (11.1%) that were eligible in 2002-03 guidelines would be ineligible under any of the new models. The final group of 145 schools (12.0%) would not be eligible under Model 1, but 111 (76.6%) would become eligible under Model 2 and all would become eligible under Model 3.

The following tables show the breakdown of gains and losses of school Title I eligibility using each model. As each of the following tables indicates, between 11.1 and 17.6 percent of schools would be at risk of losing Title I eligibility, while between 7.7 and 13.2 percent could possibly gain eligibility if there were to be a change in the current allocation methodology.

Table 15: Number and Percent of Schools that Would Qualify Under Model 1 Compared to Current DOE Method

	Schools	
	N	%
Eligible under Current DOE Method and Model 1	517	42.7
Not Eligible Under Current DOE Method or Model 1	389	32.1
Eligible Under Current DOE Method But Would Lose Eligibility Under Model 1	213	17.6
Not Eligible Under Current DOE Method but Would Become Eligible Under Model 1	93	7.7

[3] This analysis is based on the median household income for each student from the 2000 U.S. Decennial Census, the cutoff of $33,485 (185% of poverty level) and school level cutoffs of 62%.

Table 16: Number and Percent of Schools that Would Qualify Under Model 2 Compared to Current DOE Guidelines

	Schools	
	N	%
Eligible under Current DOE Method and Model 2	582	48.0
Not Eligible Under Current DOE Method or Model 2	343	28.3
Eligible Under Current DOE Method But Would Lose Eligibility Under Model 2	148	12.2
Not Eligible Under Current DOE Method but Would Become Eligible Under Model 2	139	11.5

Table 17: Number and Percent of Schools that Would Qualify Under Model 3 Compared to Current DOE Method

	Schools	
	N	%
Eligible under Current DOE Method and Model 3	595	49.1
Not Eligible Under Current DOE Method or Model 3	322	26.6
Eligible Under Current DOE Method But Would Lose Eligibility Under Model 3	135	11.1
Not Eligible Under Current DOE Method but Would Become Eligible Under Model 3	160	13.2

Any change in DOE methodology for determining Title I eligibility would most heavily impact schools that are currently eligible but would lose eligibility under any of the Census-based models.

Impact by Borough

Any change in the methodology for determining Title I eligibility would have a different impact by borough. As Table 18 indicates, there would be an increase in the number of eligible schools in the Bronx, Brooklyn, and Manhattan under any of the proposed models (except, note that there would be a decrease in the number of schools eligible under Model 1 in both the Bronx and Brooklyn). Schools in Queens would be most affected by any of the proposed changes. While 108 schools are currently eligible for Title I funds, as few as eight schools would be eligible under Model 1, and at most, only 39 would be eligible under Model 3.

Table 18: Number of Schools Eligible for Title I Funds by Borough

	Current DOE Method	Model 1	Model 2	Model 3
Bronx	219	196	219	222
Brooklyn	246	223	277	295
Manhattan	149	181	191	192
Queens	108	8	28	39
Staten Island	8	2	6	7

Impact by School Type

Any change in how school-level Title I eligibility is determined would be most beneficial at the high school level. The number of eligible elementary and middle schools would decrease under all three Census-based models, while the number of eligible high schools would increase under any of the proposed models.

Table 19: Number of Schools Eligible for Title I Funds by School Level

	Current DOE Method	Model 1	Model 2	Model 3
Elementary/Middle	547	411	507	534
High School	183	199	214	221

Student Address Match Rate

Ninety-five percent of the schools in our sample had a student address match rate of 80% or higher. While the correlation between match rate and percent eligible was positive and significant, lower match rates were not necessarily associated with not being eligible for Title I funds. In other words, having a match rate of 60% or 70% did not automatically disqualify a school from being eligible for Title I funds. Of the 60 schools that had student address match rates lower than 80%, 46 were located in the Bronx and Queens. Among the 23 Bronx schools, however, 16 would be eligible under Model 1 and/or Model 2, compared to only 6 of the schools in Queens. Four of the five schools with the lowest match rates (less than 55%) are located in the Bronx in the former District 11. These schools don't appear to have high rates of Direct Certification or recent immigrant students. Therefore, a higher match rate might improve the percent of Title I eligible students and the likelihood of school eligibility.

Direct Certification

The mean Direct Certification rate among the schools in our sample was 26.7%. Fifty percent of schools have a Direct Certification rate of 27.4% or higher. A bivariate correlation analysis found an extremely high positive and significant correlation between the percent of Direct Certification students in a school and the percent of all students eligible for Title I services. In other words, the higher number of Direct Certification students in a school, the greater likelihood that a school would be eligible for Title I funds.

Recent Immigrants

On average, schools in the sample have populations that are comprised of 6.5% recent immigrant students. Fifty percent of the schools have 5% or fewer students who are recent immigrants. However, the percent of recent immigrant students in a school was significantly and negatively correlated with a school's Title I eligibility under Models 1 or 2. In other words, schools with high populations of recent immigrants were less likely to be eligible for Title I funds under Model 1 or Model 2.

Impact of Student Eligibility within Title I Eligible Schools

Title I eligible schools are allocated Title I funds based on the number of eligible students. Assuming that the per capita funding amount remained the same under a new method of assigning eligibility, a reduced number of eligible students would result in a reduced Title I allocation to the school, compared to the current DOE methodology.

On average, each eligible school would have between 2% and 8% fewer Title I eligible students if the DOE were to change the way student-level Title I eligibility is determined. For example, under Model 1, schools, on average, would have 7.5% fewer students eligible for Title I services, with some schools having as much as 37% fewer students.

Table 20: Mean Percentage Change Among Title I Eligible Schools

	Mean	SD	Range
Model 1	-7.5%	.097	-37% to 28%
Model 2	-3.1%	.099	-36% to 33%
Model 3	-1.9%	.096	-33% to 34%

The average change in eligible students would also vary by the borough in which the school is located. Across all boroughs, except Manhattan, schools would have between 1% and 22% fewer eligible students. For example, Brooklyn schools, on average, would have 9% fewer eligible students under Model 1 and 4% fewer eligible students under Model 3. Manhattan schools, on average, would only have fewer eligible students under Model 1.

Table 21: Average Percentage Gain or Loss of Title I Funds Among Title I Eligible Schools by Borough

	Model 1	**Model 2**	**Model 3**
	Mean (range)	Mean (range)	Mean (range)
Bronx	-7.8% (-28% to 18%)	-13.4% (-22% to 22%)	-1% (-30% to 25%)
Brooklyn	-8.7% (-34% to 28%)	-4.8% (-34% to 33%)	-3.7% (-19% to +34%)
Manhattan	-4.9% (-29% to 13%)	0% (-22% to 22%)	2% (-19% to 22%)
Queens	-19.1% (-37% to 1%)	-13.4% (-33% to 10%)	-9.8%% (-33% to 21%)
Staten Island	-22.3% (-32 to -13%)	-17.7% (-32% to -2%)	-15.6% (-27% to 0%)

Updating the Poverty Measure

While Census data are considered the best data available for sub-national level statistics, including neighborhood level statistics, one concern is that they are collected only once every ten years. While the data may provide reliable estimates for one, two, or three years after they are collected, they become increasingly unreliable as the years between collections grow larger. Because of this concern, the U.S. Census Bureau is planning to implement an on-going survey that will replace the "long form" that is the data collection tool for detailed Census data. The American Community Survey (ACS) will provide annual estimates of small-area demographic, social, and economic characteristics, comparable to the current Census long form. However, until this survey is implemented in the New York City area, there are few sources of neighborhood level data that are available.

Given the lack of detailed neighborhood-level income data available between Census years, we attempted to provide estimates of changes in income using data from the New York City Housing and Vacancy Survey (NYCHVS). This survey, sponsored by the New York City Department of Housing Preservation and Development, has been implemented approximately every three years since 1965 to comply with New York State and New York City's rent regulation laws, and has been conducted by the U.S. Census Bureau. While the sample size of 18,000 housing units is significantly smaller than that of the Decennial Census, it is meant to be representative of the five boroughs. The main purpose of the survey is to collect housing data, but demographic information on the households, including race, income, employment and household composition, is also collected.

Our analysis utilized the 1999 and 2002 NYCHVS surveys to attempt to estimate the percentage change in household income between these years. Income data collected for NYCHVS is reported for 55 "sub-boroughs" within New York City, compared to 5,733 block groups for the Census. As the much smaller sample used for the NYCHVS results in less precise estimates, we computed the percent change of income at the borough level. The borough-wide percentage change was then applied to the median household incomes reported by the 2000 Census for each of the city's 5,733 block groups. Between 1999 and 2002, Manhattan residents experienced a 15% increase in income; in the Bronx and Brooklyn the increase was 18%; in Queens the increase was 13% and in Staten Island the increase was 9%.

Table 22: Percent of Students Eligible for Title I Services

		Model 1	
	Current DOE Method	**Unadjusted Median Income**	**Adjusted Median Income**
Not Eligible	30.1	49.0	58.7
Eligible for Title I Services	63.4	51.0	41.3

As Table 22 and Table 23 indicate, adjusting the median household income based on changes in income using the 1999 and 2002 NYCHVS decreases the number of students who would be eligible for free or reduced price lunch and, therefore, Title I services. The number of Title I eligible schools drops from 610, using the unadjusted median household income, to 518 with the adjusted incomes. The biggest drop is in Brooklyn, where 81 schools would lose Title I status if the adjusted median household income were used in the student Title I eligibility determination.

Table 23: Number of Schools Eligible for Title I Funds Using Adjusted Median Income

		Model 1	
	Current DOE Method	**Unadjusted Median Income**	**Adjusted Median Income**
Bronx	219	196	192
Brooklyn	246	223	142
Manhattan	149	181	172
Queens	108	8	9
Staten Island	8	2	3
Total	730	610	518

Impact of DOE Change in Allocation by Borough

Beginning with the 2003-04 school year, the DOE began to differentiate, by borough, the percent of Title I eligible students that schools needed to be eligible for Title I status.

Table 24: 2003-04 School Year Percent of Eligible Students in a School Needed to Receive Title I Funds

Borough	%
Bronx	60.00
Brooklyn	60.00
Manhattan	60.00
Queens	57.86
Staten Island	35.53

We also analyzed the data using these cutoffs and both the unadjusted and adjusted income variables. As Table 25 indicates, there would be a further drop in the number of eligible schools. The total number of eligible schools drops to 647 from the 773 schools eligible under current DOE eligibility criteria. The decrease in eligible schools is found in all boroughs, except for schools in Manhattan, where there is a 21% increase in the number of eligible schools.

Table 25: Number of Title I Eligible Schools Based on 2003-04 Eligibility Cutoffs by Borough

		Model 1 School-Level Data	
	Current DOE Method	**Unadjusted Median Income**	**Adjusted Median Income**
Bronx	223	202	193
Brooklyn	251	235	152
Manhattan	153	185	178
Queens	115	12	11
Staten Island	31	13	13
Total	773	647	547

Conclusion

Each of the three models we developed underestimates school-level Title I eligibility, when compared to the current Department of Education method. The use of Census data, through the methods we developed to determine Title I student eligibility, would result in a decrease in the number of schools that are eligible for Title I status.

While the Census data, when combined with other information on student poverty, may provide an approximation of relative student poverty in a school, it is not a sufficiently reliable predictor of individual student-level poverty, and may significantly decrease the amount of money an individual school receives under the Title I program.

Given that the percent of students eligible through Direct Certification in each school significantly impacts a school's overall eligibility, we recommend that the NYCDOE work with the U.S. Department of Agriculture to increase the types of administrative data that can be used in Direct Certification.

If the NYCDOE wants to pursue using Census data to determine Title I student eligibility, it may wish to ask the Census bureau to investigate what types of analyses the Bureau could conduct specifically for New York City. Since our analyses are based on publicly available Census data, we may not have access to other variables or to more sensitive data that might be available to the city. For example, we cannot differentiate the median household incomes by whether there are children aged 5-17 in the household, and whether they attend public or private school. This type of data might help refine the variable for median household income estimates that we used to determine student eligibility.

Additionally, the NYCDOE might work with schools to obtain more accurate home addresses, to update addresses when necessary, and to more accurately input addresses into the computer system. This may help to improve the geocoding match rate and thus the percentage of eligible students.

The availability of data from the American Community Survey could greatly increase the NYCDOE's ability to update eligibility on a year-to-year basis. While the Census-based method does not currently seem to be a viable option to replace the use of free lunch forms to determine student eligibility for Title I services, it may become so in the future.