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Measuring Equity at the School Level: The Finance Perspective

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This article explores conceptual, methodological, and empirical issues in resource allocation at the intradistrict and school levels. With increased attention focused on policies and data related to resources within districts, it is important that analytical problems and potential solutions be debated by researchers. The article develops ways that equity concepts can apply at the school level, identifies a series of methodological issues, and includes an empirical analysis of vertical equity at the intradistrict and school levels in New York City.

One of the constants in school finance policies and analyses over the past 2 decades has been the use of the school district as the primary unit of analysis. District-level per-pupil revenues, expenditures and outcomes, along with measures of ability to pay, are the data that are used in almost all studies to test hypotheses about equity, to measure trends in finances, and to mount a challenge to a state's school finance system in the courts (Berne & Stiefel, 1984; Kearney & Chen, 1990; Wyckoff, 1992).

For three principal reasons, the dominance of the district as the unit of analysis in school finance equity is being seriously challenged. First, across school districts, states, and even countries, in efforts to improve education, there is a growing belief that the most critical activities are closest to the child—at the school or program level. Second, there is increasing interest in measuring and focusing on processes, outputs, and outcomes, rather than simply financial inputs (Berne & Picus, 1994). Analyses at the school level are more likely to yield meaningful variations in these variables and to uncover stronger relationships with inputs. Third, the rapid advancement of technology now makes it possible to collect and analyze information at a level of detail that more closely mirrors the education process at the school level.

In this article, we explore both conceptual and empirical issues related to school finance analysis at the school level. It is important to examine these issues explicitly at the beginning of what is likely to prove a long line of school-level studies. Such explicit examination can help the research community develop better data and methods for their studies and can ultimately improve educational policies. The next section of the article presents a conceptual exploration of school-level equity analysis. The third section considers several methodological issues, and the article concludes with an illustrative analysis of equity at the intradistrict and school levels.

Conceptual Issues in School-Level Equity Analysis

In previous work, we developed concepts and measures of three equity principles—equal opportunity, horizontal equity, and vertical equity (Berne & Stiefel, 1984). We defined *equal opportunity* in terms of the relationship between school characteristics and a second variable, where in most cases the absence of a relationship signifies equal opportunity. School characteristics can be

broadly conceptualized to include inputs, outputs, and outcomes as possibilities. In most of this section, we discuss financial resources; however, the discussion would be similar in most instances for processes, outputs, and outcomes.

At the district level, equal opportunity with respect to ability to pay is the dominant issue, but differential tax capacity is not a central concern within districts because individual schools do not have revenue-raising responsibilities. It is likely that a new series of equal opportunity issues will surface at the school level. Two candidates for equal opportunity analyses within districts are the relationships between resources (broadly defined) on the one hand, and race and ethnicity or geography on the other hand. Within many districts, there are renewed concerns about the distribution of resources with respect to race and ethnicity. Similarly, it is often claimed that different areas within a given district are favored with respect to resources.

Horizontal equity, or the equal treatment of equals, might take on real meaning at the school level, in terms of financial resources and output measures. For financial resources, this is particularly true if funding streams coming to the school can be separated. For example, data are available for New York City that separate general education (or tax levy) funding from reimbursable program (e.g., Chapter 1) and special education funding. Philosophically, the general education spending provides an equal base for all students, whereas the other funding streams are to be used differentially across students. Thus, horizontal equity could provide a valid criterion upon which to evaluate the equity of general education funding.

Vertical equity, or the appropriately unequal treatment of unequals, is bound to be a very important equity concept at the school level. As we get closer to individual pupils in our research, it becomes more obvious that those pupils are not all equal. A few of the variables that are likely to serve as characteristics against which to measure whether there are more financial resources available are poverty, learning disabilities of various kinds, and native languages other than English. Schools where there are higher concentrations of students in any of these categories would need more resources to achieve appropriate learning (or other outputs) compared to schools with lower concentrations. Vertical equity measures will assess the degree to which those schools receive more resources per pupil.

Methodological Issues at the School Level

As researchers begin to devote more attention to school-level analyses, a series of methodological issues needs to be confronted. Data availability will sometimes dictate how the methodological issues are resolved, but explicit consideration of these issues may eventually lead to improved data collection.

School Level Versus Within District Analysis

We have used the terms *school level* and *within district* interchangeably. In reality, there are differences that could affect analyses. In most school districts, local, state, and federal dollars are allocated from a central district point to schools, to the district office itself, and perhaps to a service or administrative level between the district and the school (subdistrict). Community school districts, dropout prevention centers, and special education programs are examples of the latter. The interesting methodological question is: When the focus is the school, what is the appropriate treatment of the resources that are used at the district or subdistrict levels?

To the degree that school-level analysis is intended to describe the resources devoted to children in a more valid and reliable manner than district-level analysis, all resources potentially available to children should be included. The result of this approach would be that some form of allocation would be needed so that the sum of all resources "in the schools" equals the district resource total.

An argument against fully distributing all resources is that any method of allocating joint or intradistrict resources is arbitrary and will not necessarily represent the real availability of those joint resources at the school level. It will be interesting to see how this issue is handled in the initial reporting of school-level finance analyses.

The Concept of a School

The first image that is associated with a school often is the physical building. For school finance analysis through the early 1980s, this would have been reasonably accurate. More recently, partly as a reaction to the conditions of large organizations and the difficulty of changing them, school reformers have been turning to smaller schools as organizational units even though these schools may be physically housed in larger buildings. This raises the obvious question: Should the definition of the "school" be program based or building based?

Despite the long-standing notion of a physical school building, if the building is not coincident with the programs, then many of the potential advantages of school-level analysis will be lost if buildings are used instead of programs. A possible working principle is that if resources are allocated by programs, and students or staff are identified by programs, then these programs should be the subject of "school"-level analysis. Researchers need to be aware that data at the program level will probably lag behind the program development itself.

The Quality of School-Level Data

Researchers who analyze district-level data have come to expect reasonably reliable data, much of which is audited. Moreover, data collected at the state level is usually comparable across districts. We expect that the variability of the quality of data at the school level is much wider than at the district level, and researchers will need to take this into account as they analyze and interpret the data.

It is important that researchers understand the purpose for the school-level data collection, how the data have been used and audited in the past, and whether they have been analyzed previously. In some cases, the data may be collected for a reporting purpose and not for an analytic purpose, leading to questionable quality. Moreover, the complexity of school-level data can be greater than district-level data, and researchers will need to understand fully the definitions and coding conventions so that the analysis is as accurate as possible. A further complication is that there may be variability from school to school in the way in which the data are reported. The bottom line is that at least in the short run it is reasonable to be more concerned about the quality of school-level data than for similar data at the district level. In cases where the school-level data are collected at the state level, quality may be higher.

The Definitions of Resource Variables

There are a range of resource definition questions that raise generic issues and need to be considered. The first is the underlying basis of the resource variables; that is, whether they are based on revenues, expenditures, or both. This may be one case where researchers are fortunate in that the multitude of resource categories at the district level may be reduced to a more manageable and meaningful set at the school level. For example, at the school level a resource variable may be defined in terms of "general" education, which constitutes an attempt to include a base level of educational services for all students. In addition to this general education category, there may be categories based on particular needs including special education, compensatory education, or bilingual education.

This categorization may be based on both revenue sources (for example, no categorical funds in the general education category) and expenditure functions (for example, no special education spending in the general education category). The result may be a more informative set of variables at the school level. A related question is whether these separate streams of resources should be analyzed separately or together. This will depend on the research question and the specific definitions.

A second question is whether the data describe the full dollar costs of the resources. For example, there may be situations where teachers' salaries are recorded at the school level, but other parts of their compensation package, such as pensions and fringe benefits, are not assigned to schools. This is a serious problem, because in most cases the pension and fringe benefit costs range between 20 and 35% of the salary costs. Other

examples are paid leaves and sabbatical costs. Although data collection practices may vary, from an analytical point of view all costs should be included.

A third question is whether the school-level analysis focuses on dollars or positions. Dollars are fully comparable regardless of whether the resources are devoted to personal services or not, or whether there are different types of personnel. (Of course there may be nonpriced resources, such as volunteer time, that are not counted in either a dollar or a position number.) One problem involves the potential loss of information; the dollar figures for personnel represent a combination of positions and salaries, and there are some questions about the meaning of salary differences as they relate to productivity differences. For example, would researchers want to take into account a situation where two schools have the same dollar resources per child but one has a much smaller number of positions at higher salaries than the other? The answer is probably yes, and thus a case can be made for both *dollar* and *position* analysis in school-level research.

The final question in this category is the extent to which the research will capture the full set of resources at the school level, including resources obtained from the community and the commitment of time on the part of parents, teachers, and community members. It is clear that these are ignored in virtually all district-level analyses, but their exclusion may have more of an effect for school-level analyses, because they may vary more widely across schools.

Pupil Counts

As in most school finance analyses, there will be a variety of pupil counts available at the school level. One guideline for analysts is that the pupil count should match the resource variable. That is, general education pupils should be considered in relationship with general education dollars, special education pupils with special education funds, and so forth. The conceptual issues here do not appear to be different than at the district level, except there is the possibility that a greater level of detail may be available at the school level.

Illustrative Example of Intradistrict and School Equity Analysis

For the first time, in the spring of 1992, the New York City Board of Education published detailed budgets for its 32 community school districts (labeled hereafter as subdistricts) and the 800 plus elementary and middle/junior high schools within those subdistricts. This section presents the first analysis of the budgets and selected expenditures of these 32 community subdistricts and approximately 800 schools. These data are merged with other Board of Education data containing poverty and average teacher salary statistics, so that various relationships can be explored.

The subdistrict and school budgets are divided into three separate funding categories: general education, reimbursable programs, and special education programs. We examine the first two categories, but not the third, because special education budgets have severe data limitations.[1] In addition to the budgets and expenditures at the subdistrict and school levels, all of which are measured in dollars, data are available on the number of budgeted positions in the general education program category.

We use the New York City resource data to ask what relationships subdistrict and school-level data reveal about vertical equity with respect to poverty.[2] We use regression analysis to assess the relationship between the resource (budget, expenditure, or position) data and poverty. Pupil counts used in the analysis are based on enrollment, not attendance. To measure the poverty variable, we use the percentage of pupils who qualified for free lunch in the subdistrict (or school) in 1990–91.[3] For each per-pupil resource variable, we estimate a regression with the resource variable as the dependent variable and the percentage of the pupils in the subdistrict (or school) who qualify for free lunch as the independent variable. In all cases the regressions are weighted by the number of pupils in each subdistrict (or school). We report the basic regression statistics and then use those statistics to estimate the differences in the resources per pupil between a high- and a low-poverty subdistrict (or school).

High poverty means 80% of the pupils live in poverty and low poverty means 30% of pupils live in poverty. These two numbers cut off approximately the top and bottom three subdistricts (out of 32) in the distribution of subdistricts arranged by poverty.

The remainder of this section is organized to answer a series of vertical equity questions:

Does the relationship with poverty differ for per-pupil budgeted dollars, actual expenditures, budgeted salaries, average salaries, or positions?

Table 1 presents summary data for five subdistrict level variables that we analyze for general education spending.[4] A total of $1,594.4 million is budgeted for all the subdistricts, with a mean budget per pupil of $2,550 (column one). The total amount of general education expenditures is $1,629.5 million, $35.1 million higher than budgeted, and $2,627 per pupil (column two).[5] The dispersions in the per-pupil budget and expenditures are almost comparable, with expenditures showing a slightly higher range, standard deviation, and coefficient of variation.

The mean per-pupil budget numbers are lower than one would at first expect in a system that spends over $7,000 per pupil. There are a variety of reasons for this. First we are looking at only a small part of the $7.0 billion in total spending for education in 1991–92, namely $1.6 billion for general education for elementary and middle schools. In addition, the following amounts were budgeted: $1.1 billion in special education funding, $.9 billion for high schools, $1.1 billion in fringes and pensions, $.76 billion for food and transportation, $.43 billion for school facilities and utilities, $.13 billion for central administration, and $1.0 billion for reimbursable funds for all schools. In future tables we analyze reimbursable funds for elementary and middle schools ($660.4 million), but much of the rest of the relevant funds (e.g., school facilities, fringes, food) are not budgeted by school or subdistrict. It is clear that these funds could and should be accounted for at a school level and it is hoped that the city's reporting will soon make these data available. Nevertheless, the data we can use are from two important funding streams—general education and reimbursable programs—and are well worth analyzing.

The third column of Table 1 reports summary statistics for general education budgeted teachers' salaries per pupil. Again the dispersions are similar to those for per-pupil budget and expenditure numbers. The fourth column shows data for average teachers salaries. The average salary is based on *all* teachers, not simply ones funded with general education dollars, but we are confident that the results would not differ significantly if data on the general education teachers alone were available. The last column shows summary statistics for general education

TABLE 1
Subdistrict-Level Budgets and Expenditures per Pupil: General Education, 1991–1992

Summary statistics	GE total subdistrict budget per pupil	GE total Subdistrict expend. per pupil	GE teachers' salary subdistrict budget per pupil	Average teacher's salary	GE total pupils per position
Mean	$2,550	$2,627	$1,887	$41,107	18.22
Maximum	$2,842	$2,965	$2,096	$46,107	$19.63
Minimum	$2,414	$2,450	$1,765	$37,764	$16.19
Range	$ 428	$ 515	$ 331	$ 8,343	$ 3.43
Standard deviation	$ 77.1	$ 107.6	$ 79.6	$ 1,967.3	$ .720
Coefficient of variation	0.03	0.04	0.04	0.05	0.04
Number of subdistricts	32	32	32	32	32
Number of pupils	625,040	620,252	625,040	625,040	624,497

Source: 1991–1992 district and school budget and expenditure data, general education and position files, and 1990–91 school profiles, New York City public schools.

budgeted pupils per position. The mean number of pupils per position is 18.22, and the coefficient of variation is small (.04), like that for the other variables.

Table 2 presents the regression results for each of five variables with the percentage of pupils in poverty. The results show that the relationship with poverty, at the subdistrict level of analysis, differs by variable. A comparison of the first two columns shows that although budgets per pupil are distributed such that high poverty subdistricts receive higher per pupil amounts, expenditures per pupil show the opposite relationship. Neither relationship is large (the regression coefficients are small), nor especially strong (the coefficients of determination are small).

The third column looks at the portion of the budget devoted to teachers' salaries. On average, across all the subdistricts teachers' salaries account for 74% of the total budget.[6] Teachers' salaries show a larger and negative relationship with poverty. The last two columns explain how this finding is consistent with the small, weak relationship observed for total budgets per pupil. Average teacher's salaries are very strongly and negatively related to poverty. Average salary in high-poverty subdistricts is $4,536 lower than in low-poverty subdistricts; the R^2 is .688. On the other hand, the pupils per position are also moderately negatively related to poverty, meaning there are smaller numbers of pupils for every position (or relatively more positions per pupil) in poorer subdistricts. The combination of relatively more positions, but lower salaries, in poor subdistricts results in the weak relationship between total budgets per pupil and poverty.

Why are teachers paid less, on average, in subdistricts with greater proportions of pupils in poverty? The main reason is probably the higher turnover resulting from resignations in these subdistricts, with more hiring at the beginning salary level. In addition, the policy of allowing teachers with more years of service to transfer between schools and subdistricts results in some loss of teachers from subdistricts with higher amounts of poverty. Why are relatively more positions found in subdistricts with greater percentages of pupils in poverty? The primary reason is that even for general education positions, Chapter 1 schools are favored in the formulas that allocate positions to the subdistricts. And Chapter 1 schools have higher percentages of poor children than non-Chapter 1 schools.

Does the relationship with poverty change if subdistrict-level data for elementary and middle/junior high schools are separately analyzed?

The answer to this question is "yes" as

TABLE 2

Results of Subdistrict-Level Regression Analysis, Selected per-Pupil Variables, With Percentage Free Lunch as Independent Variable, General Education, 1991–1992

Statistics	GE total subdistrict budget per pupil	GE total subdistrict expend. per pupil	GE teachers' salary subdistrict budget per pupil	Average teacher's salary	GE total pupils per position
Regression coefficient	.480	−.786	−1.274	−9,072	−.0172
Result of a 50 percentage point change in free lunch	$24.0	−$39.3	−$63.7	−$4,536	−.86
High-poverty district	$2,561	$2,611	$1,861	$39,275	17.88
Low-poverty district	$2,537	$2,651	$1,925	$43,810	18.74
Simple correlation	.112	−.131	−.288	−.829	−.430
Coefficient of determination	.013	.017	.083	.688	.185
Number of pupils	625,040	620,252	625,040	625,040	624,497

Note. Mean value of free lunch (pupil weighted) is approximately 60%. It varies slightly by dependent variable.
Source: 1991–92 district budget and expenditure data, general education and position files, and 1990–91 school profiles, New York City public schools.

shown by comparing the results in Tables 3 and 4. The data in these tables include budgets allocated to the elementary schools (Table 3) or middle/junior high schools (Table 4) in each subdistrict. There are two differences between the data in these tables and those in Tables 1 and 2. First, the data include only budgets allocated to the schools and do not include amounts that are nonallocated or allocated to subdistrict offices.[7] Second, the

TABLE 3

Results of Subdistrict-Level Regression Analysis, Budgets or Expenditures Allocated to Elementary Schools, Selected per-Pupil Variables, General Education With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	GE total school allocation per pupil	GE total school expend. allocation per pupil	GE teachers' salary school allocation per pupil	Average teacher's salary	GE total school allocation pupils per position
Regression coefficient	−1.966	−2.390	−2.112	−8,698	−.00445
Result of a 50 percentage point change in free lunch	−$98.3	−$119.5	−$105.6	−$4,349	−.223
High-poverty district	$ 2,178	$2,315	$1,682	$39,213	20.62
Low-poverty district	$2,277	$2,434	$1,787	$43,562	20.84
Simple correlation	−.283	−.463	−.325	−.835	−.072
Coefficient of determination	.080	.214	.106	.697	.005
Number of pupils	400,853	447,763	450,853	450,853	454,083

Note. Mean value of free lunch (pupil weighted) is approximately 63%. It varies slightly by dependent variable.
Source: 1991–92 district budget and expenditure data, general education and position files, and 1990–91 school profiles, New York City public schools.

TABLE 4

Results of Subdistrict-Level Regression Analysis, Budgets or Expenditures Allocated to Middle/Junior High Schools, Selected per-Pupil Variables, General Education, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	GE total school allocation per pupil	GE total school expend. allocation per pupil	GE teachers' salary school allocation per pupil	Average teacher's salary	GE total school allocation pupils per position
Regression coefficient	4.347	4.420	3.069	−8,485	−.0420
Result of a 50 percentage point change in free lunch	$217.4	$221	$153.5	−$4,243	−2.10
High-poverty district	$2,745	$2,984	$2,170	$39,599	15.49
Low-poverty district	$2,527	$2,763	$2,016	$43,842	17.59
Simple correlation	.331	.301	.329	−.655	−.418
Coefficient of determination	.110	.090	.108	.428	.175
Number of pupils	174,187	172,489	174,187	174,187	170,414

Note. Mean value of free lunch (pupil weighted) is approximately 52%. It varies slightly by dependent variable.
Source: 1991–92 district budget and expenditure data, general education and position files, and 1990–91 school profiles, New York City public schools.

data are divided into parts belonging to elementary versus middle/junior high schools.

The coefficients for elementary schools (Table 3) show that all variables except positions are distributed in *higher* per-pupil amounts to *low* poverty subdistricts. Although the distribution of pupils per position favors the high-poverty elementary schools, the relationship is extremely small and weak; the R^2 is .005.[8] On the other hand, the coefficients for middle/junior high schools (Table 4) show that all variables except average teacher's salary are distributed in *higher* per-pupil amounts to *high* poverty schools. In particular, examining the last two columns of the table shows that these schools compensate for the strong negative average teacher's salary relationship by putting relatively large numbers of additional positions in the high-poverty schools. High poverty schools are estimated to have 15.49 pupils per position as compared to 17.59 pupils per position in low-poverty schools. The middle/junior high schools budget and expend in favor of high poverty schools, whereas the elementary schools do not.[9]

Does the relationship with poverty change if the school rather than the subdistrict is the unit of analysis?

The results in Tables 5 and 6 may be influenced by the way the data are reported. Each school in a subdistrict is assigned the *average* subdistrict teacher's salary, thereby cutting down some of the variation we would expect to find at the school level. It is clear that the data set would be more informative for all purposes if *actual* salaries at the school level were used. We suspect that as school-level analyses become more common, this kind of data reporting with average numbers will become less common.

The result, using the data as they are available to us, is that the findings do not change when we go from the subdistrict to the school level. Elementary schools budget and expend more resources per pupil in lower poverty schools, whereas middle/junior high schools do the opposite. The sign of all the coefficients in Tables 5 and 6 are identical to the comparable ones in Tables 3 and 4. The size of coefficients and the strength of the relationships are lower for the school-level analysis, however. The lower correlations are most probably a statistical effect of greater variation at the school level and, conversely, more averaging at the district level, despite the assignment of an average teacher's salary to the schools.

TABLE 5

Results of School-Level Regression Analysis, Budgets or Expenditures Allocated to Elementary Schools, Selected per-Pupil Variables, General Education, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	GE total school budget per pupil	GE total school expend. per pupil	GE teachers' salary school budget per pupil	Average teacher's salary	GE total school pupils per position
Regression coefficient	−.317	−1.506	−.613	−6,414	−.0072
Result of a 50 percentage point change in free lunch	−$15.9	−$75.3	−$30.7	−$3,207	−.36
High- poverty district	$2,201	$2,320.8	$1,701	$39,706	20.44
Low-poverty district	$2,217	$2,396.1	$1,732	$42,913	20.88
Simple correlation	−.032	−.163	−.064	−.559	−.089
Coefficient of determination	.001	.026	.004	.312	.009
Number of pupils	438,871	440,504	446,124	438,494	422,828

Note. Mean value of free lunch (pupil weighted) is approximately 63%. It varies slightly by dependent variable.
Source: 1991–92 district budget and expenditure data, general education and position files, and 1990–91 school profiles, New York City public schools.

Is the relationship with poverty different for reimbursable funding than for general education funding?

Table 7 displays general statistics on reimbursable program budgets. There is an important difference in the treatment of fringe benefits between general education and reimbursable program budgets. Fringe benefits are included in the reimbursable figures but not in the general education figures; they account for about one fifth of reimbursable budget dollars. Keeping in mind the difference in treatment of fringe benefits, as compared with the general education budget of $1.594 million, the reimbursable program budget for elementary and middle/junior high schools totals $660.4 million. This total can be broken down into five funding streams, two of which (Federal entitlement funds such as Chapter 1 monies and state entitlement funds such as compensatory aid) constitute 88.3% of the total. Total per-pupil reimbursable budgets of $1,058 are 41.5% of total general education spending. Total per-*eligible*-pupil amounts are $2,494, which means that when general education budgets are added to reimbursable budgets, eligible children have nearly twice the dollars allocated to them that registered pupils do.[10] Of course, the allocated amounts may or may not be spent specifically for eligible pupils.

Table 8 displays regression results for se-

TABLE 6

Results of School-Level Regression Analysis, Budgets or Expenditures Allocated to Middle/Junior High Schools, Selected per-Pupil Variables, General Education, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	GE total school budget per pupil	GE total school expend. per pupil	GE teachers' salary school budget per pupil	Average teacher's salary	GE total school pupils per position
Regression coefficient	3.491	3.620	2.925	−5,746	−.0294
Result of a 50 percentage point change in free lunch	$174.6	$181.0	$146.3	−$2,873	−1.47
High-poverty district	$2,725	$2,952.5	$2,170	$40,516	15.92
Low-poverty district	$2,550	$2,771.5	$2,024	$43,389	17.39
Simple correlation	.248	.227	.255	−.453	−.326
Coefficient of determination	.061	.052	.065	.205	.106
Number of pupils	170,153	167,722	172,270	167,342	166,808

Note. Mean value of free lunch (pupil weighted) is approximately 53%. It varies slightly by dependent variable.
Source: 1991–92 district budget and expenditure data, general education and position files, and 1990–91 school profiles, New York City public schools.

TABLE 7

Subdistrict-Level Reimbursable Program Budgets, 1991–92

Program types	Total reimbursable program budgets (in $ millions)	Budgets as a percentage of total	Reimbursable program budgets per pupil	Reimbursable program budgets per eligible pupil
Federal entitlement	$329.7	49.9%	$529	$1,245
State entitlement	$253.6	38.4%	$407	$958
Federal competitive	$37.5	5.7%	$60	$142
State competitive	$29.1	4.6%	$47	$110
Other	$10.5	1.6%	$17	$40
Total	$660.4	100.0%	$1,058	$2,494

Source: 1991–92 district and school budget data, reimbursable program file, New York City public schools.

TABLE 8

Results of Subdistrict-Level Regression Analysis, Reimbursable Program Budgets, Selected per-Pupil Variables, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	Total	Federal entitlement	State entitlement	Federal competitive	State competitive	Other
Regression coefficient	17.30	12.645	5.18	−1.07	.370	.160
Result of a 50 percentage point difference in free lunch	$865	$632	$259	$53	$18	$8
High-poverty district	$1,408	$784	$511	$39	$54	$20
Low-poverty district	$543	$152	$252	$92	$36	$12
Simple correlation	.859	.946	.799	−.184	.211	.526
Coefficient of determination	.738	.894	.638	.034	.045	.277
Number of pupils	625,040	624,078	624,078	624,078	624,078	624,078

Note. Mean value of free lunch (pupil weighted) is 60%.

Source: 1991–92 district budget data, reimbursable programs file, and 1990–91 school profiles, New York City public schools.

lected per-pupil reimbursable program budget variables. Except for federal competitive grants, all reimbursable program budgets are distributed in higher amounts to subdistricts with higher percentages of poor pupils. However, only the federal and state entitlement budgets show large and strong relationships. The positive relationship between per-pupil reimbursable budgets and poverty differs from the relationship between per-pupil general education expenditures and poverty at the subdistrict level, where per-pupil funds were distributed in higher amounts to lower poverty districts.

Table 9 repeats the analyses in Table 8, except that only eligible students are counted instead of all pupils. These results allow us to assess whether there is a "concentration" effect with respect to poverty. If eligible pupils in subdistricts with higher percentages of poor pupils receive more dollars per pupil, then there is a concentration effect.

Per-eligible-pupil total and federal entitlement budgets exhibit a concentration effect. This effect is large and strong for federal entitlement budgets where there is an average $790 difference between a high-poverty- and low-poverty-district and an R^2 for the regression of .826. All other variables, including state entitlements, show a negative relationship, or the opposite of a concentration effect. Thus, whereas all but federal competitive budgets are distributed in favor of subdistricts with higher percentages of poor pupils (Table 8), only federal entitlement funds exhibit a concentration effect in poor districts.

How is the relationship with poverty affected if dollars are subdivided in various ways?

We have chosen to look at two different subdivisions of the total budget. First, we have divided the total budget into three parts: dollars allocated to the schools, dollars allocated to the subdistrict office, and dollars left nonallocated. By the close of the fiscal year the nonallocated category will not exist for a subdistrict, because all funds will have been allocated to the school or subdistrict office. These three budget divisions are of interest because they may reveal different policies for high- and low-poverty subdistricts with respect to budget behavior. For example, how much is left to be allocated or rescinded by the Central Board at a later date; or how much is needed or used in the subdistrict office? Tables 10, 11, and 12 show the regression results of the tripartite division of per-pupil total budget dollars for general education programs; reimbursable programs with the total pupil count; and reimbursable programs with the eligible pupil count, respectively.

For the general education category (Table 10), the total budget is distributed such that higher poverty subdistricts receive slightly more per-pupil resources. However, column two shows that this relationship is composed of a negative school allocation for high-poverty subdistricts and a positive subdistrict office and nonallocated distribution for high-poverty subdistricts. All of the relationships are moderately weak as shown by their low R^2s. The largest coefficients occur for the school-allocation and nonallocated variables.

There are several competing explanations for why more per-pupil subdistrict office and nonallocated funds are budgeted to poorer subdistricts, on average. It is possible that poorer subdistricts need more administrative services in their subdistrict office. Alternatively, perhaps, personnel who serve in more than one school are not assigned to a school, and poorer subdistricts have more personnel who serve more than one school.[11]

Table 11 and 12 show the school, subdistrict office, and nonallocated per-pupil budget relationships for reimbursable program funds. The nonallocated category contains all the fringe benefits, and these account for just over 57% of the category. It is clear that there needs to be better treatment of fringe benefits in future school-level databases in New York City. When one keeps in mind how fringe benefits are accounted for, in both Tables 11 and 12 the results show that, on average, subdistricts with higher percentages of poorer pupils receive more per-pupil resources in all categories. (All coefficients are positive.) Particularly striking are the large coefficients for the subdistrict office per pupil, and for the nonallocated per pupil and per eligible pupil. Districts with greater percentages of poor pupils either need or use

TABLE 9

Results of Subdistrict-Level Regression Analysis, Reimbursable Program Budgets, Selected per Eligible Pupil Variables, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	Total	Federal entitlement	State entitlement	Federal competitive	State competitive	Other
Regression coefficient	7.445	15.79	−1.52	−5.74	−.86	−.23
Result of a 50 percentage point difference in free lunch	$372	$790	−$76	−$287	−$43	−$12
High-poverty district	$2,611	$1,493	$934	$52	$97	$36
Low-poverty district	$2,238	$703	$1,010	$338	$139	$48
Simple correlation	.303	.909	−.225	−.331	−.183	−.261
Coefficient of determination	.092	.826	.051	.110	.033	.070
Number of pupils	264,831	264,831	264,831	264,831	264,831	264,831

Note. Mean value of free lunch (pupil weighted) is 64%.

Source: 1991–92 district budget data, reimbursable programs file, and 1990–91 school profiles, New York City public schools.

more in their subdistrict offices and also leave more nonallocated.[12]

Table 13 provides the results of the analysis of our second division of total budget dollars. Here we divide the general education budget that is allocated to the schools into a direct and indirect component.[13] Conceptually, the distinction is based on the question of whether the resources are directly or indirectly serving an educational function. The distinction was made on the basis of existing budget codes, and we were constrained to put each code entirely in one category or the other.[14] We made this distinction to approach, as closely as we could with these data, the concerns of educators and policymakers about whether scarce resources are budgeted for personnel and programs that are central to the educational mission. As a result of growing bureaucracy, administra-

TABLE 10

Results of Subdistrict-Level Regression Analysis, General Education Budgets per Pupil, of Total Subdistrict Budget, School Allocation, Subdistrict Office Budget, and Unallocated Budget, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	Total subdistrict GE budget per pupil	GE school allocation per pupil	GE subdistrict office budget per pupil	GE unallocated budget per pupil
Regression coefficient	.480	−1.122	.374	1.229
Result of a 50 percentage point change in free lunch	$24.0	−$56.1	$18.7	$61.4
High-poverty district	$2,561	$2,304	$121	$135
Low-poverty district	$2,537	$2,360	$103	$74
Simple correlation	.112	−.168	.127	.221
Coefficient of determination	.013	.028	.016	.049
Number of pupils	625,040	625,040	625,040	625,040

Note. Mean value of free lunch (pupil weighted) is 60%.
Source: 1991–92 district and school budget data, general education file, and 1990–91 school profiles, New York City public schools.

TABLE 11

Results of Subdistrict-Level Regression Analysis, Reimbursable Program Budgets per Pupil, of Total Subdistrict Budget, School Allocation, Subdistrict Office Budget, and Unallocated Budget, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	Total subdistrict RE budget per pupil	RE school allocation per pupil	RE subdistrict office budget per pupil	RE unallocated budget per pupil
Regression coefficient	17.30	7.93	2.19	7.14
Result of a 50 percentage point difference in free lunch	$865	$396.5	$109.5	$357
High-poverty district	$1,408	$708	$198	$501
Low-poverty district	$543	$311	$88	$144
Simple correlation	.859	.769	.568	.763
Coefficient of determination	.738	.591	.322	.582
Number of pupils	625,040	625,040	625,040	625,040

Note. Mean value of free lunch (pupil weighted) is 60%. Source: 1991–92 district and school budget data, reimbursable programs file, and 1990–91 school profiles, New York City public schools.

tive overhead, and the proliferation of nonessential services, there are fears that resources devoted directly to student learning will command a smaller share of the total. Without a universally agreed-on definition of what is central to the education function, and with our data constraints, the direct/indirect division is the closest we can come to a meaningful distinction.

On average, direct allocations are 86.5% of total school allocations. Table 13 repeats the regression results for the per-pupil total school allocation and shows the results for the direct and indirect school allocations. The total allocations are negatively related to the percentage of pupils in poverty. Per-pupil direct allocations are also negatively associated with the percentage of pupils in poverty, whereas the per-pupil indirect allocations are positively associated with the percentage of pupils in poverty. Although the total allocation regression is not strong (R^2 = .028), the direct and indirect regressions are stronger (R^2 = .114 and .154).

TABLE 12

Results of Subdistrict-Level Regression Analysis, Reimbursable Program Budgets per Eligible Pupil, of Total Subdistrict Budget, School Allocation, Subdistrict Office Budget, and Unallocated Budget, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	Total subdistrict RE budget per eligible pupil	RE school allocation per eligible pupil	RE subdistrict office budget per eligible pupil	RE unallocated budget per eligible pupil
Regression coefficient	7.445	.87	.134	6.44
Result of a 50 percentage point difference in free lunch	$372	$43.5	$6.7	$322
High-poverty district	$2,611	$1,306	$363	$941
Low-poverty district	$2,238	$1,262	$357	$619
Simple correlation	.303	.052	.017	.423
Coefficient of determination	.092	.003	.000	.179
Number of pupils	264,831	264,831	264,831	264,831

Note. Mean value of free lunch (pupil weighted) is 64%.

Source: 1991–92 district and school budget data, reimbursable programs file, and 1990–91 school profiles, New York City public schools.

TABLE 13

Results of Subdistrict-Level Regression Analysis, General Education Budgets per Pupil, of Total, Direct, and Indirect School Allocations, With Percentage Free Lunch as Independent Variable, 1991–92

Statistics	GE total school allocation per pupil	GE direct school allocation per pupil	GE indirect school allocation per pupil
Regression coefficient	−1.122	−2.009	.887
Result of a 50 percentage point change in free lunch	−$56.1	−$100.4	$44.3
High-poverty district	$2,304	$1,972	$332
Low-poverty district	$2,360	$2,072	$288
Simple correlation	−.168	−.339	.393
Coefficient of determination	.028	.114	.154
Number of pupils	625,040	625,040	625,040

Note. Mean value of free lunch (pupil weighted) is 60%.

Source: 1991–92 district and school budget data, general education file, and 1990–91 school profiles, New York City public schools.

Subdistricts with higher percentages of poor pupils budget more per-pupil resources for nonallocated, district-office, and indirect resources. Many educators and policymakers would find this unsettling. The reasons for the result need to be more fully explored to see whether there are higher administrative costs or different budget strategies in these districts.

Conclusions

The analyses presented in this article answer some questions, but raise many others, as would be expected from an early attempt to assess resources beneath the district level. From both policy and methodological perspectives, pressure will need to be applied to school districts to produce and disseminate school-level data that will yield answers to the most important questions. For example, by setting out to examine resource allocations to schools, we discovered an alarmingly low level of the per-pupil general education budget for elementary and middle schools—$2,550, compared to the almost $7,000 total budget per pupil in the district. Although we have accounted for the difference in terms of budgets for reimbursable programs, high schools, special education, maintenance, fringes, and so forth, further research on whether additional resources should reach the child is clearly needed.

Even within the allocations to the elementary and middle schools, our analysis sounds a warning signal. In the general education category, poorer subdistricts receive more funds per pupil in nonallocated, district office, and indirect categories, but not usually in allocated and direct categories. This is consistent with the claim by many school districts across the country serving poor children that nonclassroom management and oversight burdens are substantial. The policy question is whether these results are necessary or productive, and whether ways can can be found to get more resources to poor children.

A second example involves the use of average teacher salary data at the subdistrict and school level, instead of actual teachers' salaries. Our subdistrict analysis confirms what was found in Los Angeles—that poorer students are taught by less experienced, less well-educated teachers. We suspect that similar trends would be apparent within subdistricts if the teachers' salary data were not averaged. This raises the critical policy question of how to better allocate teacher resources within urban districts. Should schools receive lump sums of resources and thus risk having fewer teachers when they have more expensive ones, or should the budget be based on positions, which would mean that schools with higher priced teachers would receive more resources? And do we need to start to ask, again, whether teachers' salaries within districts should be sensitive to the difficulty of the task at the school level? Regardless of how we answer these questions, the line of inquiry is consistent with the recognition that measures of dollars alone are not sufficient in an equity analysis and that to some degree the education process must be examined.

Our analysis also highlights the importance of understanding resource allocations within districts. The relationship among general education resources and poverty that we found for middle schools was not present in elementary schools, a previously unknown finding that requires a reexamination of the allocation methods. The research also permits routine assessments of reimbursable funding, instead of the episodic investigations that often are accompanied by a major reauthorization of, for example, Chapter 1. The fact that we found some concentration effects within a single district for Chapter 1 funding, but not for state compensatory education funding, should be incorporated in the debates over how these programs are structured.

In terms of vertical equity with respect to poverty, this initial examination of the data indicates that the glaring inequities that have been commonplace at the state level do not exist within New York City. Nevertheless, the distribution of teachers in high- and low-poverty subdistricts sounds an alarm about the quality of personnel resources that may be a concern in many districts. And despite the improved analysis that these data allow, we have only begun to ask questions about facilities, special education, and educational outcomes.

Notes

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[1] In particular, there are no available data on student numbers across different special education programs (e.g., students in resource-room programs versus full-day programs for severely impaired children).

[2] There are other independent variables that would be useful to study in a vertical equity analysis. Examples are: percentage of students with disabilities or with English as a second language; percentage of Chapter 1 eligible pupils; and attendance rates. Many of these are highly correlated with poverty. In addition, we believe poverty captures one of the most widely agreed on vertical equity indicators and have used it here for that reason. Note that student race and ethnicity is an important variable to study in an equal opportunity analysis.

[3] We use the 1990–91 data because when this analysis was carried out, the data on poverty by school for 1991–92 were not available. We are confident that the results are unaffected by the use of the previous year's data. Also, in separate analyses we have tried a slightly different poverty variable, the poverty percentage (which is the higher of a geographically defined poverty measure and the free lunch number), but the results do not change.

[4] In this and subsequent tables, numbers of pupils or schools will sometimes differ depending on which dependent variable is being analyzed. The reasons for the different numbers are varied: The data may have contained slightly different numbers (e.g., tapes with budget data versus tapes with expenditure data); the pupil counts may measure different kinds of pupils (e.g., total pupils versus eligible pupils who score below certain performance levels); or cleaning data of outlying schools that appear to be bad data may have reduced the count.

[5] Money was added to the education budget during the second part of the fiscal year. Higher expenditures did not come from overspending.

[6] Note that fringe benefits and pensions are not included in general education budget figures.

[7] These later two categories are analyzed in Table 10. Just over 91% of the total district general education budget is allocated to the schools within the subdistricts.

[8] All regression coefficients are significant because we use pupil-weighted regressions and thereby create a very large sample size. Another view of the issue of significance is that it is not relevant because we are analyzing population data.

[9] Other analyses that we have performed with these data support the finding that the use of school versus subdistrict as the unit of analysis weakens but does not change the results. See Blalock (1964, 97–114) for a discussion of the effects of units of analysis on regression statistics.

[10] The eligible pupil count for each school is based on the number of pupils who score below certain performance levels. Although these students may be the target group for many of the reimbursable programs, particularly the state and federal entitlement grants, other reimbursable grants are not targeted to these pupils, making the per-pupil calculations with the eligible pupils somewhat inaccurate. See New York City Public Schools (1992; 3-2).

[11] The relationships stay the same when expenditures are substituted for budgets. There are no nonallocated expenditures, the school allocation regression coefficient is -1.249 (R^2 of .063), and the district office coefficient is .463 (R^2 of .022).

[12] Expenditure data for reimbursable programs were not usable because of data inconsistencies.

[13] Unallocated and subdistrict office budgets cannot meaningfully be divided this way.

[14] Indirect service types include resources coded as follows in the budget data: administrative-district office, administration, assistant principals, community relations, extended use, principals, school guards, school aides, secretaries. Direct service types include: conseling DC 37 paras, laboratory specialists, lump sum, other hourlies, OTPS, paid leaves, per diems, per sessions, preparation periods, teachers, UFT paras. Some items are not included in the database at all. These include: pupil transportation, food service, building maintenance, and custodians.

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