SEEP

Special Education Expenditure Project

Center for Special Education Finance

How Does Spending on Special Education Students Vary Across Districts?

An Analysis of Spending by Urbanicity, District Size, Median Family Income, and Student Poverty Levels in 1999-2000

Report 2
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SEEP Reports

This document is a part of a series of reports based on descriptive information derived from the Special Education Expenditure Project (SEEP), a national study conducted by the American Institutes for Research (AIR) for the U.S. Department of Education, Office of Special Education Programs (OSEP). SEEP is the fourth project sponsored by the U.S. Department of Education and its predecessor, the Department of Health, Education and Welfare, in the past 40 years to examine the nation's spending on special education and related services. See Kakalik, Furry, and Carney (1981), Moore, Strang, Schwartz, and Braddock (1988), and Rossmiller, Hale, and Frohreich (1970).

The SEEP reports are based on analyses of extensive data for the 1999-2000 school year. The SEEP includes 23 different surveys to collect data at the state, district, and school levels. Survey respondents included state directors of special education, district directors of special education, district directors of transportation services, school principals, special education teachers and related service providers, regular education teachers, and special education aides. Survey responses were combined with other requested documents and data sets from states, schools, and districts to create databases that represented a sample of approximately 10,000 students with disabilities, more than 5,000 special education teachers and related service providers, approximately 5,000 regular education teachers, more than 1,000 schools, and well over 300 local education agencies.

The series of SEEP reports will provide descriptive information on the following issues:

- What are we spending on special education services for students with disabilities in the U.S.?
- How does special education spending vary across types of public school districts?
- What are we spending on due process for students with disabilities?
- What are we spending on transportation services for students with disabilities?
- How does education spending vary for students by disability and what factors explain differences in spending by disability?
- What role do functional abilities play in explaining spending variations for students with disabilities?
- What are we spending on preschool programs for students with disabilities?
- Who are the teachers and related service providers who serve students with disabilities?
- How are special education teaching assistants used to serve students with disabilities?
- What are we spending on special education services in different types of schools?
- How does special education spending vary across states classified by funding formula, student poverty, special education enrollment levels, and income levels?

One of the SEEP reports will also be devoted to describing the purpose and design of the study.

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Highlights

This report explores general patterns of variation in total spending on special education students across districts categorized according to urbanicity, district size, median family income, and student poverty levels. A cost index is used to assess the effects on expenditure levels of geographic variations in the costs of education. The analyses are descriptive in nature and not intended to establish causal links.

The smallest districts spend the most. The smallest districts (fewer than 2,500 total students) spend 14 percent more in actual dollars, and 22 percent more in cost-adjusted dollars, to educate a special education student compared to the largest districts. This expenditure includes both the regular and special education of a student with disabilities. The spending ratio (relative spending on the typical special versus regular education student) for the smallest districts is estimated to be 2.19, compared to an overall average spending ratio of 1.90. This difference in the spending ratios is consistent with the notion that there may be more difficulty adjusting service levels for special education students than regular education students in the smallest districts.

Rural districts spend the most (in cost-adjusted dollars). Urban districts spend the most in actual dollars, and rural districts spend the least, with suburban districts in between. However, after adjusting for differences in the costs of resources, the pattern is reversed. The spending ratios are 1.82 for rural districts, compared to 1.95 for urban districts, which suggests that rural districts spend a greater cost-adjusted amount on the typical regular education student as well. The differences are not statistically significant.

The third of districts with the lowest median family income spend less in both actual and cost-adjusted terms. Districts with middle-income families spend $2,314 more per student than districts with the lowest-income families. In cost-adjusted dollars, the difference is less at $1,658. These differences are statistically and economically significant. The spending ratio is also higher for the lowest-income districts, but the difference was not statistically significant.

Low-poverty districts have the lowest spending ratios. No consistent positive or negative relationship is found for expenditures and districts' student poverty levels, in either actual or cost-adjusted terms. However, low-poverty districts have the lowest spending ratios, 1.72, compared to 1.86 for the second lowest quartile, and 1.97 and 1.98 for the two highest-poverty quartiles.

I. Introduction

The first report based on the 1999-2000 Special Education Expenditure Project (SEEP) indicated that local education agencies (LEAs) in the U.S. expended about $12,474 per student to educate special education students, and that this figure amounts to about 90 percent more than the amount spent on the typical regular education student with no special needs (i.e., $6,556).[1] Stated another way, the spending ratio, which compares the total spending to educate a special education student versus a regular education student with no special needs, is 1.90. The total expenditure on a special education student includes expenditures on instruction, related services, and administration associated with the regular education and special education programs received by students eligible for special education services.[2] This report and other SEEP reports use the phrase "student with a disability" to refer to a student receiving special education services, as determined by the student's Individual Education Program (IEP), under the Individuals with Disabilities Education Act (IDEA).

The purpose of this report is to explore the variations in total spending on special education students and in the spending ratios across districts categorized according to urbanicity, size (as measured by total enrollment), median income of the families living within these districts, and student poverty levels (measured by the percentage of students receiving free or reduced price lunches). While these analyses are not intended to imply causation between district characteristics and spending, each of these four characteristics reflects something different about the environment within which the districts operate that may provide some insights for further analyses.

Urbanicity provides some indication of the nature of the labor market within which school districts operate and also of the community surrounding the district. District size provides a rough indication of the potential for economies of scale (reduced costs per student due to a larger number of students) available to the district in the operation of its programs. Median income of the families living within district boundaries indicates something about the capacity and willingness of the community to pay the taxes that support spending on education services. Finally, the percentage of students living in poverty within a district indicates the nature of student needs and the potential for the prevalence of certain types of learning difficulties.

The data used in this report and the first SEEP report include special education students served within the public schools and students placed in non-public schools or other public agencies paid for by the school district. However, this report excludes special education students served in state special education schools or in schools operated by intermediate education units because it was not meaningful to classify these agencies according to urbanicity, size, family income, or student poverty. Since no data are available for individual students served at home or in hospital settings, these students are excluded

[1]See Chambers, Parrish, and Harr (March 2002).
[2]This estimate does not include the expenditure on other special needs programs (Title I, GATE, and programs for English language learners). With the expenditure on other special programs, the total per pupil expenditure is $12,639.

from the analyses as well.[3] The total weighted sample of students reflected in these analyses includes about 99 percent of all special education students served in the 50 states and the District of Columbia.

Because of this slightly different sample, calculating the expenditure per pupil for these students yields a figure of $12,480 (compared to the $12,474 cited above). The per pupil expenditure to educate a regular education student in this sample equals $6,573.[4] Based on this figure, LEAs are spending approximately 90 percent more on the typical special education student than on the typical regular education student. This implies a spending ratio for the average special education student of 1.90 (=$12,480/$6,573).

Appendix A of this report provides details about the sample used in these analyses. Appendix B presents the detailed tables on which the graphics in this report are based. In some instances where statistical significance of certain differences are reported in this paper, the reader can refer to Appendix C in which the regression results for actual expenditures, cost-adjusted expenditures, and spending ratios are reported.

[3]Data on homebound and hospital programs were only collected at the aggregate level by district and account for a total of only 0.6 percent of all special education students.

[4]The education expenditure for regular education students, $6,573, represents the weighted average expenditure on regular education students *in the school attended by the average* ***special education*** *student*. This figure differs slightly from the value reported in Chambers et al. (2002) of $6,556, which reflects the weighted average expenditure on regular education students *in the school attended by the average* ***regular education*** *student*. If the distribution of regular education students and special education students were identical across all schools, these two figures would have been identical. The difference of $17 per pupil is neither statistically nor economically significant.

II. Actual vs. Cost-Adjusted Expenditures

The per student expenditure data for the 1999-2000 school year in this report are presented in two different ways: actual and cost-adjusted. Because these analyses explore variations across various categories of districts, it is important to take into account the fact that districts in different locations across the U.S. face differences in the costs of the resources used to provide education services. The observed variations may be a result of differences in the prices paid for comparable resources in different geographic locations. By adjusting for these cost differences, one can see the extent to which the differences in expenditure reflect *real* differences in the resources made available to students or are simply a result of geographical differences in the cost of comparable resources (e.g., varying teacher salaries). In other words, by controlling for variations in the purchasing power of the education dollar in different jurisdictions, more precise conclusions can be drawn about the variations in *real* resources across geographic locations.

The cost-adjustment is accomplished by dividing the actual expenditures by a geographic cost of education index (GCEI).[5] The GCEI is similar to the Consumer Price Index (CPI), published by the Bureau of Labor Statistics, with two differences. First, the GCEI is cross-sectional in nature while the CPI is a time series. Namely, the GCEI measures cost differences across different geographic locations at a single point in time, while the *CPI* measures cost differences over time for a predetermined geographic jurisdiction.

Second, the CPI measures differences in the cost of living of urban consumers, while the GCEI measures cost differences in the prices of educational resources. Specifically, the CPI measures differences in the prices paid for goods and services such as housing, food, entertainment, and transportation for consumers, while the GCEI measures differences in the prices school districts pay for teachers, administrators, and related service providers. The GCEI addresses the following question: *How much more or less do local education agencies located in different jurisdictions (e.g., states or other geographic locations) pay for* ***comparable*** *personnel and non-personnel resources used to provide education services?*[6]

[5]See Chambers (1997 and 1999) for reports on how the GCEI is actually calculated.

[6]The GCEI is estimated using the teacher cost index derived from Chambers (1997). The GCEI is based on analysis conducted for the 1993-94 school year, while our expenditure data are for the 1999-2000 school year. However, the factors that impact geographic cost differences over time change relatively slowly. Previous analyses of changes in the GCEI over time show very high correlations among the cost of education indices over a six-year period (Chambers, 1997). The GCEI used in this analysis has been rescaled so that the average special education student is located in a district in which the GCEI is set to 1.00.

III. Spending Differences by Urbanicity

The total expenditure to educate a student with a disability varies somewhat with the degree of urbanicity of the student's district (Exhibit 1). Districts were divided into three categories: urban, suburban, and rural.[7]

Exhibit 1 reveals different results for the actual and cost-adjusted figures. The levels of actual spending suggest that more is being spent to educate students with disabilities in urban districts ($12,718) than in suburban ($12,518) and rural districts ($11,365). Actual expenditures on special education students are 12 percent higher in urban than rural districts.

Exhibit 1. Total Expenditure to Educate a Student with a Disability Across Districts Classified by Degree of Urbanicity, 1999-2000

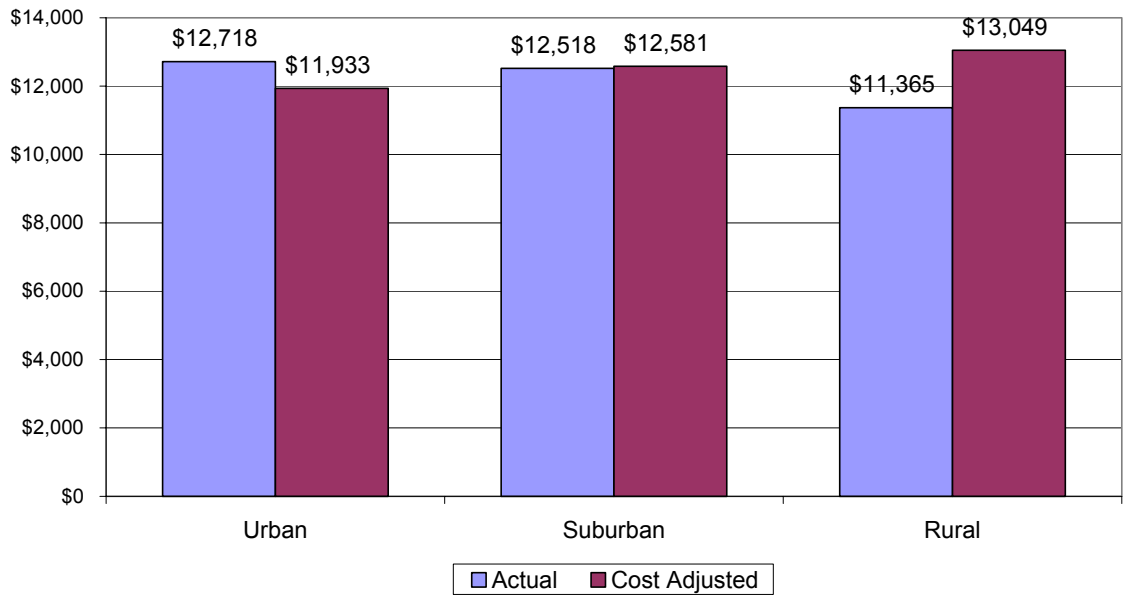

Exhibit 1 reads: In cost-adjusted terms, the total expenditure to educate a student with a disability is $11,933 in urban districts and $13,049 in rural districts.

However, this pattern reverses itself when these expenditure figures are adjusted for geographic cost differences. Most previous studies have shown that urban centers pay higher costs for comparable resources than their suburban and rural counterparts. Yet once the expenditures are adjusted for geographic cost differences, the data suggest that urban districts are devoting lower levels of *real* resources to special education students compared to rural districts. In real terms, rural districts are spending about 9 percent more

[7]The three categories represent a consolidated version of the locale type variable included with the *Common Core of Data* published by the National Center for Education Statistics, 1999-2000.

($13,049 vs. $11,933) than their urban counterparts to provide education services to students with disabilities. Real spending on the typical special education student in a suburban district amounts to $12,581, falling between the urban and rural districts. None of these differences are statistically significant.

The degree of urbanicity also affects the relative spending on special versus regular education students. The spending ratio ranges from 1.82 in rural districts to 1.95 in urban districts. That is, the average urban district spends about 95 percent more on the typical special education student than on the typical regular education student with no special needs, while rural districts spend an additional 82 percent. This suggests that rural districts spend a greater cost-adjusted amount on the typical regular education student, but these differences are not statistically significant.

IV. Spending Differences by District Size

Categorizing the districts by size yields some interesting results (Exhibit 2). All but the smallest districts (with fewer than 2,500 students) spend similar amounts to educate a student with a disability; the four largest categories are within about $1,000 of each other in both cost-adjusted and actual terms.

Exhibit 2. Total Expenditure to Educate a Student with a Disability Across Districts Classified by Enrollment, 1999-2000

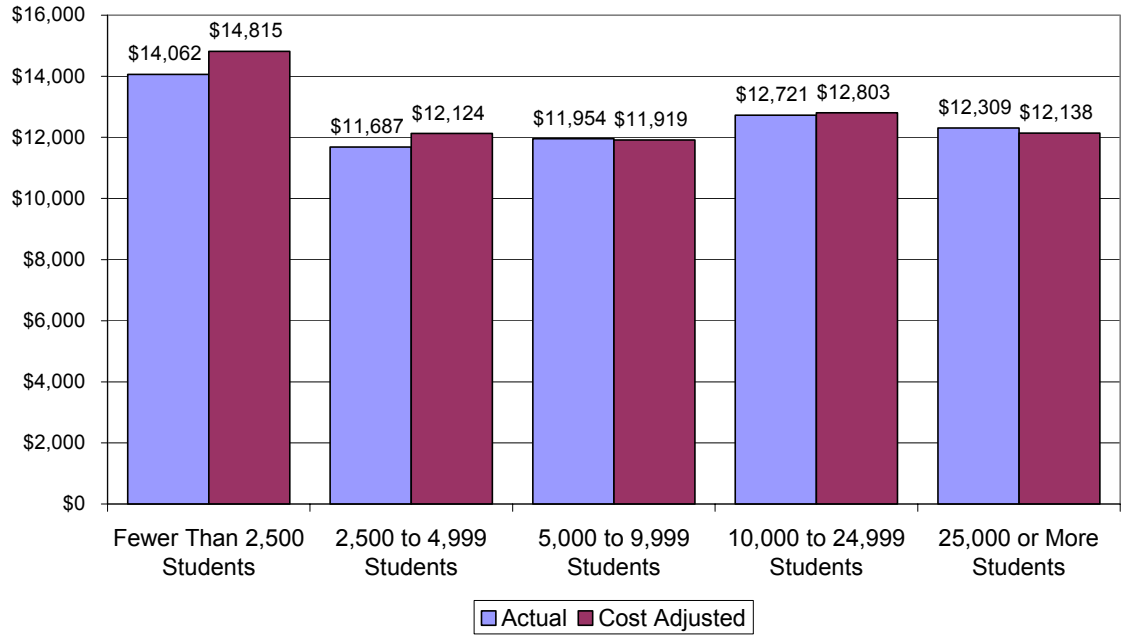

Exhibit 2 reads: In cost-adjusted terms, the total expenditure to educate a student with a disability is $14,815 in districts with fewer than 2,500 students, and $12,124 in districts with between 2,500 and 4,999 students.

However, districts with fewer than 2,500 students reported a level of actual expenditure 14 percent higher than the actual expenditure in the districts with enrollment of 25,000 or more students ($14,062 vs. $12,309), and a cost-adjusted level of expenditure that is 22 percent higher ($14,815 vs. $12,138). While the differences based on actual expenditures are not statistically significant, the differences based on cost-adjusted expenditures are both economically and statistically significantly different from each other (economic significance indicates a difference large enough to make a real difference in the levels of services being offered). This difference may be a reflection of a lack of economies of scale associated with the small number of students; districts with fewer than 2,500 students may not have the critical mass of students in certain disability categories to provide services in the optimal setting.

Looking at the spending ratios provides further interesting results (Exhibit 3). While the districts that have more than 2,500 students exhibit spending ratios between 1.81 and 1.92, the districts with fewer than 2,500 students show a spending ratio of 2.19. In other words, in the smallest districts, expenditures on the typical special education student are more than twice as high as those for regular students without any special needs. The difference between the spending ratio for the smallest districts and the spending ratio for the next two largest districts is marginally statistically significant (at the 10 percent level). These results suggest that the absence of economies of scale may have a larger impact on special than on regular education students.

Exhibit 3. Special Education Spending Ratio Across Districts Classified by Number of Students Enrolled, 1999-2000

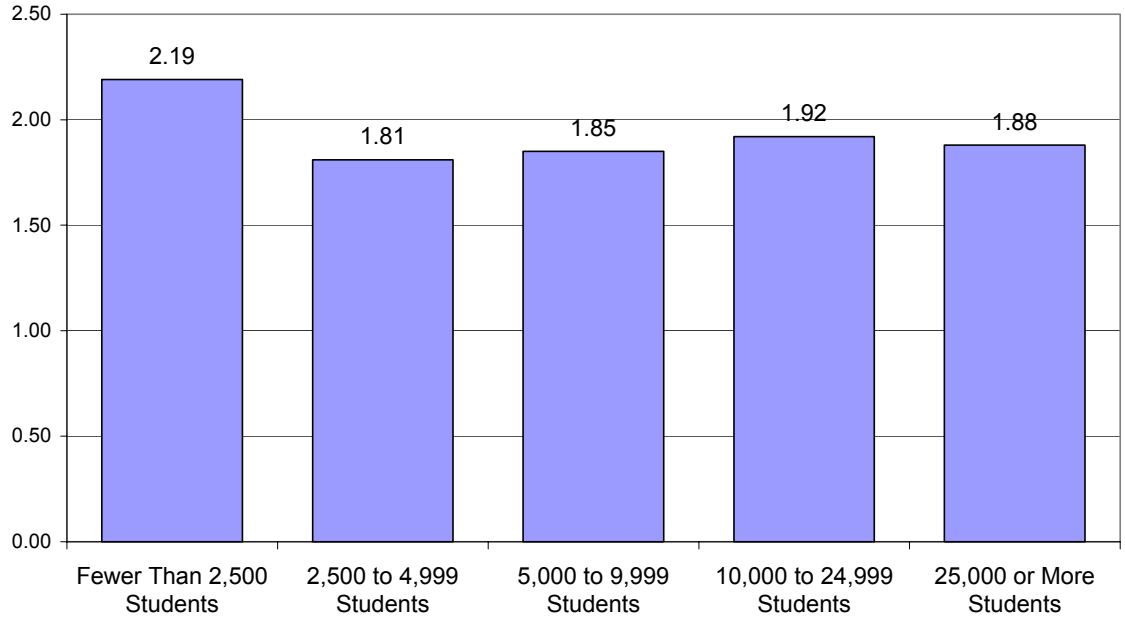

Exhibit 3 reads: In school districts with fewer than 2,500 students, the special education spending ratio is 2.19. In school districts with between 2,500 and 4,999 students, the special education spending ratio is 1.81.

V. Spending Differences by Income Level

Do districts serving communities with higher median family incomes spend more on special education services? For the purposes of this comparison, districts are divided into thirds according to median family income.[8]

As demonstrated in Exhibit 4, the districts in the middle-income group exhibit the highest per student spending on special education students of the three income categories. Districts in the lowest-income group show a total expenditure of $10,798 to educate a student with a disability, significantly less than the amount expended in the middle-income ($13,112) or highest-income group ($12,965). This difference is not only economically significant, but it is also statistically significant. The difference between the middle- and highest-income groups is less than $150 per student.

Exhibit 4. Total Expenditure to Educate a Student with a Disability Across Districts Classified by Median Family Income, 1999-2000

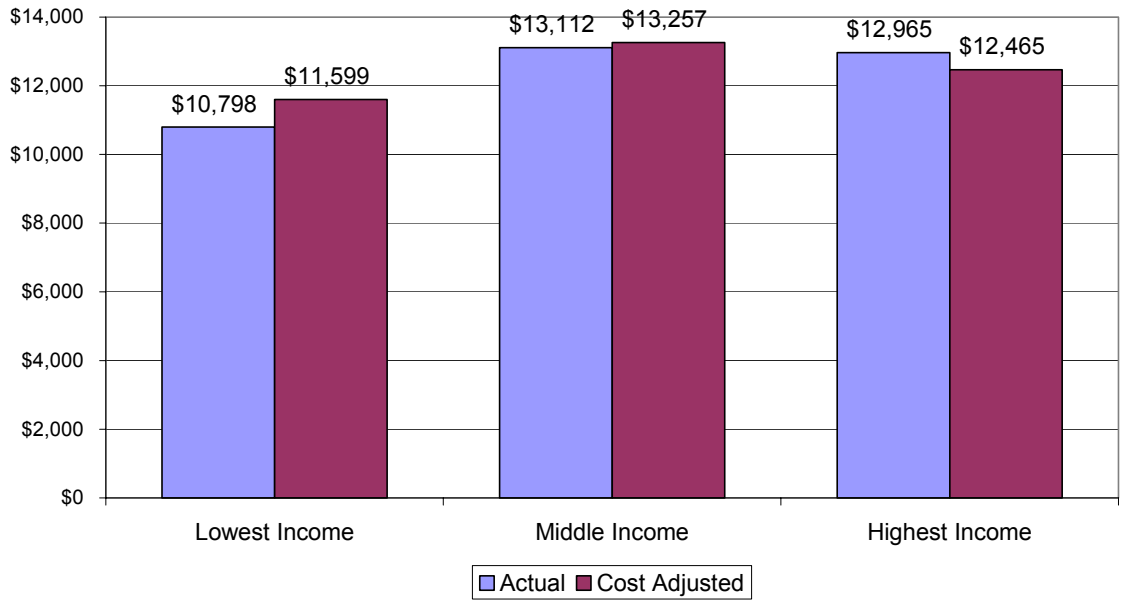

Exhibit 4 reads: In cost-adjusted terms, the total expenditure to educate a student with a disability is $11,599 in districts with the lowest median family income, and $13,257 in districts in the middle third of median family income.

The districts show a pattern of expenditure levels that is only slightly affected by GCEI adjustment. The pattern of variation across the income groups remains the same, but the per student spending in districts with the lowest-income ($11,599) and middle-income

[8]Data on the 2000 census were not available as of the writing of this report, so it was necessary to measure income levels using data for the 1990 census organized by school district.

($13,257) increase slightly while the highest-income group decreases slightly ($12,465). The spending levels for the lowest- and middle-income groups are statistically significantly different from each other.

With regard to the spending ratios, the middle- and highest-income thirds have ratios of 1.99 and 1.89, respectively, while the lowest third has a ratio of 1.83. This suggests that compared to low-income districts, middle- and high-income districts spend relatively more on the average special education student than on the average regular education with no special needs. However, none of these differences in the spending ratios are statistically significant.

VI. Spending Differences by Student Poverty

While the median family income provides some information on the ability of the school district to tax local populations for education spending, student poverty provides an indication of differences in student needs within a district. The percentage of students living in poverty, defined here as the percentage of students eligible for free and reduced price lunches, suggests differences in family background that have been associated with the prevalence of certain learning difficulties in children.[9]

[9]See Finn, Rotherham, and Hokanson (2001).

In Exhibit 5, districts are divided into quartiles according to the percentage of all students eligible for free and reduced price lunch programs. There is no consistent positive or negative relationship between spending on the typical special education student and the poverty level of the students in the district. The actual total expenditure to educate a student with a disability ranges from a low of $11,403 in the second-lowest quartile to $12,929 in the second-highest quartile. The lowest and highest quartiles fell between these two, at $12,206 and $12,705 respectively.

Exhibit 5. Total Expenditure to Educate a Student with a Disability Across Districts Classified by Student Poverty Level, 1999-2000

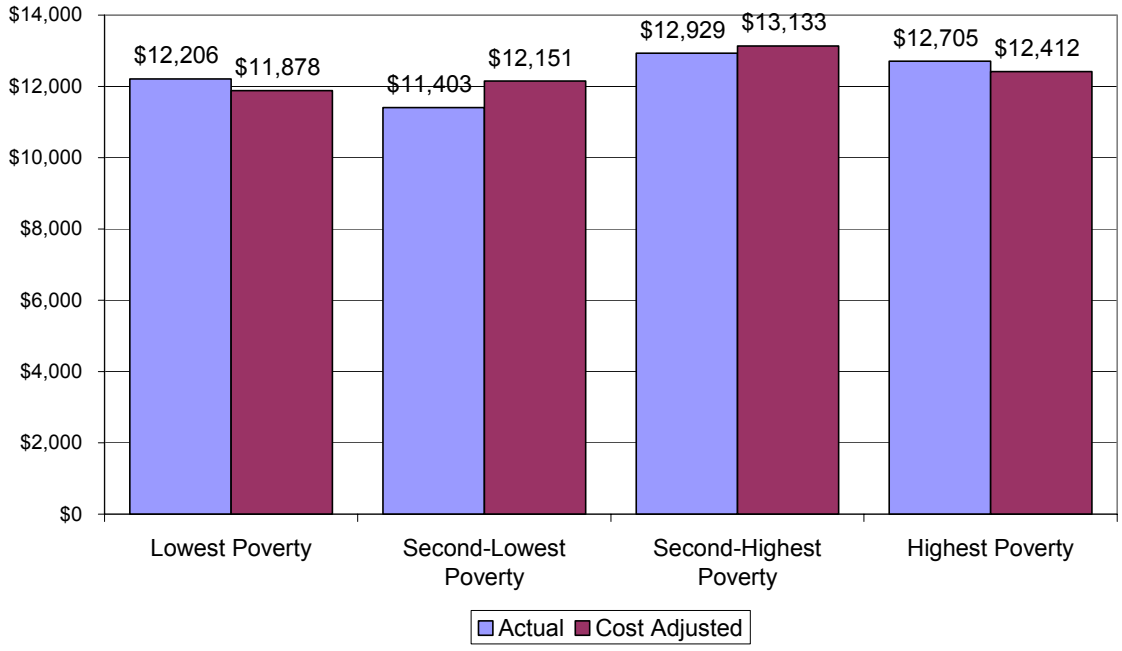

Exhibit 5 reads: In cost-adjusted terms, the total expenditure to educate a student with a disability is $11,878 in the lowest-poverty districts and $12,151 in the districts with the second-lowest poverty.

Adjusting for geographic differences in the cost of education makes little difference. The per student expenditure differences across student poverty are insignificant.

With respect to the spending ratios, however, categorizing the districts by student eligibility for free and reduced price lunches is more revealing, uncovering important differences among the district types (Exhibit 6). The districts serving the smallest percent of students living in poverty exhibit the lowest spending ratio at 1.72. That is, the lowest poverty districts spend relatively less on the typical special versus regular education student than districts serving greater percentages of students living in poverty. This compares to a spending ratio of 1.86 for the second lowest group, and ratios of 1.97 and 1.98 for the second-highest and highest groups. The spread between the lowest and highest poverty districts is a full 26 percentage points, and this difference is statistically significant at the 5 percent level.

Exhibit 6. Special Education Spending Ratio by Student Poverty Level, 1999-2000

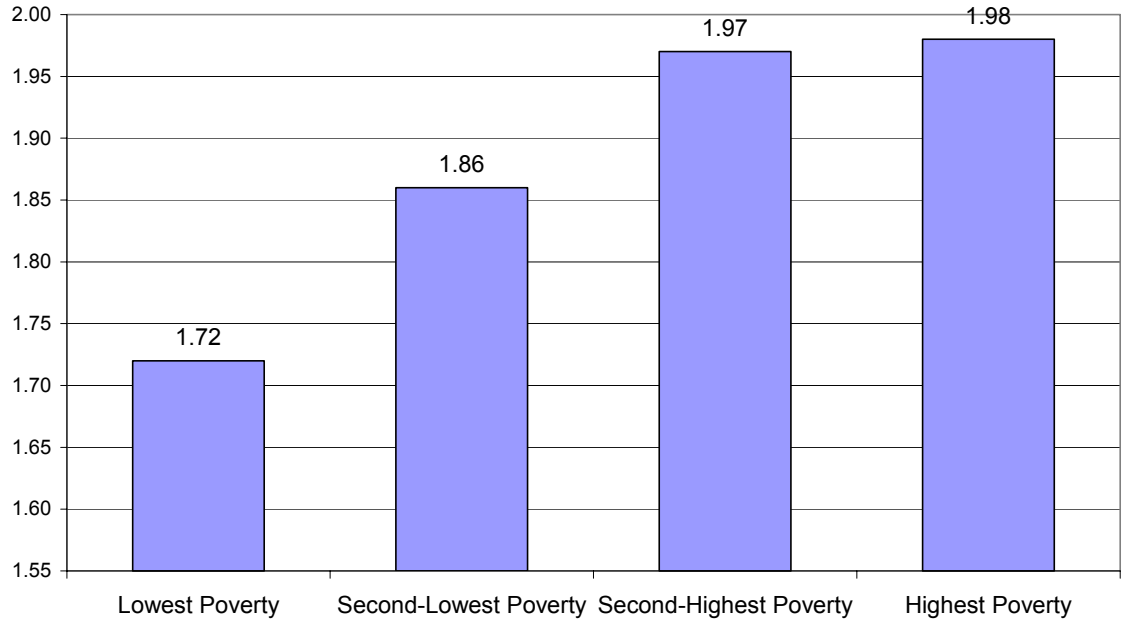

Exhibit 6 reads: The districts in the quartile with the lowest poverty level have a special education spending ratio of 1.72, while districts in the quartile with the second-lowest poverty level have a special education ratio of 1.86.

VII. Summary and Conclusions

This report explores general patterns of variation in total spending on the special education student across districts categorized according to urbanicity, district size, median family income, and student poverty levels. It also adjusts expenditure levels for geographic variations in the costs of education. The analyses are descriptive in nature and not intended to establish causal links. Nevertheless, the relationships between spending and these types of district characteristics are of interest because they reveal patterns of spending that suggest future lines of research related to the adequacy and equity with which education services are delivered to various student populations. Multivariate analysis will be necessary to disentangle the factors that might explain these patterns of variation in the levels of spending on special education students and the relative spending on special versus regular education students.

One significant pattern of difference in spending observed in this report is associated with district size. The results presented in the report are consistent with the possibility that the smallest districts may suffer from a lack of economies of scale (reduced costs per student due to a larger number of students) with respect to the provision of special education services. The smallest of districts (fewer than 2,500 total students) spent between 16 and 24 percent more in *real terms* to educate special education students than larger districts. This expenditure includes regular and special education. A similar pattern was observed with respect to the spending ratio (i.e., relative spending on the typical special versus regular education child), which is about 16 percent higher in the smallest districts than in the largest of districts, though this difference is not statistically significant. This suggests that there may be somewhat more difficulty adjusting services for special education students than for regular education students in the smallest districts.

Rural districts spend about 9 percent more in *real terms* to educate the typical special education student than their urban counterparts. However, the spending ratios are 1.82 for rural districts compared to 1.95 for urban districts, which suggests that rural districts spend a greater cost-adjusted amount on the typical regular education student as well. However, none of the results with respect to urbanicity are statistically significant.

The middle and highest income districts exhibit higher spending in *real terms* than the lowest income districts. The levels of spending with respect to the percent of students living in poverty do not yield a consistent pattern. The spending ratios, however, do suggest that the highest poverty districts spend relatively more on special than regular education students, compared to other poverty levels.

These analyses have uncovered interesting relationships between spending and district characteristics. However, there is still a wealth of information within the uniquely comprehensive data that this study has gathered. Further research will need to take into account a broad range of factors, such as student need, district fiscal capacity, and demographic characteristics, that are likely to play a role in local funding decisions regarding special as well as regular education services.

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Appendix A

SEEP Samples

The SEEP surveys were sent to a stratified random sample of districts and schools (see "SEEP Reports") that included representatives from the 50 states and the District of Columbia. Samples of school districts were selected within each of the states (a minimum of two districts in each state, except for Hawaii and the District of Columbia, which have only one school district each). Samples from larger states included more districts. Intermediate education units (IEUs) were selected from among IEUs serving the districts included in the sample. IEUs were surveyed only if they received funds directly from the state for serving their students and essentially operated independently of the school districts in the region they serve.

Samples of elementary, secondary, and special education schools were selected from among the sampled districts and IEUs (where appropriate). In addition, state special education schools were also sampled.

Expanded samples of districts, IEUs, and schools were also selected through a series of nine separate contracts with individual states.[10] These states provided additional support for data collection, and these expanded samples are included in the analyses presented in these reports.

Data were collected from all special education teachers and related service providers assigned to the schools in the sample. In addition, samples of regular education teachers and special education teacher aides were selected from the staff in these schools.

Finally, the special education teachers and related service providers were each asked to select a sample of two students with disabilities from the rosters of students they serve. To prevent the possibility of a student being selected multiple times, the research team developed sample selection procedures so that students were only selected from the most restrictive placement possible for any given student. The sample selection procedures were designed to ensure that the service provider most knowledgeable about any student completed the survey about the student.

The student sample on which many of the analyses are based comes from 1,053 of the 1,767 schools included in our original sample (representing 45 states and the District of Columbia). This sample includes 330 regular local educational agencies, 14 IEUs, and 7 state special education schools. Analysis of the patterns of response suggests that the samples on which these estimates are based do not appear to exhibit any response bias.

[10]These nine states include Alabama, Delaware, Indiana, Kansas, Missouri, New Jersey, New York, Ohio, and Rhode Island.

Appendix B

Actual and Cost-Adjusted Expenditures Per Pupil for Special and Regular Education Students

District Attribute	Number of students on which estimates are based	Estimated population of students in this category	Actual total expenditures used to educate a special education student (includes expenditures on regular ed & special ed)	Standard error of adjusted total expenditure (in column 4)	Actual total expenditures used to educate a regular education student with no special needs	Spending ratio based on actual total expenditures = (4)/(6)	Actual total expenditures used to educate a special education student including other special need programs	Spending ratio including other special need programs = (8)/(6)	Cost-adjusted total expenditures used to educate a special education student (includes expenditures on regular ed & special ed)[1]
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Overall Average	***9,356***	***6,060,706***	***$12,480***	***$343***	***$6,573***[2]	***1.90***	$12,648	1.93	***$12,480***
Urbanicity of the districts in which students are served:									
Urban	1,886	1,252,563	$12,718	$858	$6,568	1.95	$12,828	1.97	$11,933
Suburban	6,432	4,389,119	$12,518	$414	$6,605	1.90	$12,704	1.93	$12,581
Rural	1,038	419,024	$11,365	$649	$6,250	1.82	$11,529	1.85	$13,049
Classification of districts according to size (as measured by enrollment):									
Fewer than 2,500	977	249,802	$14,062	$1,060	$6,451	2.19	$14,205	2.21	$14,815
2,500 to 4,999	1,127	292,172	$11,687	$959	$6,391	1.81	$12,008	1.87	$12,124
5000 to 9,999	1,049	429,392	$11,954	$951	$6,383	1.85	$12,102	1.87	$11,919
10,000 to 24,999	3,813	2,256,969	$12,721	$445	$6,627	1.92	$12,911	1.95	$12,803
25,000 or more	2,390	2,832,371	$12,309	$601	$6,588	1.88	$12,450	1.9	$12,138
Classification of districts according to the median income levels of households (1990 Census):									
Lowest-Income Districts	2,277	1,473,866	$10,798	$308	$5,929	1.83	$10,942	1.86	$11,599
Middle-Income Districts	2,956	1,723,532	$13,112	$552	$6,598	1.99	$13,329	2.02	$13,257
Highest-Income Districts	4,123	2,863,308	$12,965	$613	$6,889	1.89	$13,116	1.91	$12,465
Classification of districts according to the poverty levels of students served (percent of students receiving free &/or reduced price lunch):									
Lowest-Poverty Districts	2,311	1,267,978	$12,206	$994	$7,075	1.72	$12,473	1.76	$11,878
Second-Lowest Poverty Districts	1,040	875,965	$11,403	$761	$6,148	1.86	$11,500	1.87	$12,151
Second-Highest Poverty Districts	3,139	1,823,985	$12,929	$560	$6,557	1.97	$13,137	2.01	$13,133
Highest-Poverty Districts	2,866	2,092,778	$12,705	$573	$6,459	1.98	$12,808	1.99	$12,412

[1] Cost adjusted expenditure figures represent actual spending adjusted for geographic differences in the costs of education as estimated by the teacher cost index developed by Chambers (1997). The cost index, which was originally estimated for the 1993-94 school year, was adjusted so that the expenditure for the average special education student is unchanged from the nominal values. In this way comparisons between the nominal and cost adjusted figures reflect only differences in the relative variations across districts rather than any rescaling effects caused by changes in the distribution of student enrollments between 1993-94 and 1999-2000.

[2] The figure of $6,573 reported in this table represents the weighted average expenditure on regular education students *in the school attended by the average **special education** student.* This figure differs slightly from the value reported in Chambers et al. (2002) of $6,556, which reflects the weighted average expenditure on regular education students *in the school attended by the average **regular education** student*. If the distribution of regular education students and special education students were identical across all schools, these two figures would have been identical. The difference of $17 per pupil is neither statistically nor economically significant.

APPENDIX C

Regression Results for Actual Expenditures, Cost-Adjusted Expenditures, and Spending Ratios

Table C-1. Actual Expenditures: Regression Results

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Urbanicity by district				
Intercept	11365	649	17.52	<.0001
Rural	0	0		
Urban	1353	1076	1.26	0.2094
Suburban	1153	771	1.49	0.1361
District size (measured by enrollment)				
Intercept	14062	1060	13.27	<.0001
Fewer than 2,500	0	0		
2,500 to 4,999	-2374	1456	-1.63	0.1041
5,000 to 9,999	-2107	1425	-1.48	0.1402
10,000 to 24,999	-1340	1151	-1.16	0.245
25,000 or more	-1753	1216	-1.44	0.1506
Median family income by district				
Intercept	10798	308	35.04	<.0001
Lowest-Income Districts	0	0		
Middle-Income Districts	2313	633	3.66	0.0003
Highest-Income Districts	2167	686	3.16	0.0018
Student poverty by district				
Intercept	12206	994	12.28	<.0001
Lowest Poverty Districts	0	0		
Second Lowest Poverty Districts	-803	1253	-0.64	0.5222
Second Highest Poverty Districts	723	1144	0.63	0.5278
Highest Poverty Districts	499	1154	0.43	0.6658

To calculate the expenditures for a particular category, add the estimate of the intercept to the estimate of the category of interest. For example, the average actual per pupil expenditure in districts with the lowest median family income is $10,798 + $0 = $10,798. For districts with the highest median family income, the average actual per pupil expenditure is $10,798 + $2,167 = $12,965.

If the P-value is less than 0.05, the difference between the actual per pupil expenditure for the category and the actual per pupil expenditure for the control group is statistically significant. For example, the P-value for the highest median family income category is 0.0018, which is less than 0.05: therefore, the difference between the actual per pupil expenditure in this category and in the control group (in this case, the category with the lowest median family income) is statistically significant.

Table C-2 Cost-Adjusted Expenditures: Regression Results

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Urbanicity by district				
Intercept	13049.53	776.34	17.16	<.0001
Rural	0	0		
Urban	-1115.88	890.21	-1.28	0.2016
Suburban	-468.323	899.28	-0.53	0.5953
District size (measured by enrollment)				
Intercept	14814.83	1122.37	13.48	<.0001
Fewer than 2,500	0	0		
2,500 to 4,999	-2689.95	1406.62	-1.95	0.0518
5,000 to 9,999	-2896.12	1325.04	-2.23	0.0264
10,000 to 24,999	-2011.57	1208.83	-1.7	0.0904
25,000 or more	-2677.13	1269.24	-2.15	0.0321
Median family income by district				
Intercept	11599.23	384.46	30.8	<.0001
Lowest-Income Districts	0	0		
Middle-Income Districts	1657.18	687.97	2.46	0.0145
Highest-Income Districts	866.28	705.30	1.25	0.2108
Student poverty by district				
Intercept	11877.43	953.80	12.71	<.0001
Lowest-Poverty Districts	0	0		
Second Lowest Poverty Districts	273.82	1379.03	0.2	0.8395
Second Highest Poverty Districts	1256.10	1114.44	1.15	0.2507
Highest Poverty Districts	534.98	1037.94	0.53	0.5991

To calculate the expenditures for a particular category, add the estimate of the intercept to the estimate of the category of interest. For example, the average cost-adjusted per pupil expenditure in districts with the lowest median family income is $11,599.23 + $0 = $11,599.23. For districts with the highest median family income, average cost-adjusted per pupil expenditure is $11,599.23 + $866.28 = $12,465.51.

If the P-value is less than 0.05, the difference between the average cost-adjusted per pupil expenditure for the category and the cost-adjusted per pupil expenditure for the control group is statistically significant. For example, the P-value for highest median family income category is 0.2108, which is greater than 0.05: therefore, the difference between the cost-adjusted per pupil expenditure in this category and in the control group (in this case, the category with the lowest median family income) is not statistically significant.

Table C-3. Spending Ratios: Regression Results

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Urbanicity by district				
Intercept	1.82	0.09	20.15	<.0001
Rural	0	0		
Urban	0.13	0.12	1.09	0.2752
Suburban	0.08	0.11	0.69	0.4922
District size (measured by enrollment)				
Intercept	2.19	0.18	12.46	<.0001
Fewer than 2,500	0	0		
2,500 to 4,999	-0.37	0.21	-1.8	0.0723
5,000 to 9,999	-0.34	0.20	-1.7	0.091
10,000 to 24,999	-0.26	0.19	-1.4	0.1611
25,000 or more	-0.31	0.20	-1.55	0.1217
Median family income by district				
Intercept	1.83	0.07	25.56	<.0001
Lowest-Income Districts	0	0		
Middle-Income Districts	0.16	0.11	1.44	0.1501
Highest-Income Districts	0.06	0.11	0.5	0.6198
Student poverty by district				
Intercept	1.72	0.11	15.91	<.0001
Lowest Poverty Districts	0	0		
Second Lowest Poverty Districts	0.14	0.16	0.88	0.3804
Second Highest Poverty Districts	0.26	0.14	1.9	0.0582
Highest Poverty Districts	0.26	0.12	2.13	0.0341

To calculate the spending ratio for a particular category, add the estimate of the intercept to the estimate of the category of interest. For example, the average spending ratio in districts with the lowest median family income is 1.83 + 0 = 1.83. For districts with the highest median family income, the average spending ratio is 1.83 + 0.06 = 1.89.

If the P-value is less than 0.05, the difference between the spending ratio for the category and the spending ratio for the control group is statistically significant. For example, the P-value for highest median family income category is 0.6198, which is greater than 0.05: therefore, the difference between the spending ratio in this category and in the control group (in this case, the category with the lowest median family income) is not statistically significant.