Expenditures in Public School Districts: Estimates of Disparities and Analysis of Their Causes

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Introduction

There has always been substantial variation in revenues and expenditures per pupil for public elementary and secondary education among the local educational agencies (LEAs) of almost every state, as well as among the states. Public school finance is primarily a state and local government function, and localities and states vary widely in their ability and willingness to raise revenues for this purpose. Further, while states generally subsidize LEAs in ways intended to at least partially equalize fiscal resources among them, states and the Federal Government also provide additional funds on behalf of high-needs pupils, such as the disabled, with results intended to

better match resources with pupil needs, even though this may increase simple measures of disparity in expenditures per pupil.

There is continuing debate over the importance of these revenue and expenditure variations. While some believe that states have an obligation to provide substantially equal educational resources to all pupils, regardless of the locality in which they live, primarily on the basis of general concepts of equity or fairness, others believe that local educational expenditure variations are significant only if they are substantially associated with differences in academic achievement or other important educational outcomes. There are unresolved disputes over the relationships between expenditure variations and pupil academic achievement or other desired educational outcomes. Some individuals have interpreted the available research on the relationship between education expenditures and pupil achievement as indicating that the relationship is weak, that spending has little effect on achievement,

NOTE: This is an abbreviated version of the Congressional Research Service Report for Congress of the same title, dated December 19, 1995. The CRS report includes discussion and analysis of the general structure of state school finance systems, and of the value, meaning, and significance of school finance "equalization."

or at least little effect in comparison to the effects of such factors as pupil family background. In contrast, others argue that the primary weakness is with the design of most existing research on the relationships between education spending and pupil achievement, and that the few well-designed studies show these relationships to be both statistically significant and substantial.

Second, whatever the inherent significance of spending variations with respect to pupil outcomes, there is ongoing debate over whether this should be a Federal concern. One position is that school finance equity is an issue of concern and responsibility for the states, but not the Federal Government. The Federal financial contribution to elementary and secondary education revenues has always been relatively marginal, and has become more so in recent years. According to the U.S. Department of Education (1995) the Federal share of revenues for public elementary and secondary education has declined from 9.8 percent in 1979–80 to 6.9 percent in 1992–93. Further, in 1973, the U.S. Supreme Court decided, in the case of *Rodriguez v. San Antonio Independent School District*, that differences in local expenditures per pupil within a state did not violate the U.S. Constitution, as long as these differences were the result of state actions intended to meet a public purpose, such as increased local control of education that might accompany substantial reliance on local revenue sources. For these and other reasons, some may feel that Federal involvement in state school finance issues would constitute an unjustified intrusion into state responsibilities.

> *National interest in public elementary and secondary education finance has been spurred by decisions of a number of state supreme courts that school finance systems violate state constitutions...*

However, an alternative position is that there is an appropriate, if secondary, role for the Federal Government to play in the evaluation and possible reform of state school finance programs. National interest in public elementary and secondary education finance has been spurred by decisions of a number of state supreme courts that school finance systems violate state constitutions, plus legal challenges to school finance systems in a number of other states. Further, as many of the education reforms adopted in the 1980s and 1990s evolve, especially the emphasis on high standards for curriculum content and pupil performance, increased concern has been expressed about the ability of LEAs to pay for many of the recommended, or even mandated, changes in their schools. There is also a long-standing national interest in promoting equality of educational opportunities, both within and among the states.

Current Federal involvement in elementary and secondary school finance issues, especially those related to local spending disparities, consists primarily of:

- collection of finance data by the National Center for Education Statistics (NCES), of the U.S. Department of Education, and the Bureau of the Census, at a state level and for large (enrollment of 15,000 or more) LEAs each year, and for all LEAs every second year and seventh year of a decade;

- analyses of school finance-related issues supported by the NCES and other branches of the Office of Educational Research and Improvement (OERI);

- a current, congressionally-mandated study of school finance by the National Academy of Sciences;[1]

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[1] The FY1995 appropriations act for the Department of Education and other agencies, Public Law (P.L. 103-333) provided $3.2 million to be available until expended for "school finance equalization research".

- a recently authorized (the Improving America's Schools Act, Public Law (P.L.) 103-382), but thus far not funded, Education Finance Incentive Grant Formula for the program of education for the disadvantaged, Title I, Elementary and Secondary Education Act[2] (ESEA); and

- a provision of the Goals 2000: Educate America Act (P.L. 103-227) which authorizes the U.S. Department of Education to provide technical assistance to states for the development of plans to increase school finance equity (Sec. 313—no funds have yet been specifically appropriated for this purpose).

Thus, the current Federal role is limited to data gathering and analysis, with authorization of a grant formula that would reward states with low disparities in their school finance programs, but no actual appropriation of funds for this formula.

What is the Range in Expenditures Per Pupil for Public Elementary and Secondary Education in the United States?

Sources of Data and Their Limitations

Every second year NCES, in conjunction with the Census Bureau, collects and disseminates financial data for each of the Nation's LEAs. This is the only current source of expenditure data that includes all LEAs in all states. The only other sources of such data are individual states or LEAs, and those data are neither comprehensive nor necessarily comparable across LEAs and states.

However, there are several limitations or **disadvantages** to using these NCES/Census data to esti-

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mate variations in expenditures per pupil among LEAs in the states. These are primarily elements that it would be desirable to take into account in the calculation of disparity statistics, but adequate data are not available. The main effect of these limitations is to make analysis of the reasons for, and significance of, disparity calculations more difficult. Major limitations to the NCES/Census expenditure data, and our calculations of expenditure disparities among each state's LEAs that are based upon these data, are listed.

- These calculations do not adjust for differences among LEAs in **pupil needs**, which in many cases are recognized by categorical state and Federal aid programs that provide additional funds to LEAs with high proportions of special needs pupils. For example, expenditures per pupil might be relatively high in an LEA because it has high numbers of disabled, limited English-proficient (LEP), or poor children. There might also be additional costs associated with population sparsity or density, for which these calculations also do not account. These are among possible reasons for expenditure disparities that most analysts would generally consider to be legitimate. While data are available from which some adjustments based on some groups of high needs pupils could be made—for example, 1990 Census data are available on the number of poor school-aged children living in (although not necessarily attending public school in) LEAs—these adjustments would be imprecise and arbitrary, and may not include all of the categories of high needs pupils actually addressed in different state finance systems.

- There are significant differences among LEAs in most states in the **costs** of providing educational services. In particular, salaries for teachers and other staff vary widely among LEAs in many

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[2] See White (1995).

states. While salary variations might partially reflect differences in teacher "quality", they are also influenced by such factors as overall labor supply and demand conditions in each area, average experience of the LEA's teachers, general living costs, or the extent and effectiveness of teacher unions. These factors are not reflected in the analysis in this report.

- There are certain potential **accounting** problems with the data. For example, State government expenditures for teacher retirement that are not passed through LEAs are excluded. Only expenditures for **current operations** are included in table 1, not other expenditures such as capital expenditures for school construction, etc. There may be significant, unresolved differences in accounting for expenditures by different states and LEAs; e.g., differences in accounting for expenditures as "current" versus "capital," or as "elementary and secondary education" versus "adult education". There may also be significant differences in state and local accounting periods.

- All of these data apply to the 1991–92 school year. Significant changes may have occurred in the disparity of expenditures per pupil among LEAs in a state since that time. Changes may also have occurred in LEA boundaries or structure since 1991–92.

Variation in Expenditures Per Pupil within States—Coefficient of Variation

The measure of expenditure disparity shown in table 1 is the **coefficient of variation** (COV) for expenditures per pupil among the LEAs of each state.

The primary advantage of the COV is that it takes into account the expenditure levels of **all** of the LEAs in each state[3], rather than only extreme cases of the highest- and lowest-expenditure LEAs. The COV also has the advantage of relating variation among a state's LEAs to the overall average expenditure per pupil in that state, thereby adjusting for the fact that because state average expenditures per pupil vary widely, an average variation of, for example, $500 per pupil would be much more significant in a low-spending state than in one with high average expenditures per pupil. However, the disadvantage of the COV is that it is relatively complex and the meaning may not be intuitively obvious.

The coefficient of variation of a distribution of numbers—such as the average expenditures per pupil for LEAs in a state—is defined as the "standard deviation" of these numbers divided by the mean, or average. The *standard deviation* is the "average" variation from their mean of a distribution of numbers. More specifically, the standard deviation is the "absolute value" of the average variation from the mean (i.e. numbers both above and below the mean are treated as positive numbers). This is accomplished by first squaring the differences from the mean and adding them, which is equal to the "variance," then taking the positive square root of the resulting number. The standard deviation has the advantage of being a measure of variation that takes all cases into account. However, the standard deviation has the disadvantage of indicating only the average dispersion from the mean, while the value of the mean itself may vary widely for different distributions. This is applicable to average expenditures per pupil, which are much higher for some states than others.

The coefficient of variation adjusts for these differences in the statewide average per pupil expendi-

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[3]   In this case, all LEAs in the state that meet minimum enrollment size thresholds.

State	LEA type	Coefficient of variation	Range between the 5th and 95th percentile (in dollars)
Table 1.—Data on school expenditure variations in the states, 1991–92			
Alabama	unified	11.8	1,255
Alaska	unified	38.1	7,657
Arizona	elementary	12.8	1,188
	secondary	18.4	2,306
	unified	15.5	2,078
Arkansas	unified	13.7	2,078
California	elementary	43.0	1,472
	secondary	12.8	2,057
	unified	12.0	1,392
Colorado	unified	12.0	1,788
Connecticut	unified	12.9	3,239
Delaware	unified	6.0	994
Florida	unified	8.4	1,186
Georgia	unified	17.3	2,845
Idaho	unified	13.8	1,499
Illinois	elementary	27.4	4,017
	secondary	28.2	6,795
	unified	15.9	1,776
Indiana	unified	14.6	1,808
Iowa	unified	8.3	1,176
Kansas	unified	13.7	2,107
Kentucky	unified	11.6	1,293
Louisiana	unified	12.1	1,499
Maine	elementary	20.8	3,513
	secondary	5.6	1,035
	unified	11.7	2,333
Maryland	unified	13.0	2,472
Massachusetts	unified	21.9	3,545
Michigan	unified	20.7	3,368
Minnesota	unified	15.0	2,738
Mississippi	unified	11.4	1,058
Missouri	unified	34.0	4,876
Montana	elementary	19.1	2,191
	secondary	18.6	2,975
	unified	11.4	963
Nebraska	unified	14.3	1,981
Nevada	unified	9.0	583
New Hampshire	elementary	20.6	3,464
	secondary	12.2	2,220
	unified	14.9	2,326

Table 1.—Data on school expenditure variations in the states, 1991–92, continued			
State	LEA type	Coefficient of variation	Range between the 5th and 95th percentile (in dollars)
New Jersey	elementary	17.9	4,182
	secondary	19.7	5,249
	unified	13.5	3,556
New Mexico	unified	14.9	1,808
New York	unified	21.6	5,122
North Carolina	unified	8.9	1,204
North Dakota	unified	15.2	1,545
Ohio	unified	27.4	2,878
Oklahoma	unified	12.6	1,265
Oregon	unified	13.4	2,217
Pennsylvania	unified	18.8	3,933
Rhode Island	unified	8.0	1,755
South Carolina	unified	10.7	1,294
South Dakota	unified	15.2	1,830
Tennessee	unified	16.2	1,491
Texas	unified	12.5	1,500
Utah	unified	12.5	1,142
Vermont	elementary	18.9	3,430
	secondary	17.8	3,333
	unified	16.7	3,812
Virginia	unified	20.3	2,534
Washington	unified	8.9	1,523
West Virginia	unified	5.3	781
Wisconsin	unified	12.5	1,901
Wyoming	unified	15.8	2,572

SOURCE: CRS calculations based on data from an NCES survey of LEA finances for 1991–92.

ture because it is the standard deviation expressed as a percentage of the mean. For example, if the coefficient of variation for a distribution of numbers is 25 percent, then the average variation from the mean for these numbers is equal to 25 percent of the mean. As this percentage increases, the overall dispersion of the numbers on which the coefficient of variation was calculated becomes greater. In this case, the higher the coefficient of variation, the greater is the aggregate disparity in expenditures per pupil among LEAs in a state.

An example might help to illustrate the advantage of using the coefficient of variation as a measure of LEA expenditure disparities. Assume there are two hypothetical states, "Columbia" and "Fredonia," each with six LEAs of equal enrollment size. The distribution of expenditures per pupil among the LEAs of each state is shown in table 2.

For each of these two hypothetical states, the range of expenditures, between the highest and lowest spending LEAs in the state, is the same—$4,000. However, the overall dispersion around the statewide mean is much greater for Fredonia, where all LEA expenditure levels are very high or very low, than for Columbia, where most are near the average. This difference in overall dispersion is reflected in the standard deviation, which is higher for Fredonia ($1,871) than Columbia ($1,159), but this understates the difference in dispersion in the two distributions because it fails to adjust for the substantial difference in average values ($4,533 for Columbia versus $3,533 for Fredonia). The coefficient of variation, which is 53 percent for Fredonia, but much lower—26 percent—for Columbia adjusts for this difference

> *With respect to both the coefficient of variation and the range, expenditure disparity measures are calculated by state and by type of LEA...*

in the statewide mean. Thus, the average variation from the mean is 53 percent (of the mean) for Fredonia's LEAs, and 26 percent for those in Columbia.

Table 1 lists the coefficient of variation among LEAs in each state for 1991–92, based on the NCES/Census data. It also lists a calculation of the **range** in expenditures per pupil between high and low spending LEAs in the state. This range figure is simply the difference, in dollars, between the expenditures per pupil for LEAs at the 5th and 95th percentile (i.e., when LEAs are sorted according to their average expenditures per pupil) in the state. The difference between LEAs at the 5th and 95th percentiles is used instead of the difference between the absolute highest and lowest spending LEAs in the state in an effort to avoid distortions from anomalous, extreme cases.

The range figures are provided to help provide context for the discussion of variations; however, because it is a preferable measure of overall expenditure variations, the analysis following table 1 will be based only on the coefficient of variation calculations.

With respect to both the coefficient of variation and the range, expenditure disparity measures are calculated by state and by type of LEA: elementary, secondary, or unified (elementary and secondary combined) for states with significant numbers of each type of LEA.[4] LEAs are compared only to those of similar type because costs are generally higher for secondary than for elementary education. Neither the District of Columbia nor Hawaii are included in this analysis because each consists of only one LEA. In addition, limited purpose LEAs, such as those providing only vocational education or education for disabled children, are excluded from the

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[4] Because more than 10 percent of the students attend schools in separate (non-unified) school districts, the analysis includes elementary and secondary school districts for the following states: Arizona, California, Illinois, Maine, Montana, New Hampshire, New Jersey, and Vermont.

Table 2.—Measures of disparities in expenditures per pupil in two hypothetical states		
LEA	"Columbia"	"Fredonia"
1	$2,500	$1,500
2	$4,400	$1,600
3	$4,500	$1,900
4	$4,600	$5,300
5	$4,700	$5,400
6	$6,500	$5,500
Mean	$4,533	$3,533
Standard deviation	$1,159	$1,871
Range	$4,000	$4,000
Coefficient of variation	**26%**	**53%**

SOURCE: Riddle and White, unpublished tabulations.

calculations, as are small LEAs with enrollment below 200 pupils (to avoid distortions resulting from diseconomies of scale (i.e., increasing costs per pupil when the total number of pupils in a LEA is very low)).

Brief analysis of expenditure disparity data

Keeping in mind the many limitations to the NCES/Census data on which the calculations in table 1 were based, it is nevertheless worthwhile to examine general patterns in these data. Particular attention is given to states that these data indicate have the greatest variations in expenditures per pupil among their LEAs.

Table 3 lists the 10 states with the highest and lowest coefficient of variation for expenditures per pupil among the state's LEAs. For most states, only the unified school districts are used in the analysis. In the two columns of table 3, states are listed in order of their ranking on the coefficient of variation measure— thus, in the first column in table 3, California elementary LEAs had the highest estimated COV, and Michigan unified LEAs the 10th highest.

Figure 1 illustrates the coefficient of variation estimates for the unified schools districts in each state. While the limitations of these data and calculations must be kept in mind, certain states and LEA types appear to have especially high or low disparities in expenditures, as measured by the coefficient of variation. Characteristics that tend to be associated with high-COV states include numerous, relatively small (in terms of both population and geographic size) LEAs; significant proportions of their enrollment in separate (particularly elementary), rather than unified, LEAs; and frequently a relatively low state share of public elementary and secondary education revenues (7 of the 10 in column 1 of table 3 were below average in 1992–93). In contrast, low-COV states tend to have broad-based, usually county-level, LEAs (e.g., such Southeastern states as West Virginia, Florida, North Carolina, and South Carolina); predominantly unified, or at least relatively large secondary, LEAs; and frequently a relatively high state share of public elementary and secondary education revenues (8 of the 11 in column 2 of table 3 were above average in 1992–93).

With respect to state court activities, the school finance systems of all of the high-COV states listed in the first column of table 3 have been challenged in

recent years, although not successfully in all cases. However, there have also been recent state court challenges to the school finance systems in five of the eleven low-COV states listed in column 2 of table 3. Further, there is no close correlation between the estimated COV and the final decisions thus far of state supreme courts on these challenges. Several of the systems in high-COV states have been found to date by State supreme courts to be constitutional (e.g., New York, Illinois), while one of the systems in low-COV states has recently been found by a State supreme court to be unconstitutional (i.e., Rhode Island).[5]

A final note regarding table 3—even after removal of the smallest enrollment LEAs from consideration, Alaska may be a special case with particularly dispersed pupil populations and unusual cost considerations, and therefore its COV estimate may not be comparable to other states.

Table 3.—The 10 states with the highest and lowest coefficient of variation in LEA expenditures per pupil	
10 state/LEA types with the **highest** coefficient of variation in expenditures per pupil	10 state/LEA types with the **lowest** coefficient of variation in expenditures per pupil
California (elementary) – 43.0 Alaska (unified) – 38.1 Missouri (unified) – 34.0 Illinois (secondary) – 28.2 Illinois (elementary) – 27.4 Ohio (unified) – 27.4 Massachusetts (unified) – 21.9 New York (unified) – 21.6 Maine (elementary) – 20.8 Michigan (unified) – 20.7	West Virginia (unified) – 5.3 Maine (secondary) – 5.6 Delaware (unified) – 6.0 Rhode Island (unified) – 8.0 Iowa (unified) – 8.3 Florida (unified) – 8.4 North Carolina (unified) – 8.9 Washington (unified) – 8.9 Nevada (unified) – 9.0 South Carolina (unified)/ Oregon (secondary) (tie) – 10.7
SOURCE: CRS calculations based on data from an NCES survey of LEA finances for 1991–92.	

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[5]   See for example, National Conference of State Legislatures 1995; The
    Finance Project 1994; Education Commission of the States 1994;
    Education Daily 1995.

Figure 1.—Coefficients of variation for expenditures per pupil, by unified LEAs
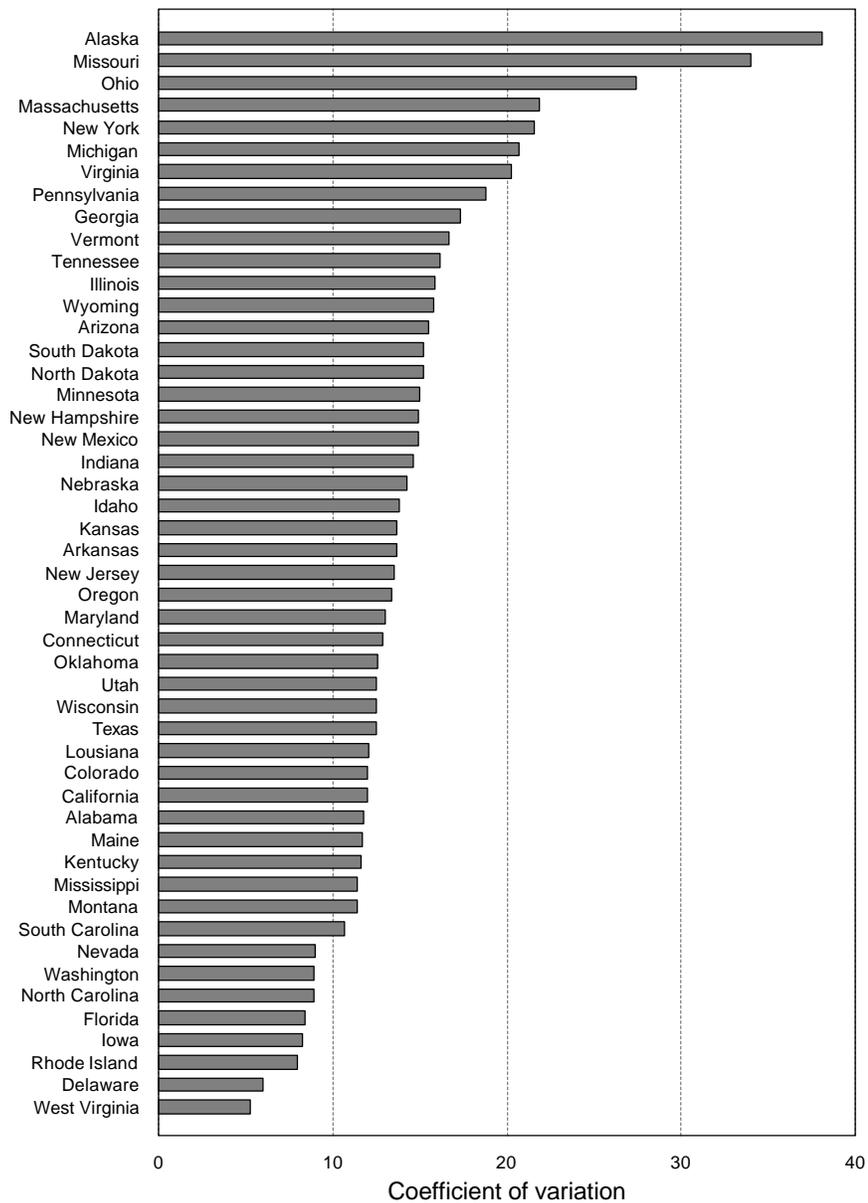
SOURCE: CRS calculations based on data from NCES survey of LEA finances for 1991–92.

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