

Student-Level Finance Data: Wave of the Future?

LAWRENCE O. PICUS

The principal focus of school finance in the past has been on elimination of fiscal disparities among school districts. Whether the goal was to eliminate differences in per-pupil spending or to establish greater taxpayer equity, most school finance research has focused on ways to measure equity and on treatments for differences in the fiscal capacity of school districts. Although there is still much to be done on this front, school finance today must also address a number of new issues: whether spending levels are adequate to meet the needs of our children; how educational resources are allocated and used; and how funding levels are linked to student outcomes. In this article, I suggest that to fully understand each of these issues, school finance researchers will need to collect resource allocation data at the student level.

In recent years, considerable attention has been devoted to the collection of school-level fiscal data. These efforts seem motivated by both the growing trend toward more school-site decision making and the growing demand for accountability for student performance. In the states with the most experience in school-level data collection, one constant has been that gathering these data is expensive and difficult. Often once collected, the data remain relatively unused. Moreover, to the extent that understanding how resources are linked to student outcomes is the reason for collecting these data, it seems probable that school-level variables will suffer from the same lack of specificity that has plagued the use of district-level expenditure variables in research on this topic.

This article begins with a summary of the literature on resource allocation in schools—specifically, on the

reasons that we might want to collect student-level data. Following the review of the literature, I identify four major research focuses of school finance and suggest how student-level data collection might improve our understanding of each focus. I conclude by suggesting how such data might be collected in the future.

Review of the Literature

Despite the large sums of money spent annually for K-12 education, we know remarkably little about how those funds are used at the individual student- and school-level. School finance studies have traditionally focused on school districts as the level of analysis, and most states only collect information from constituent school districts at the district level. The focus of most state finance reporting systems is on fiscal accountability, not understanding how or why resource decisions are made. These systems generally focus on object-level reporting. As a result, we know a great deal about how much our schools spend for salaries, benefits, contracts, and so forth, but relatively little about expenditures by function (e.g., instruction, administration, pupil services, maintenance and operations, transportation), and even less about how much is spent by individual programs.

For example, many districts cannot tell us how much is spent per pupil for elementary versus secondary instruction, much less answer questions such as, What are per pupil costs for mathematics instruction at the high school? or, How much is spent on individual students at the elementary level? Yet, until we can identify these costs, it seems unlikely that we will be able to ascertain how the use of educational resources is linked to student achievement.

Lawrence O. Picus is an associate professor in the Rossier School of Education and director of the Center for Research in Education Finance at the University of Southern California.

Berne and Stiefel (1997) argue that student resource studies can answer three types of questions: those having to do with *resource effectiveness*, *equity*, and *resource intent*.

Resource Effectiveness Questions

A large body of literature, both in economics and school finance, has focused on production function analyses that attempt to relate inputs to outputs. Studies of this type are useful for answering questions on the effectiveness of resource use and the cost-effectiveness of different programs. To date, production function analyses that attempt to relate the student outcomes to resources have not clearly identified a link between spending and student achievement. Eric Hanushek's work in this field led him to conclude that there does not appear to be a systematic link between student achievement and the level of spending (see, for example, Hanushek 1989, 1994a, 1994b, 1996a, 1996b). He does not suggest that such a link does not exist, only that at the present time schools need to spend the resources they have more efficiently if they are to improve student learning with more money (see, in particular, Hanushek 1994b).

In recent years, a number of authors have challenged Hanushek's findings, arguing that more money does relate to higher levels of student achievement. Hedges, Lane, and Greenwald have argued extensively that if different statistical methods are used to conduct meta-analyses of production function studies, there is a clear link between spending and student achievement (see Hedges, Laine, and Greenwald 1994a, 1994b; Greenwald, Hedges, and Laine 1996a, 1996b; Laine, Greenwald, and Hedges 1996). Ferguson (1991) found that "hiring teachers with stronger literacy skills, hiring more teachers (when students-per-teacher exceed eighteen), retaining experienced teachers, and attracting more teachers with advanced training are all measures that produce higher test scores in exchange for more money" (485). Other work by Ladd and Ferguson (1996) in Alabama found similar links between spending and student achievement.

Cost-effectiveness studies are less common in the educational literature. In part this is due to the difficulty in measuring educational outcomes consistently across children. Cost-benefit analysis, of which cost-effectiveness is a derivative (Levin 1983), relies on the ability to value both costs and benefits in dollar terms. The difficulty in education is that to compare student achievement we need to rely on various test scores and measures of gain. Because tests in different subjects use different scales, as do different tests of the same subjects, it is virtually impossible to compare the cost-effectiveness of different programs with district- and state-level aggregate cost data.

Berne and Stiefel (1997) argue that studies such as the ones described above "could be done with much

more accuracy if there were student-level resource measures that were defined to be inclusive and to differentiate between kinds of programs and students. The data would be useful if it were gathered at the school level or if it were a sample of individual student-level data that was representative at the school level" (70).

Equity Questions

School finance has a long history of analyzing funding equity. However, most of that work has looked at spending differences across school districts. Very few studies have considered school-level finance equity either within districts or across districts in an individual state. Hertert (1996) analyzed school-level equity in California, but to do so he was forced to collect data from a sample of school districts and key in their data by hand. Nakib (1996) analyzed school-level equity in Florida using that state's extensive school-level data. Picus (1993a, 1993b) used a national sample of school districts merged from the *Schools and Staffing Survey, 1993-94* (NCES 1994) and the U.S. Bureau of the Census's census of governments (U.S. Bureau of the Census 1987, 1990) to analyze school-level expenditure patterns by various district characteristics such as size, location, and wealth. However, outside of this work, there have been few school-level analyses of finance equity. Berne and Stiefel (1997) suggest that "a well-defined set of student resource variables would improve equity studies at the school level including studies that use administrative data, particularly if those variables are capable of serving as models for other data sets" (70).

Resource Intent Questions

The third category of questions Berne and Stiefel identify have to do with how resources are used or how they flow to programs or schools. Studies of this sort include the resource cost model developed by Chambers and Parrish (1983, 1994) and the work that Bruce Cooper and the accounting firm of Coopers and Lybrand are doing in analyzing school district expenditures by program and level. This work provides a wealth of information on how educational resources are used. However, data collection methods are expensive, and they suffer from the inherent incompatibilities in the way districts and states report fiscal data. These complexities, combined with the need to make hard decisions about allocation of overhead costs and central office expenditures, have led most analysts to shy away from such efforts.

Resources Available to Children from Other Sources

An important component of resource availability for students is the services that they, and their families, receive from other government and nonprofit agencies, including religious institutions, food banks, and social

service agencies. To fully understand the resources available for each child, some knowledge of these services is also important. The most likely place to get this kind of information is through the parent survey and interview. McCroskey and Meezan (1997) show that there is a very high correlation between parent self-reports on social services received and social worker reports on family receipt of these services. Thus it might be possible to develop reasonable data on what other services are available to children through the addition of items to the parent survey.

In addition to public or quasi-public services, the time parents spend helping their children with homework after school is an important educational resource, as is knowledge of the parents' income and educational attainment. In addition, some measure of the number of books in the home, and whether the child's family has a computer, may provide information on resources available to each child that might help in linking educational resources to student outcomes—even if those resources are found outside the traditional school.

In summary, although no studies to date have looked systematically at student-level resource allocation patterns, it is clear that much of the school finance community would benefit from such knowledge. However, collection of student-level data is complex and difficult. Therefore development of strategies to collect this information accurately and without undue burden on local school officials is critical. In the next section of the article I discuss four areas in which, if such efforts were made, the likely payoff would be substantial.

Four School Finance Areas That Would Benefit from Student-Level Data

Equity

Although issues of equity have been the principle focus of school finance since the turn of the century (see, e.g., Odden and Picus 2000), school finance research will continue to look at issues of equity well into the foreseeable future. One area gaining more attention is within-district spending disparities.

Hertert (1996) demonstrated that even in a state with relatively equal per-pupil spending (California), there are substantial differences in per-pupil spending among schools within a district and among schools across districts. She also showed that substantial differences exist in the types of resources available to children, finding a considerable disparity in the pupil/teacher ratio for teachers of high-level math and science courses. Clearly those students in schools with a lower ratio (fewer students per teacher) have greater access to teaching resources for those subjects.

The differences Hertert (1996) identifies across schools are an important concern for school finance

researchers. Even if we make progress in improving the equity of district-level finances, if differences continue to exist among schools our ability to improve student learning for all may be compromised. Understanding the extent to which differences in spending and educational resources are unevenly distributed among schools both within districts and in different districts within a state is another critical issue for future school finance research.

Although school-level data would improve our understanding of those differences considerably, anyone who has been in a school recently can't miss the fact that even within individual classrooms, considerable differences in the resources available for each child exist. For example, some children, as part of a special education inclusion program, may have their own teaching aide for all or part of the day. Other children may be taken from the classroom for a portion of some or all days each week for special instruction. This model is common in Title I programs and is a critical part of the Reading Recovery program. These actions are intended to improve the "vertical equity" in schools, something school finance research has had limited success in measuring to date. Moreover, they show clearly that substantial differences in the resources available to individual children do exist.

Adequacy

The 1990s saw a resurgence in school finance litigation. Since 1989, a total of twenty-one cases have found their way to the highest court in their respective states. In twelve of those, the court decided in favor of the plaintiffs (see Odden and Picus 2000 and related Web site <http://www.mhhe.com/schoolfinance>). Beginning with the 1989 decision in Kentucky (*Rose v. Council for Better Education*, 790 S.W.2d 186 [1989]), courts have been more willing to overthrow the existing funding system, define remedies, and establish concrete requirements for constitutional remedy. In many instances, these decisions have focused on an alternative concept in school finance, that is, adequacy.

In the past, school finance cases were brought on the more narrow grounds of funding equity for students or taxpayer equity through remedies such as fiscal neutrality. Adequacy cases argue that it is the responsibility of the state to provide an "adequate" level of resources to ensure that each child receives a satisfactory education. As envisioned by William Clune (1994), adequacy shifts the focus of school finance reform from inputs to an emphasis on high minimum outcomes.

Currently there are four general approaches being used to estimate the costs of an adequate education, as described below.

Professional judgment model. Charged by the Wyoming Supreme Court with defining a "proper" education and

funding it, the state legislature established a basket of outcomes and created three prototype school models—one each for elementary, middle, and high school—designed to meet the goals of this basket. The costs of these models were then estimated and those figures were used to fund school districts through the state finance formula (Guthrie and Rothstein 1999). Wyoming's model was to be "cost" based—meaning that estimates of the resources needed to finance the prototype models had to be based, as much as possible, on the market costs of the goods and services needed.

Ohio adequacy model. Faced with a court ruling requiring that all children receive an adequate education, Ohio responded in a different manner. The state has in existence a set of school standards that all school districts are expected to meet. By identifying those districts that meet the standards, and estimating the costs incurred by each, it is possible to estimate the expected cost of providing an adequate education. Although questions have come up regarding which districts that meet the standards should and should not be included in the analysis, and how to handle districts that meet all of the standards one year and not the next, this model appears to offer an excellent approach for state policymakers (Alexander, Augenblick, Driscoll, Guthrie, and Levin 1995).

Cost functions model. Many economists have attempted to understand the relationship between spending and student achievement through the use of production functions. In this research, student achievement is the dependent variable and one of the independent variables is spending per pupil or some proxy for spending. An alternative being considered by economists is to turn the equation around and make the expenditures the dependent variable and the level of student achievement the state wants to achieve one of the independent variables. This process is very new and has only been estimated in a handful of states, notably Wisconsin and New York (Rechovsky and Imazeki 1998; Duncombe and Yinger 1999).

Resource cost model. Developed by Jay Chambers and Thomas Parrish (1983, 1994), the resource cost model (RCM) uses groups of professional educator experts to first identify base staffing levels for the regular education program and then identifies effective program practices and their staffing and resource needs for compensatory, special, and bilingual education. All ingredients are assessed using average price figures, but in determining the foundation base dollar amount for each district, the totals are adjusted by a geographic education price index. This method was used to propose a foundation spending level for both Illinois and Alaska, but the proposals were never implemented.

In all of these cases, the availability of student-level

resource data would improve the accuracy of estimates of the costs of providing students with an adequate education.

Accountability

Holding schools accountable for the performance of their students has become one of the staples of education policy in the 1990s. Policymakers talk about giving schools the funds they need and holding them accountable for student performance. Although this rhetoric is popular, it is a long way from states actually relaxing their control over the basic accounting functions they currently require of school districts, particularly for specific grant programs. This is understandable; any legislator who appropriates billions of dollars for schools only to find that some of the money has been "misused" will want to have some redress with local officials. Hence, we have been slow to remove restrictive and outdated fiscal controls on schools.

Some progress has been made in this direction through so-called market-based approaches to school reform or reorganization. Specifically, programs that support site-based management, school choice, vouchers, and charter schools offer local school officials the opportunity to have more control over the allocation and use of the revenues they receive. The question facing school finance researchers is, do local educators take advantage of this new flexibility and use their resources differently? If they do, does it make a difference in student outcomes? Both questions are critical components of future school finance research. We also need to know if different organizational structures lead to greater gains in student learning than others, and we need a better understanding of the relationship between organizational structure, resource use, and student achievement. Armed with this information, it may be possible to hold schools accountable for the performance of their students.

Productivity

We are a long way from understanding the link between money and student outcomes. Despite hundreds of studies and years of debate, the question of how money matters is still hotly debated. What we need is better fiscal data. Today it is possible to get detailed student-level demographic and performance data. Often we can only link it to districtwide fiscal data. If we better understood how much was spent at the school, or ideally at the student level, it should be possible to more fully understand the relationship between money and achievement. Additionally, it is also important to understand what resources money buys at the school. For example, it may be more important to know about the characteristics of individual teachers than how much they earn or even how many students are in their classes.

How Do We Collect School-Level Data?

To address the four topics described above, school finance researchers will need access to a wide range of new data. It is clear that answering many of the questions posed requires detailed and accurate data at levels lower than the school district. Understanding how funds are distributed to schools, how those schools use those funds, and what resources are available to individual students is critical to developing a better understanding of what we need to do to create high-performing schools.

Development of school-level data is one possible option. This appears to be an expensive alternative, and one that does not guarantee we will have substantially better answers to many of the questions posed above. Today, nine states have begun initiatives to collect school-level fiscal data. Ohio, Texas, and Florida have been pioneers in this endeavor, and some interesting research findings are beginning to emerge from the vast array of data available in those three states (Nakib 1996; Sherman, Best, and Luskin 1996). While other states will surely follow, at least one, Washington, has decided that at the present time, the expense of collecting school-level fiscal data exceeds the value of those data (JLARC 1999).

School-level data are hard to collect. Two recent volumes of the *Journal of Education Finance* (vol. 22, no. 3 and vol. 23, no. 4) make this clear. The first, edited by Odden and Busch (1997), summarizes the efforts of the Consortium for Policy Research in Education (CPRE) to analyze school-level databases in a number of states, while the second, edited by Goertz and Stiefel (1998), describes the results of a multiyear study of school-level data and equity in four school districts—New York, Rochester, Fort Worth, and Chicago.

Although school-level data is clearly important, a more cost-effective strategy might be to collect student-level resource data. If we are ever to truly understand how money matters, and get a truly accurate sense of the equity of the distribution of the funds we currently make available to children through their schools, we need to have a better picture of the resources available to each student.

It is unlikely that state data systems will ever have the capacity to handle data for the millions of children in our schools. Moreover, the expense of collecting these data probably far exceeds its value in terms of understanding educational productivity. However, with relatively few additional items, student-level resource indi-

cators could be collected through the major longitudinal surveys conducted regularly by the National Center for Education Statistics (NCES). Picus and Peternick (forthcoming) prepared a position paper on this issue and developed potential survey items for the Early Childhood Longitudinal Survey, a large-scale, nationally representative survey being conducted by the National Center for Education Statistics that will follow children from kindergarten through fifth grade.

By adding questions related to the services offered to each child, and the costs of those services, it may be possible to collect nationally representative data on student-level resource allocations. Combined with more detailed state- and school-level data availability, school finance research will be able to focus directly on all four issues identified above: equity, adequacy, accountability, and productivity.

Recent school finance discussions have focused on the importance of school-level data collections. Although this remains an attractive approach from a school finance perspective, it seems that our true focus should be

on individual students. We already have student-level data on student outcomes, demographics, and academic characteristics. Our inability to link money and/or resources to student outcomes seems to be, at least in part, a result of not having similarly detailed fiscal data. School-level fiscal data will only give us a partial solution to this problem. It is also very expensive to collect, and comparisons across states and even across districts within a state may be very difficult, if not impossible.

It seems that it would be both more practical and cost-effective for the federal government (through NCES) to support the collection of data at the student level. These data could be aggregated up to school, district, and even the state level, if desired. Picus and Peternick (forthcoming) have shown that it is feasible to collect a considerable amount of student-level fiscal and resource data with a few additions to the current drafts of the Early Childhood Longitudinal Survey. If the data from this survey prove valid and useful, then future longitudinal surveys could be designed from the ground up, with resource and fiscal data having a place in each instrument.

Collecting data through these surveys would not provide universe data on fiscal resources available to students; it would provide a sound, statistically valid sample of student-level fiscal data that could be linked to other data on performance. More importantly, it would be possible to capture the differences in services

While school-level data are attractive for a number of reasons, student-level data collections have the potential to be more cost-effective and more useful in improving our understanding of student learning.

received by children enrolled in the same classroom. The ability to distinguish services available to individual students is critical to making distinctions about why their performance varies.

Additionally, student-level fiscal data allows NCES to collect information about resources directed toward students in any school setting that can be identified, and only requires that the type of schooling be made clear. It would then be theoretically possible to see if there are systematic differences in the funds and resources available to children in alternative school settings and to see if those differences relate to differences in performance.

Thus, while school-level data are attractive for a number of reasons, student-level data collections have the potential to be more cost-effective and more useful in improving our understanding of student learning. In all cases, the focus of this fiscal data collection should be to help better understand the factors that lead to improved learning on the part of our students.

REFERENCES

- Alexander, K., J. Augenblick, W. Driscoll, J. Guthrie, and R. Levin. 1995. *Proposals for the elimination of wealth-based disparities in public education*. Columbus, OH: Department of Public Instruction.
- Berne, R., and L. Stiefel. 1997. Student-level school resource measures. In *Selected papers in school finance 1995*, edited by W. J. Fowler. Washington DC: National Center for Education Statistics.
- Chambers, J., and T. Parrish. 1983. *The development of a resource cost model funding base for education finance in Illinois*. Stanford, CA: Associates for Education Finance and Planning.
- . 1994. State-level education finance. In *Advances in educational productivity*, 45-74. Greenwich, CT: JAI Press.
- Clune, W. H. 1994. The shift from equity to adequacy in school finance. *Educational Policy* 8(4): 376-95.
- Duncombe, W. D., and J. M. Yinger. 1999. Performance standards and educational cost indexes: You can't have one without the other. In *Equity and adequacy in education finance*, edited by H. F. Ladd, R. Chalk, and J. S. Hansen, 260-97. Washington, DC: National Academy Press.
- Ferguson, R. F. 1991. Paying for public education: New evidence on how and why money matters. *Harvard Journal on Legislation* 28: 465-97.
- Goertz, M. E., and L. Stiefel, eds. 1998. Special issue on school level data. *Journal of Education Finance* 23(4). Entire issue.
- Greenwald, R., L. V. Hedges, and R. D. Laine. R. D. 1996a. Interpreting research on school resources and student achievement: A rejoinder to Hanushek. *Review of Educational Research* 66(3): 411-16.
- . 1996b. The effect of school resources on student achievement. *Review of Educational Research* 66(3): 361-96.
- Guthrie, J. W., and R. Rothstein. 1999. Enabling adequacy to achieve reality: Translating adequacy into state school finance distribution arrangements. In *Equity and adequacy in education finance*, edited by H. F. Ladd, R. Chalk, and J. S. Hansen, 209-59. Washington, DC: National Academy Press.
- Hanushek, E. A. 1989. The impact of differential expenditures on school performance. *Educational Researcher* 18(4): 45-51.
- . 1994a. Money might matter somewhere: A response to Hedges, Laine, and Greenwald. *Educational Researcher* 23(3): 5-8.
- . 1994b. *Making schools work: Improving performance and controlling costs*. Washington DC: The Brookings Institution.
- . 1996a. The quest for equalized mediocrity: School finance reform without consideration of school performance. In *Where does the money go? Resource allocation in elementary and secondary schools*, edited by L. O. Picus and J. L. Wattenbarger, 20-43. Thousand Oaks, CA: Corwin Press.
- . 1996b. A more complete picture of school resource policies. *Review of Educational Research* 66(3): 397-410.
- Hedges, L. V., R. D. Laine, and R. Greenwald. 1994a. Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher* 23(3): 5-14.
- . 1994b. Money does matter somewhere: A reply to Hanushek. *Educational Researcher* 23(3): 9-10.
- Hertert, L. 1996. Does equal funding for districts mean equal funding for classroom students? Evidence from California. In *Where does the money go? Resource allocation in elementary and secondary schools*, edited by L. O. Picus and J. L. Wattenbarger. Newbury Park, CA: Corwin Press.
- Joint Legislative Audit and Review Committee (JLARC). 1999. *Final report of the study of school level fiscal data collection*. Olympia, WA: JLARC.
- Ladd, H., and R. Ferguson, R. 1996. How and why money matters: An analysis of Alabama schools. In *Holding schools accountable*, edited by H. F. Ladd, 299-326. Washington DC: The Brookings Institution.
- Laine, R. D., R. Greenwald, and L. V. Hedges. 1996. Money does matter: A research synthesis of a new universe of education production function studies. In *Where does the money go? Resource allocation in elementary and secondary schools*, edited by L. O. Picus and J. L. Wattenbarger, 44-70. Thousand Oaks, CA: Corwin Press.
- Levin, H. 1983. *Cost effectiveness: A primer*. Beverly Hills, CA: Sage Publications.
- McCroskey, J., and W. Meezan. 1997. *Family preservation and family functioning*. Washington, DC: Child Welfare League of America.
- Nakib, Y. A. 1996. Beyond district-level expenditures: Schooling resource allocation and use in Florida. In *Where does the money go? Resource allocation in elementary and secondary schools*, edited by L. O. Picus and J. L. Wattenbarger. Newbury Park, CA: Corwin Press.
- National Center for Education Statistics (NCES). 1994. *Schools and staffing survey, 1993-94*. Washington, DC: U.S. Department of Education, NCES.
- Odden, A., and C. Busch, eds. 1997. Special issue on collection of school-level finance data. *Journal of Education Finance* 22(3). Entire issue.
- Odden, A. R., and L. O. Picus. 2000. *School finance: A policy perspective*. 2nd ed. New York: McGraw-Hill.
- Picus, Lawrence O. 1993a. *The allocation and use of educational resources: School level evidence from the schools and staffing survey*. Working Paper No. 37. Los Angeles, CA: USC Center for Research in Education Finance.
- . 1993b. *The allocation and use of educational resources: District level evidence from the schools and staffing survey*. Working Paper No. 34. Los Angeles, CA: USC Center for Research in Education Finance.
- . 1997. Does money matter in education? A policymaker's guide. In *Selected papers in school finance, 1995*, edited by W. Fowler. Washington DC: National Center for Education Statistics.
- Picus, L. O., and L. Peternick. (forthcoming) Developing student level resource variables for the early childhood longitudinal survey. In *Selected papers in school finance, 1998*, edited by W. Fowler. Washington, DC: U.S. Department of Education.
- Rechovsky, A., and J. Imazeki. 1998. The development of school finance formulas to guarantee the provision of adequate education to low-income students. In *Developments in school finance 1997*, edited by W. Fowler. Washington, DC: National Center for Education Statistics (NCES 98-212).
- Sherman, J., C. Best, and L. Luskin. 1996. *Assessment and analysis of school-level expenditures*. Working Paper 96-19. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement.
- U.S. Bureau of the Census. 1987. *Finances of public school systems*. Washington, DC: U.S. Government Printing Office. GC87(4)-1.
- . 1990. *Public education finances: 1987-88*. Series GF-88-10. Washington, DC: U.S. Government Printing Office.