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ABSTRACT

The National Center for Education Statistics (NCES) surveys the changing landscape in education finance by commissioning papers from members of the school finance research community. Papers that address the questions of the current and future financial condition for school districts are presented here. The papers, which are intended to promote the exchange of ideas among researchers and policymakers, take two separate tacks. One set explores the present financial condition of school districts, focusing on how a retiring work force may influence the finances of school districts, how school districts respond to fiscal exigencies, and the efficacy of urban school districts. The other papers propose an imaginative new way of funding education, at the school level, and simulates the results for Texas, offering a summary of issues and problems related to school-based funding approaches. The recurrent theme revolves around the proposition that state aid should be distributed to schools rather than to school districts. Some of the specific topics addressed here include the dynamics of teacher salary expense, how school districts respond to fiscal constraint, the condition of urban school finance, reinventing education finance, and exploring alternatives for school-based funding. (RJM)

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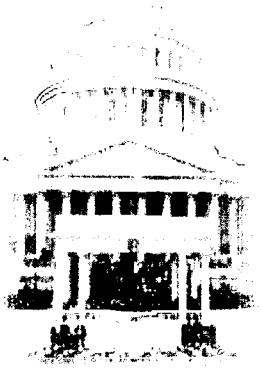

1996

Selected Papers in School Finance

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U.S. Department of Education
Office of Educational Research and Improvement **NCES 98-217**

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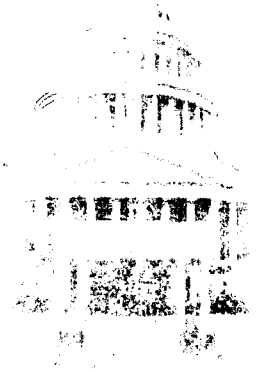

Selected Papers in School Finance 1996

William J. Fowler, Jr., Editor

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The National Center for Education Statistics (NCES) is the primary federal entity for collecting, analyzing, and reporting data related to education in the United States and other nations. It fulfills a congressional mandate to collect, collate, analyze, and report full and complete statistics on the condition of education in the United States; conduct and publish reports and specialized analyses of the meaning and significance of such statistics; assist state and local education agencies in improving their statistical systems; and review and report on education activities in foreign countries.

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Dedication

In memory of Steven D. Gold, 1945–1996

This publication is dedicated to Steven D. Gold, who may be best known for his compendium for the American Education Finance Association (AEFA) of *Public School Finance Programs of the United States and Canada*, which has become the standard in the field for those who wish to compare state education aid programs. As one of the few state/local fiscal experts in the United States who had an abiding interest in elementary and secondary education finance, his comments were frequently quoted on the front page of the *Wall Street Journal*. Although he always claimed that education was not his specialty, his work was held in great regard by the education finance research community, and he served as an AEFA board member for many years.

Extremely prolific, Dr. Gold had written 17 books about state and local government finances, including *The Fiscal Crisis of the States*, published in 1995. Dr. Gold was a senior fellow at the Urban Institute. For 6 years prior to his move to Washington, D.C., he was the director of the Center for the Study of the States at the State University of New York in Albany. He also was a professor there of public administration and public policy.

He was a graduate of Bucknell University in Pennsylvania and received master's and doctoral degrees in economics from the University of Michigan. He taught economics at Grinnell College and Drake University, both in Iowa, before becoming a senior fellow and director of fiscal affairs at the National Conference of State Legislatures in Denver.

Those of us who knew him were always awed by his quick intelligence, his quiet reserve and his insightful humor despite two epic battles with cancer, the first of which he thought he had won, only to have the disease return after a decade. His optimism and bounteous research and publications while engaged in attempting to subjugate his illness serves as a paradigm for those of us who achieve far less, with far fewer ordeals. There can be no greater tribute to this man, and his work, for others in the education finance research community to attempt to emulate him.

Foreword

Paul D. Planchon, Associate Commissioner

Surveys and Cooperative Systems Group

The National Center for Education Statistics (NCES) attempts to understand the dynamically changing landscape in education finance by commissioning papers from distinguished members of the school finance research community. These esteemed scholars are asked either to:

- Assess the data needs of the profession;
- Deal with difficult statistical and measurement questions that arise when conducting empirical and quantitative research;
- Examine pragmatic education finance issues for states, school districts, or schools.

The papers presented here were commissioned by NCES to address the question of the current and financial future for school districts in two distinct fashions. One set of papers explores the present: papers examine how a retiring work force may influence the finances of school districts; how school districts respond to fiscal exigencies, and the efficacy of urban school districts. The remainder propose a imaginative new way of funding education, at the school level, and simulate the results for Texas.

This compilation of papers is the third in the renewal of this series, which previously was discontinued in 1977. The papers are intended to promote the exchange of ideas among researchers and policymakers. Because the views are those of the authors, the papers may provoke discussions, replications, replies and refutations. If so, the publication will have accomplished its task. There are few things so satisfying to NCES as promoting and contributing to the thinking and discussion of academia and the public in an area such as education finance.

Acknowledgments

The editor wishes to gratefully acknowledge the comments and suggestions of the reviewers: Lee M. Hoffman and Michael P. Cohen of the National Center for Education Statistics (NCES). I also wish to acknowledge the contributions of Mia Perona, Rebecca Pratt, Allison Pinkney, and Carol Rohr of Pinkerton Computer Consultants, Inc. who edited the manuscript and incorporated text and graphics into a published document.

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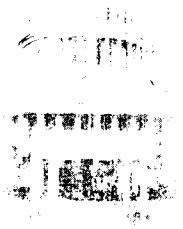
About the Author

William J. Fowler, Jr. is the director of the Education Finance Statistical Center (EFSC) at the U.S. Department of Education, National Center for Education Statistics (NCES). He specializes in elementary and secondary education finance and educational productivity research. His recent work has focused on the development of geographic and inflationary cost adjustments, and their effect upon measures of equity; school-level financial reporting; the construction of a student-level resource measure; and issues in analyzing NCES student achievement and finance data.

Dr. Fowler has worked for NCES since 1987, before which he served as a supervisor of school finance research for the New Jersey Department of Education. He has also taught at Bucknell University and the University of Illinois, and served as a senior research associate for the Central Educational Midwestern Regional Educational Laboratory (CEMREL) in Chicago and for the New York Department of Education.

Dr. Fowler received the Outstanding Service Award of the American Education Finance Association in 1997, and served on its Board of Directors from 1992 to 1995. He serves on the editorial board of the *Journal of Education Finance*. Dr. Fowler is a graduate of Columbia University with a doctorate in education (1977).

Selected Papers in School Finance



Introduction and Overview

Introduction and Overview

William J. Fowler, Jr.
National Center for Education Statistics

The National Center for Education Statistics (NCES) commissioned the papers in this publication to confront implicit vexing questions in education finance. While earlier papers in this NCES series have addressed the nation's education finance information needs and statistical and measurement problems for the profession, this volume instead examines pragmatic education finance issues for school districts and schools. The papers include an examination of the implications of a retiring teacher work force for school districts, how school districts respond to fiscal pressures, and an assessment of the financial condition of urban school districts. The implicit questions posed by these papers revolve about the current and financial future for school districts. Since the nation has enjoyed an unprecedented period of prosperity, it is only natural to wonder what the effect upon our nation's school districts will be when adversity strikes.

Perhaps the most profound proposed change in school district funding is the recent proposition that state aid should be distributed to schools rather than school districts. The layperson often does not comprehend the enormity of such a change. While in 1994–95 there were 49 state education agencies that distributed state aid to 14,400 school districts in the nation, there were 84,705 schools (with enrollment).[1] Heretofore, state equity challenges have primarily focused upon the equity in funding between school districts. If funding is changed to the school-level, the focus of those equity challenges may well change. Here the implied question pirouettes about the appropriate organizational level to receive state education funds. This volume of *Selected Papers in School Finance* includes the popular proposal of allocating state aid to schools, and another paper that conducts an examination of how state aid to schools might be undertaken and its impact.

In the first paper, conducted by **Hamilton Lankford, Peter Ochshorn,** and **James Wyckoff** at the State University of New York - Albany, the balance between projected enrollment increases to 2005 is weighed against the potential for teachers to retire by that year. While few school district budgets will increase concomitantly with the "baby boom echo" of

[1] U.S. Department of Education, National Center for Education Statistics. *Statistics in Brief: Overview of Public Elementary Schools and School Districts: School Year 1994–95*. Washington, D.C.: 1996.

enrollment, previous studies suggest savings seldom occur when enrollment increases. However, the aging teacher workforce might offer the potential for substantial salary and benefit savings. Lankford, Ochshorn, and Wyckoff examine whether school districts in New York are likely to experience salary savings as a result of the retirement of "baby boom" teachers. Entry-level public-school teachers in New York receive an average of $30,289 in salary, while teachers pondering retirement at the highest salary level receive an average of $56,125. This difference of more than $25,000 would almost pay for an additional entry-level teacher.

Less is known about these issues because the research on teacher retirement has focused upon the structure of teacher retirement programs and statistical analyses of the factors relevant to the retirement decisions of teachers. Unlike college professors, who have a retirement plan, TIAA-CREF, that many institutions use, and has a relatively short "vesting" period (when funds can be left to mature in the program), teachers in one state seldom can transfer their state retirement benefits to another state.[2] Lankford, Ochshorn, and Wyckoff attempt to inform us by using a regression to age and replace the teacher workforce in New York State, including enrollment changes, and then determining the salary savings. In a typical year between 1987 and 1995, the file contained data for about 200,000 teachers.

Teachers' salaries typically increase based upon the acquisition of advanced degrees and teaching experience. The "quit rate" for teachers is higher for new teachers than those with over 10 years of experience, in which the rates remain stable. Lankford, Ochshorn, and Wyckoff explain that the extent to which there will be savings associated with boomer-teachers retiring depends upon whether the "boomer bulge" dissipates before teachers reach retirement, which in turn is dependent upon quit rates. The quit rates also influence the salary expenditures, and thus, savings. To extrapolate school budgets from 1994–95 to 2003–04, average quit rates were applied to each teacher. Although the baby-boom cohort is not completely dissipated by 2003–04, these retirements do not result in substantial salary savings in most school districts.

Lankford, Ochshorn, and Wyckoff also consider what would happen if school districts were to offer early retirement incentives to teachers. Past experience suggests that the incidence of retirement among those eligible only rose 4 percent. Even assuming an increase in the quit rate of 25 percent, the change in median salary is only about 0.7 percent lower. They concluded that there seems, at best, to be only modest savings from retirements.

Helen F. Ladd, from Duke University, examines how school districts have responded to fiscal constraints in the past, in order to gain insight into how they might respond in the future. Ladd presumes that school districts will face a less sanguine financial future as a result of projections of higher enrollment, a slower economy, and increasing competition for funds at the local and state level. In her paper, she uses cross sectional data for Texas and New York to develop a measure of fiscal condition for each school district. She then examines the choices made by school districts facing differing degrees of financial hardship.

When she refers to the fiscal condition of a school district, Ladd means the gap between a district's capacity to raise revenue for education and its "expenditure need." Both capacity and need are outside of the immediate control of local school officials. In contrast to simpler methods of measures of fiscal condition, that only measure the ability to raise revenue, the fiscal condition she refers to also captures the fact that some

[2] The recent change in TIAA-CREF's tax status now permits it to offer such portable plans to elementary-secondary school teachers, and may transform these features of teachers' employment.

districts must spend more money per student to attain a given level of educational services. Although Ladd describes that fiscal condition can be measured in two ways, the simple way is to calculate how much revenue the district would generate per pupil if it taxed that base at a similar tax rate. A more complex method, not employed here, would require information on the composition of the tax base in each district, and how much of the tax burden on each type of property is shifted to nonresidents.

Ladd also devises her own cost adjustment, which includes eight variables: the percentages of students who are in special education programs, have limited English proficiency, are economically disadvantaged, and are in secondary school; the square of the logarithm of student enrollment; a cost-of-living index; and an indication of a school district being in a rural area. She uses these to determine the "expenditure need." Her resulting fiscal condition measure ranges form -0.31 to +0.93 across 993 Texas school districts, which is a relative measure. On average, stronger fiscal condition is associated with higher cost-adjusted per pupil spending on education. Using this measure of fiscal condition, Ladd then turns to examining how it affects the school district budget allocation and staffing decisions in Texas.

Using a regression, Ladd examines how budget shares or staffing patterns are affected by a district's fiscal condition, controlling for other determinants, such as district size, personal income per pupil, and the percentage of students from economically disadvantaged households. She finds that fiscally constrained districts respond by trying to protect the level of instructional spending, that central administration spending and staffing appear to be a luxury that is more affordable for districts in strong fiscal condition, and that spending on capital outlays is more responsive than other categories to a district's fiscal condition. Annual shortfalls in capital spending and maintenance in response to an extended period of fiscal constraint are likely to leave some districts with serious deficiencies in their capital facilities.

Dale Ballou, from the University of Massachusetts at Amherst, examines how urban school districts compare to other school districts, particularly since the performance of urban school systems seems to compare less favorably with other school districts (Lippman, 1996). His paper relies upon contrasting urban schools with schools in suburban and rural communities. Although he considers systematic differences unfavorable to urban schools as indicative of inefficiency, he does not consider this methodology conclusive.

Ballou first examines the percentage of resources devoted to instruction for urban schools versus others, and finds virtually no difference. Much to his surprise, urban school systems actually devote a smaller share of current expenditures to administration, almost 15 percent less than rural districts. Concerned about accounting differences, Ballou also examines staffing patterns, and confirms that urban schools staff similarly to other schools (although aides create a slightly higher proportion of teaching staff). Poorer districts employ more teachers relative to administrators and total staff, undoubtedly to serve the high proportion of disadvantaged students.

Since urban districts are larger than other school districts, Ballou tests whether the lower spending on administration is the result of economies of scale. An inverse relationship between enrollment and administrative share presumably reflects economies in administrative operations. Using a regression that controlled for the community's demand for school services, as well as the educational needs of the school-age population, confirmed that urban systems spend proportionately less on administration, but not as a result of economies of operation. In other words, urban school districts exceed the size necessary to realize scale economies (about 5,000 students). Ballou finds that there are few scale economies for urban

schools. Increasing mean school size by 100 students saves urban districts only $14, on average.

Turning to non-teaching faculty, Ballou finds that class sizes in urban secondary schools are unusually large, suggesting that faculty in urban schools are diverted from teaching more so than elsewhere. Utilizing the NCES Schools and Staffing Survey (SASS), teacher absenteeism is a greater problem in urban schools than elsewhere, particularly for schools with higher percentages of poor and minority students. Ballou also examines excessive bureaucratization, and finds that urban districts finance a significantly higher share of instructional expenditures from categorical aid, and that this is not due to higher concentrations of students in poverty.

This suggests that regulations and oversight that accompany such funding may constrain local decision makers.

Examining the responses of urban principals in the 1993–94 SASS regarding their influence over curriculum, hiring, discipline, and the budget, Ballou concludes they have less influence than do their suburban and rural counterparts. In addition, principals' managerial prerogatives are constrained by decisions taken at higher administrative levels. Nearly half of urban school systems offer parents some form of school choice, (e.g, magnet schools, or choice of school within or outside the district); many parents choose such options rather than non-urban school districts. However, these participation rates are very low.

Finally, Ballou appraised teacher compensation. Urban districts are slightly more likely to use incentives to recruit teachers in subjects where there is a shortage of qualified instructors, to staff positions in undesirable locations (such as high crime, high poverty, inner-city neighborhoods), or to reward merit. Almost 14 percent of urban teachers work in systems that give them "battle pay." Thirty percent of urban teachers receive incentives to teach in shortage areas. Merit pay if far more of a factor in private schools that it is in public, with larger and more recurrent merit pay awards.

James W. Guthrie, a professor of education and public policy at Peabody College, Vanderbilt University, challenges the conventional manner in which public elementary and secondary schools are financed through the school district, and suggests that these mechanisms be altered to empower individual schools. Guthrie argues that America's public education system has evolved governance and finance arrangements which are inappropriately or inadequately aligned with arenas of action. The way Guthrie frames this argument is to explain that state legislators, and governors, and local school board members and their superintendents have decision-making authority and can be held accountable, but do not actually operate schools or provide instruction, and have remarkably little ability to influence those who do. Conversely, the principals and teachers who actually operate schools have little formal authority, or control over school budgets. Guthrie argues this is the unintended result of numerous well meant educational reforms.

One problem is the size of educational institutions. Although 90 percent of local school districts in the nation enrolled 5,000 or fewer students in 1990, 50 percent of students were enrolled in only 5 percent of the nation's school districts. These large districts include New York, Los Angeles, Chicago, Washington, DC, and Dallas. Central city school board members in New York and Los Angeles represent a million constituents. Guthrie recounts that the progressive movement caused big city school districts to replace ward-based elected school boards with central city boards, often appointed. Although corruption was diminished, greater authority came to rest in the hands of fewer individuals. Desegregation and federal and state categorical aid programs funded under the 1995 Elementary and Secondary Education Act (ESEA) resulted in a proliferation

of special programs and a substantial increase in special program administrators.

The changes described by Guthrie caused district-level decision-making to become remote, diffuse, and divorced from the operating authority of schools. Second, it is difficult for a principal and her staff to not be second-guessed by a higher authority. Third, the proliferation in decision makers has led to an enormous set of rules by which schools must operate. This, in turn, has led to everyone and no one being in charge.

State finance mechanisms, Guthrie argues, reinforce these existing dysfunctional relationships and big city budgeting procedures exacerbate the problem significantly. It is the local school district which is fiscally accountable, not a school. Guthrie only condemns the largest school districts, which often rely upon formulaic or mechanical budgeting procedures, often in the name of equity, which may well harm equity in the process. For example, teachers are allocated by the number of students enrolled, as are materials. Support staff may be allocated the same way, for example, one vice principal for every 500 students.

Guthrie explains that two schools of the same size and student body composition may receive different dollar allocations because teachers' salaries and benefits are usually determined by seniority and training. The highest paid teachers typically earn twice what the entry-level teacher earns. In addition, senior teaching staff usually are afforded the opportunity to choose their school assignment. Guthrie reports data from two states with school-level finance data that suggest that the classroom expenditure differences may exceed $25,000 per classroom. Secondary schools spend more than elementary schools.

As an alternative, Guthrie discusses school-based management, charter schools, contracting with private sector firms, and vouchers. He suggests that politically, these systems are very difficult to attain. The technical side is far less complex. Revenue, Guthrie suggests, should follow a child, wherever he attends, and should be conceived of as belonging to the schools. The revenue should contain virtually the full cost of educating pupils (including capital costs), and be highly fungible (able to be spent on anything). Finally, schools should be permitted substantial discretion in purchasing.

Guthrie concludes that 90 percent of funding should pass through district offices and be allocated to operating school sites. He then concludes by imagining three scenarios in 2010.

Catherine Clark and **Laurence A. Toenjes** of the Texas Center for Educational Research in Austin attempt to use a simulation to implement Guthrie's suggestions. Clark and Toenjes acknowledge that despite the belief that formula funding is fairer, there are wide disparities of per-pupil resources reported among schools in large districts. They use Texas data to explore expenditure patterns among districts and campuses under current law. They then simulate the results of pre-established allocation percentages, and conclude with a summary of issues and problems related to the school-based funding approaches.

Clark and Toenjes find that roughly 60 percent of operating expenditures are related to instruction, and that 93 percent goes for payroll. In 1994–95, roughly two-thirds (68 percent) of total current operating expenditures are allocated to schools, mostly in the form of personnel assignments and supplies. Clark and Toenjes also examined the operations expenditures for the largest districts in Texas. Interestingly, 71 percent are tied to the school, with the highest percentage being 75.3 percent. They conclude that no school district was currently passing on 90 percent of revenue to schools. Moving to Guthrie's suggestion of 90 percent of resources to schools would result in $15.4 billion flowing to schools. School operations expenditures would increase by 32.6

percent, representing an additional $1,290 per students. Resources at the average school would rise to about $4,692. The effect on administration and support services would be dramatic, with schools having to undertake many of those activities. Clark and Toenjes suggest a gradual phase-in of such a proposal.

In Texas, Clark and Toenjes find that teacher salaries are only weakly related to years of experience. Apparently Texas school districts offer high salaries for recruiting purposes, and as incentives. In addition, the last decade has brought salary compression, with teachers reaching the top of the salary guide within a decade. Texas teachers also do not participate in collective bargaining. However, at the school level, teacher salaries and school resources are highly correlated.

Clark and Toenjes then go on to try to formulate and simulate a "campus foundation program" (CFP). Based on state aid formula elements for the 1996–97 school year, the statewide average CFP would be $4,007. This is about 78 percent of resources flowing through the local school district to its constituent schools. They also simulate a block-grant plan.

The two approaches explored by Clark and Toenjes are, they admit, sketchy and fail to account for many important features of school finance systems, such as facility funding; educator salaries, retirement, and benefits; tax rate limitations; unequalized local revenue; transportation revenues; and federal funds and programs. The raise several difficult issues with school-level funding. One issue is the scant preparation of school personnel in managing public funds. A second issue concerns how hiring and compensation of professional staff would be undertaken. A third issue is whether empowering 84,705 public schools in the nation will actually prove to be more efficient that funding 14,400 public school districts.

New Developments

The commissioned papers published here are but one aspect of the continuing efforts of NCES to provide relevant fiscal data and promote issues and analyses of interest to the public and the education finance research community. In partnership with the American Education Finance Association (AEFA), NCES also provides a "research initiative" to encourage a handful of beginning scholars to undertake research in education finance.

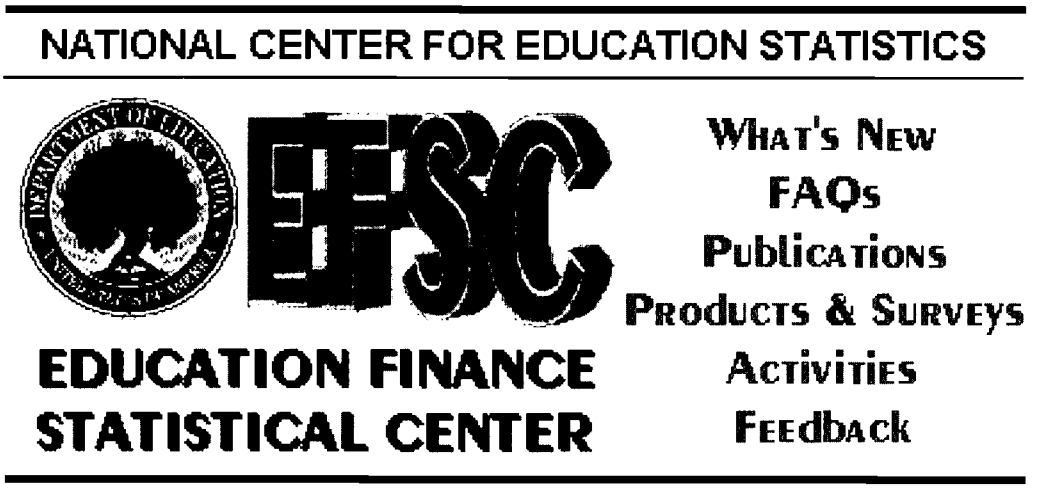
For academic researchers, as well as the public at large, who may have questions about education finance, I encourage those with Internet access to visit the URL

http://nces.ed.gov/edfin

which is the NCES web page for education finance. Although it is always changing, a copy in its present form is presented in Figure 1. From this site, individuals can order a CCD CD-ROM with state finance data and school district finance data. NCES hopes to add all the functions now residing on the CCD CD-ROM to the web page, so that individuals can choose the web or the CD-ROM to access data. Browsers can also obtain graphics, publications, geographic or inflation cost adjustments; download specific data sets; obtain data updates; and email questions to NCES staff. NCES is always interested in how the web page for education finance might better assist our customers, and welcomes comment and suggestions.

Those interested in education finance should be aware of proposals by the Governmental Accounting Standards Board (GASB) to substantially change accounting for governmental units, including school districts, as early as June 15, 2000. GASB is

Figure 1.—EFSC web site at http://nces.ed.gov/edfin



contemplating the use of an "entity-wide" perspective that would capture many revenues and liabilities currently not recognized when reporting the financial condition of a public school system. GASB is also contemplating requiring the use of depreciation in governmental accounting as early as June 15, 2003. These changes will influence NCES financial surveys, require a new NCES accounting handbook, and revolutionize the reporting of statistics for education finance. Those interested in obtaining more information should call GASB at (203) 847-0700. NCES will also post updates on its education finance web page.

Congress has urged NCES to develop a model for reporting finances at the school level for the nation's 84,705 elementary and secondary public schools. Traditionally, school finance information is held at the school-district level, and only eight states now report school-level finance data. When financial data are reported at the school level, those revenues and expenditures are estimates derived from school district records. There are many ways to estimate school-level financial data, and NCES is evaluating the most promising approaches, with the potential of developing a parsimonious synthesis. NCES also plans to utilize the National Cooperative Education Statistics System to enable and assist states in devising financial reporting systems at the school level. There are several potential strategies NCES is employing to collect and report school-level financial data for the nation, including adding to the School and Staffing Survey (SASS), becoming a "repository" of extant school-level financial data, including proprietary data, and experimental electronic collections, termed "data harvesting." A report to Congress should soon be released by NCES, and will be available on the NCES education finance home page.

Perhaps the most exciting and challenging work NCES has underway in education finance is to attempt to develop a student-level resource measure that could be used as a component in NCES surveys of students, such as the National Educational Longitudinal Survey (NELS), which followed students in 8th, 10th, and 12th grade. The progeny of NELS is the Early Childhood Longitudinal Survey (ECLS), which will follow students from kindergarten through 6th grade. NCES aspires to develop a student-level resource measure as a component of ECLS. Such information would permit the education finance research community to answer equity questions, such as whether poor students receive the same (or greater) resources than other students in a school. It would also permit the evaluation of whether a student who is entitled to specific resources, such as handicapped, bi-

lingual, or compensatory education, actually receives the additional resources which they were intended to receive. Such information may also address questions of resource effectiveness and cost-effectiveness.

The Dynamics of Teacher Salary Expense

Hamilton Lankford, Peter Ochshorn, and James Wyckoff
State University of New York
University at Albany

About the Authors

Hamilton Lankford is Associate Professor of Economics and Public Policy at the State University of New York at Albany. He received his Ph.D. in Economics from the University of North Carolina at Chapel Hill, and was a dissertation fellow at the Brookings Institution. Professor Lankford's current research focuses on the economics of education. He has collaborated with Jim Wyckoff on a series of projects examining public/private school choice and the allocation of school expenditures. He was awarded an NSF/ASSA/Census Fellowship to examine the effects of school choice and residential location choice on the racial composition of urban schools. He is also engaged in research examining the implicit subsidy to school districts from the property tax deduction on federal and state income taxes.

Peter Ochshorn is an economics consultant. Peter received his Ph.D. in Economics from the University of Michigan. Prior to his consulting career, Dr. Ochshorn was Assistant Professor of Economics at the State University of New York at Albany and was an economic researcher at the New York State Department of Taxation and Finance. Dr. Ochshorn specializes in econometrics and is the author of several articles that apply econometrics to various substantive areas.

James Wyckoff is Associate Professor of Public Administration and Policy and Economics at the State University of New York at Albany. He received his Ph.D. in Economics from the University of North Carolina at Chapel Hill. Professor Wyckoff's research is focused largely on the economics of education. Over the last several years, in collaboration with Hamp Lankford, he has pursued two lines of research. The first addresses issues of public and private school choice, examining factors relevant to these choices and how these choices affect the racial and economic characteristics and the academic quality of students in public and private schools. The second area of research examines how public schools allocate resources. This work explores changing resource allocations over time, with particular focus on teacher compensation and special education. It is from this research that the chapter in this volume is drawn.

Selected
Papers in
School
Finance

The Dynamics of Teacher Salary Expense

The Dynamics of Teacher Salary Expense

Hamilton Lankford, Peter Ochshorn, and James Wyckoff
State University of New York
University at Albany

Introduction

Much has been made of the budgetary impact of the so-called baby boom enrollment echo on school districts. It is estimated that the nation will need an additional 190,000 teachers by the year 2006 and that to maintain current service levels public schools will need to spend an additional $15.1 billion dollars just to keep pace with increasing enrollments.[1]

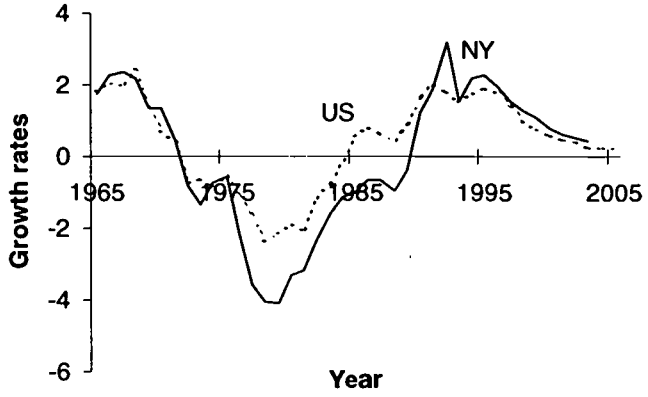
Indeed, over the period from 1985 to 2005 enrollments in elementary and secondary schools are estimated to increase by just under 25 percent, with most of this growth occurring before 1997. Figure 1 shows the annual enrollment growth for the United States over the 1969–2005 period. From 1970 to 1984 U.S. enrollments fell, reducing fiscal pressure in many school districts. Since 1984, fiscal pressure has been increasing, with growth rates peaking during the mid-1990s.[2] Although growth rates are expected to decline somewhat during the late 1990s and early next century, enrollment increases and the accompanying budgetary pressure will continue. Although school district budgets do not increase proportionately to enrollment increases, research indicates that there are few economies of scale with respect to enrollment increases. Thus, enrollment increases are a real and sizable source of concern for many school districts.

Another, less noticed trend has the potential to offset the fiscal effects of increased enrollment. In many school districts, teachers who were hired to teach the students from the baby boom have recently begun to retire. These retirements will continue over the next 10 years. As these teachers retire, they will be replaced with new, substantially lower paid teachers. Figure 2 shows the experience dis-

[1] U.S. Department of Education (1996).

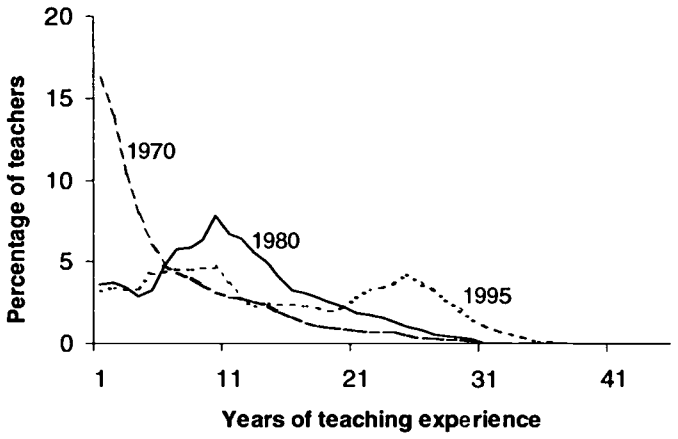
[2] For a detailed analysis of the effect of school district enrollment trends on school district budgets in the U.S., see Hanushek and Rivkin (1996). Grissmer and Kirby, in a series of papers, analyze teacher supply in Indiana and the nation (1987, 1991, 1992, 1993). For an analysis of these trends in New York, see Lankford and Wyckoff (1995).

Figure 1.—Annual school enrollment growth rates for the United States and New York



SOURCE: U.S. Department of Education, National Center for Education Statistics, Digest of Education Statistics 1995 and Projections of Education Statistics to 2006.

Figure 2.—Years of teaching experience of New York state teachers



SOURCE: Based on calculations by authors using New York State Education Department Personnel Master File (NYSED PMF).

tribution for all New York state teachers in 1970, 1980, and 1995.[3] The 1970 spike of teachers with 1 to 5 years of experience hired in response to the baby boom enrollment surge gradually worked its way through the system. By 1995, the cohort of teachers with 20 to 30 years of experience (veterans) accounted for one-third of all teachers in New York. Teachers with similar experience in 1970 accounted for only 6 percent of all teachers. This is a dramatic shift in the experience distribution of teachers.

The aging teacher workforce offers the potential for substantial salary savings. An example of a district's salary schedule is shown in figure 5. Since teacher salaries are largely determined by experience in the school

[3] Information on the age distribution for a national sample of teachers is provided by the Schools and Staffing Survey (SASS). In addition, there is limited age information provided by the American Federation of Teachers regarding the teachers in its unions. The information from both sources is consistent with that provided for New York State. For example, information from the SASS (U. S. Department of Education, 1996a) indicates that the average age of teachers has increased between 1987–88 and 1993–94. In addition, the portion of New York teachers who are at least 50 years old is only slightly greater than the national average. Many school districts across the United States find themselves with an aging workforce in which a large number of teachers are at or near retirement.

district, the cohort of aging teachers represents a substantial portion of school district salary expense. Table 1 shows the salaries paid to entry level teachers and teachers at the top end of the experience distribution for the United States and New York. As the veteran teachers retire, their replacements will earn from $15,000 to $30,000 less. With such a large percentage of the teacher population in this cohort, the potential savings are substantial.

In this paper we examine the potential salary savings from teachers aging through the experience distribution and compare this to the salary costs associated with the increasing enrollment from the baby boom echo. In general, we find that few districts are likely to experience meaningful salary savings as a result of the retirement of the baby boom cohort of teachers. Thus, the increasing enrollments of the baby boom echo are likely to continue to force difficult decisions in most school districts.

Teacher Retirement

The literature on teacher retirement generally examines two issues—work describing the structure of teacher retirement programs[4] and statistical models of the factors relevant to the retirement decisions of teachers.[5] Through the collective bargaining process, teachers have won generous retirement increases over the last 20 years. Until recently, the vesting requirements and a lack of portability of many of these plans had the effect of tying teachers to particular districts. During the period of declining enrollments from 1970 until the mid-1980s, many districts employed early retirement incentive programs to replace highly paid veteran teachers with entry level teachers. While the research regarding retirement programs provides a useful understanding of teacher retirement policies, the analysis is largely descriptive and aggregative. It is not intended to examine the behavioral responses to policy changes.

Statistical models of teacher quits typically employ data for a sample of teachers over time to understand the individual and school-level variables that cause some teachers to leave teaching. This work largely focuses on teacher retention during the early years of teaching careers, rather than factors relevant to retirement decisions.

The Dynamics of Teacher Salary Expense

Teacher compensation in most districts is based on salary schedules in which salaries largely reflect teacher in-district experience and educational attainment. Thus, total teacher salary expense is determined by the number and education-experience distribution of teachers[6] together with the salary matrix. The number of teachers is given by the desired student-

Table 1.—Teacher salary structure

	Entry level	Veteran
United States	$23,956	$40,517
New York	30,289	56,125

SOURCE: U.S. salary information comes from U.S. Department of Education (1996a) and reflects 1993–94 averages for public school teachers with a master's degree and no experience and highest step of the schedule. New York information from the New York State Education Department Personnel Master File (NYSED PMF) represents state averages in 1994–95 for the same categories.

[4] Examples of this type of research include Auriemma, Cooper, and Smith (1992), and Tarter and McCarthy (1989).

[5] Recent examples include Brewer (1996), Theobald and Gritz (1996), Mont and Rees (1996), and Murnane and Olsen (1990).

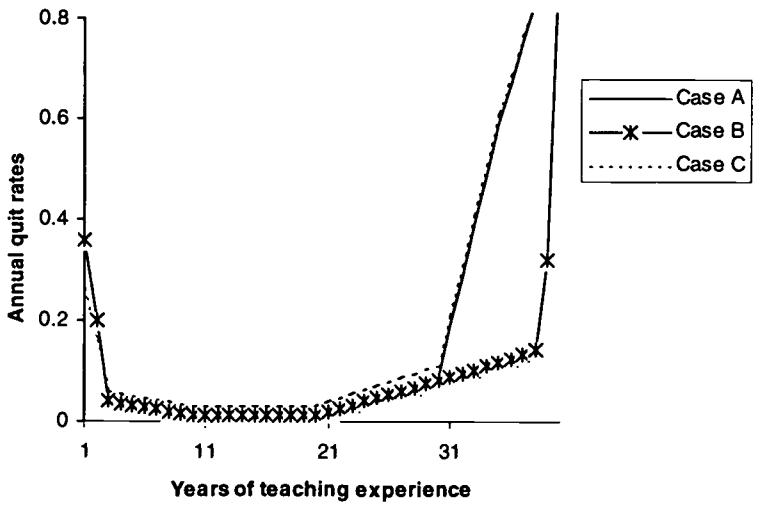
[6] Although teachers in a district receive compensation associated with other factors, such as extra-curricular activities, their salaries largely reflect their educational attainment and years of experience.

teacher ratio and enrollments. Throughout the following analysis we take student-teacher ratios as given by the actual district level value for historical years (1987–88 through 1994–95), and we assume the 1994–95 values hold constant through 2003–04 when making projections. With regard to the salary matrix, we assume that the rewards to experience are as given in the 1987–88 salary matrix for each district.[7] As we age and replace the teaching workforce, we assume that the education levels of teachers in each district remain constant throughout.

Within a district, our analysis turns on two variables, enrollment changes and an aging teacher workforce. Enrollment changes directly affect the number of teachers hired. An aging workforce produces higher salaries as teachers move up the salary schedule. It also produces teacher quits which produce salary savings through the substitution of new teachers for veteran teachers. The analysis of changing enrollments is straightforward. For example, increasing enrollments in any given year lead to new hires, who then begin to work their way through the salary schedule.[8] Understanding the effects of the evolving teacher experience distribution is more complicated.

How the experience distribution of teachers changes over time is a function of teacher quit rates, the initial experience distribution, and whether the total number of teachers changes. A district's annual quit rate for teachers in a particular experience category is defined to be that proportion of the teachers who retire, resign or are terminated in a year.[9] The three hypothetical cases shown in figure 3 illustrate several features typical of teacher quit rates. Quit rates are relatively high for new teachers. After declining over approximately

Figure 3.—Examples of quit rates, by years of teaching experience



SOURCE: Hypothetical cases constructed by authors.

[7] Alternative assumptions (e.g., using the 1994–95 salary schedule for experience) has almost no effect on the results.

[8] A portion of the initial new hires quit and are replaced by other new hires. Others continue teaching, thereby gaining experience and higher salaries. It follows that the salary expenditure associated with the teachers hired to teach the additional students will increase over time as these teachers move through the experience distribution.

[9] Quit rates are defined in terms of separations from a particular district. Alternative measures could be based on individuals leaving teaching altogether, leaving the public sector, or leaving the public sector, in a particular state. The appropriate definition depends upon the questions of interest. Since salary schedules in individual districts are based on in-district experience, and we are interested in budgets at the district level, district-level quit rates are employed in this analysis. To allow for the common practice of teachers taking leaves of absence, a quit is operationally defined to be a teacher not returning to teach in the district within 3 years. In reality, the rates at which teachers in a district quit will be subject to random fluctuations. The deterministic quit rates represent average quit patterns.

the first 10 years of teaching, the rates remain relatively constant over a range of years and then rise.[10]

When the total number of teachers in a district is constant over time, the number of teachers quitting at a point in time determines the number of new teachers that must be hired. Thus, the number of replacement teachers needed depends upon the initial experience distribution and teacher quit rates, since these determine the number of quits. For example, with a large number of highly experienced teachers having relatively high quit rates, the number of replacements will be larger than if the experience distribution is such that the bulk of teachers are in stages of their careers where quit rates are relatively low (i.e., the middle range of experience). In general, the number of new hires in a year together with the number of returning teachers in each experience category imply the new experience distribution.

Figures 4a and 4b show the hypothetical case of a district initially having the experience distribution labeled "year-00". This is the actual experience distribution for all New York public school teachers in 1970, and is roughly characteristic of the experience distributions found in districts across the county at the end of the baby-boom era. Consider how the experience distribution would change over time for the case where the total number of teachers hired remains constant and annual quit rates were as represented by case-C in figure 3. Those teachers hired around year-00 who continue to teach (i.e., the year-00 cohort) have a marked effect on the teacher distribution in subsequent years. This is certainly true for the distribution in year-10, although the relatively high quit rates for inexperienced teachers have altered the shape of the distribution of teachers who remain from the year-00 cohort. Between years 10 and 20 the "boomer" cohort continues to move through the experience distribution, with no change in the shape of the bubble, and only a modest reduction in its size. This results from teachers in this range of experience having quit rates which are both relatively constant and low. As shown in figure 4b, the change between year-20 and year-30 is more marked as a result of those remaining from the "boomer" cohort having experience levels such that quit rates are relatively large and increasing.

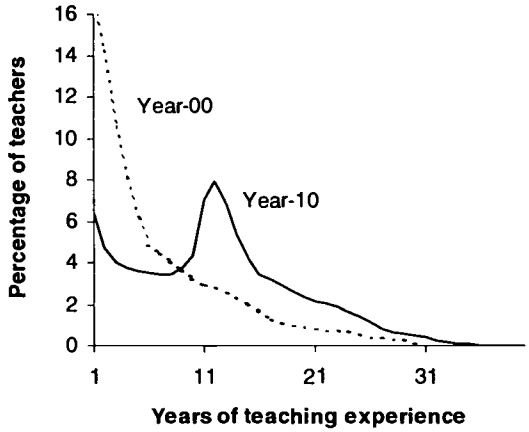
The dark solid line in figure 4b shows the asymptotic distribution of experience. "Asymptotic" is used to describe this distribution since the actual experience distributions of the district asymptotically approach this distribution over time, provided that the total number of teachers and the set of quit rates remained unchanged.[11] Higher quit rates, especially for low levels of experience, would result in faster convergence. As is shown in figure 4b, the evolving experience distribution is relatively close to the asymptotic distribution even as the last of teachers in the year-00 cohort reach retirement. Once achieved, the asymptotic distribution would be self perpetuating; at each experience level, the number of teachers employed in year t+1 would be the same as the number employed in year t.

Even if the set of quit rates were constant over time, changes in the total number of teachers—due either to enrollment changes or changes in pupil-teacher ratios—would "shock" the system, thereby perturbing the convergence to the asymptotic distribution.

[10] This pattern has important implications. For example, the quit rates for case A in figure 3 imply that only 42 percent of those teachers newly hired will be teaching in the district after 10 years. However, 89 percent of those teachers who have already taught in the district for 10 years continue to teach there another 10 years. For teachers with 20 years of experience, 61 percent continue to teach another 10 years.

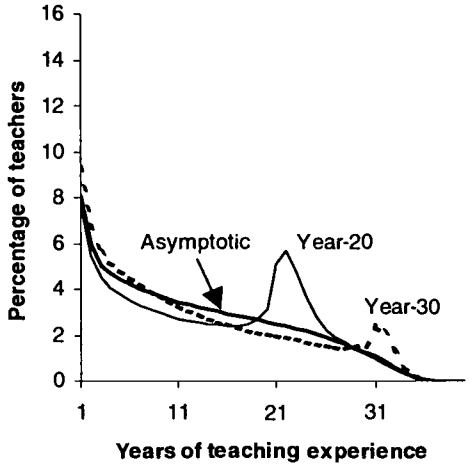
[11] It is possible that convergence will not occur. Consider the case where there is a zero quit rate for all teachers having less than T years of experience and a quit rate of one at experience level T. In this case, any bulges in the experience distribution would cycle through unchanged over time. In contrast, non-zero quit rates over a wide range of experience levels have the effect of "stirring-up" the distribution, resulting in bulges being dissipated and the actual experience distribution converging to the asymptotic one. The dampening of the "boomer bubble" is clearly seen in figures 4a and 4b.

Figure 4a.—Teacher experience distributions over time



SOURCE: New York State Education Department Basic Education Data System (NYSED BEDS), 1970, and simulation by authors.

Figure 4b.—Teacher experience distributions over time



SOURCE: Simulation by authors.

What is relevant here is that the experience distribution subsequent to a shock will evolve over time following a pattern dictated by the initial distribution of quit rates.

As a result of the experience distribution changing over time, the total expenditure on teacher salaries in the district will typically change even if the total number of teachers in a district and its salary schedule are constant. Reconsider figures 4a and 4b, which provide snap shots of the evolving experience distribution. This along with the salary schedule shown in figure 5 implies the pattern of average salaries shown in figure 6.

If the asymptotic experience distribution had been in place in year-00, average salary expenditure would have remained constant at $33,068 through time, shown by the horizontal line in figure 6. However, as a result of the relatively large cohort of new teachers hired just prior to year-00, the average salary expenditure of $28,771 in year-00 is 13 percent smaller. How average salaries change as this cohort retires is more pertinent here. In the simulation, salary expenditures in year-30 are almost 5 percent lower than that associated with year-20, even though the number of teachers remains unchanged. A comparison of the experience distributions for these years in figure 4b reveals why. Many of the

teachers having 20+ years of experience and salaries exceeding $40,000 in year-20 are replaced with inexperienced teachers having salaries of approximately $25,000 in year-30.

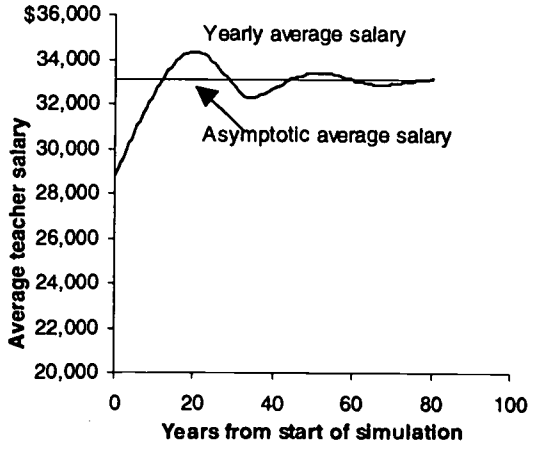
The example demonstrates how teacher retirements can lead to reductions in salary expenditures. Savings occur after the average salary initially over-shoots its asymptotic value. The extent to which there are savings will depend upon the experience distribution in place as the boomer cohort approaches retirement, the set of quit rates (e.g., the rates at which they retire), and the salary schedule in place. Before considering these factors, it is pertinent to note that the experience distribution at any point in time reflects past quit rates.

Both experience distributions shown in figure 7 were generated with the initial experience distribution in year-00 shown in figure 4a. The cases differ as a result of assumed differences in quit behavior, represented by cases A and C in figure 3. Because of the cumulative effect of higher quit rates, figure 7 shows that relatively fewer teachers are close to retirement in case C. It follows that any subsequent salary savings associated with retirements will be smaller, other things equal. Again, this results from the high quit rates dissipating the bulge more quickly, which in turn reduces the extent to which the average salary overshoots and subsequently falls. In terms of the situations currently faced by public school districts, the extent to which there will

Figure 5.—Example of a district salary schedule

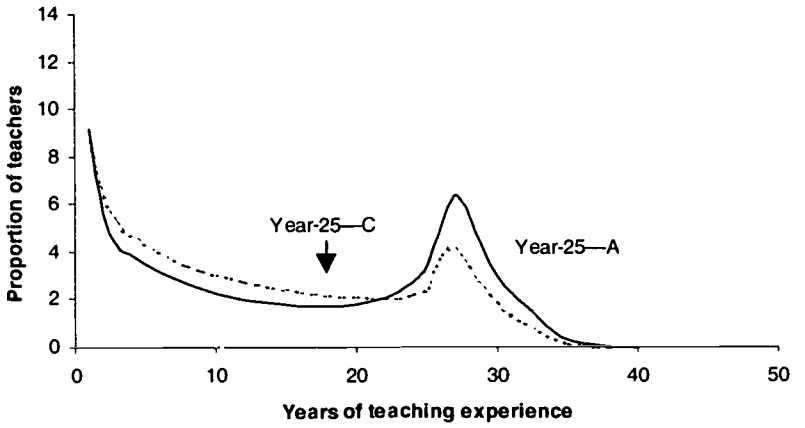
SOURCE: Hypothetical case.

Figure 6.—Average yearly and asymptotic (real) salaries



SOURCE: Simulation by authors.

Figure 7.—Experience distributions resulting from quit rates A and C



SOURCE: Simulation by authors.

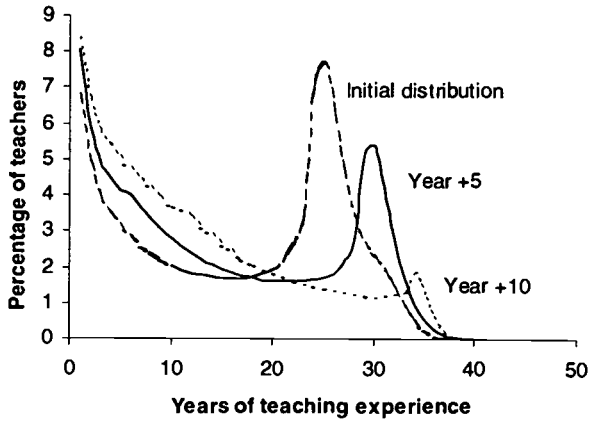
be savings associated with boomer-teachers retiring depends upon the extent to which the boomer bulge dissipated before the teachers reached retirement, which in turn depends upon quit rates.

For a given experience distribution in place at a point in time (e.g., year-25), quit rates also have a direct effect on the extent to which total salary expenditures fall in subsequent years. Suppose that the current experience distribution is as shown in figures 8a and 8b. The experience distributions for the two cases in 5 and 10 years out differ as a result of differences in quit rates, cases A and B, in figure 3, respectively. The sets of quit rates are the same for teachers having no more than 20 years of experience. The retirement pattern in case A corresponds to the case where few teachers teach beyond 30 years. In case B, relatively more teachers continue teaching beyond that experience level. As shown in figure 8a, the relatively higher rates of retirement in case A result in the "boomer bulge" dissipating more quickly. This has important implications for the change in salary expenditures. Figure 9 shows how the average salary expenditures in both cases would change over time.

Over the first 10 years, salary expenditures in case A fall at a rate of approximately 1 percent annually. The expenditure reduction in case B is smaller so that by the end of 10 years annual salary expenditures for case A are over 5 percent lower than for case B. This would be expected for the early years given that the retirement of the boomer cohort is more concentrated in case A. To some extent the savings due to the retirements in case B are only delayed. Annual salary expenditures continue to fall between years 10 and 15 in case B but bottom out and then rise slightly in case A. However, it is striking that at each point in time the average salary for case A is either approximately equal to or below that for case B. Even though the initial experience distribution is the same in the two cases, the interaction of this distribution with the two sets of quit rates leads to accumulated salary savings that are systematically different.

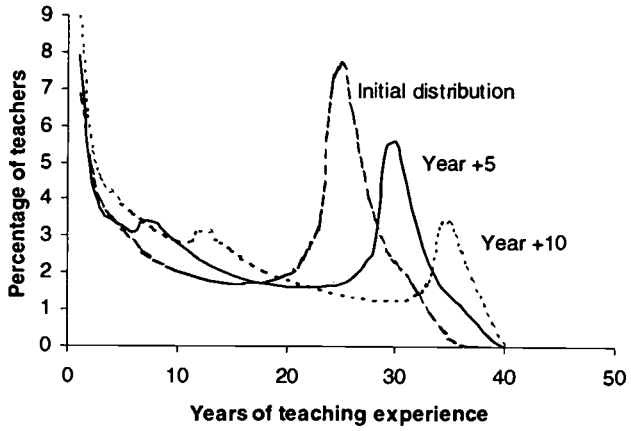
The horizontal lines in figure 9 show the average salaries for the asymptotic experience distributions implied by the quit rates in cases A and B. The average salary in case A is lower than that in case B by approximately $500 as a result of quit rates for teachers approaching retirement being relatively higher in case A; the higher quit rates imply an asymptotic experience distribution with relatively fewer experienced teachers. A less obvious result relates to the short-run salary difference. For much of the initial 15 year period, average

Figure 8a.—Simulated distributions of experience: Case A



SOURCE: Simulation by authors.

Figure 8b.—Simulated distributions of experience: Case B



SOURCE: Simulation by authors.

teacher salaries in the two cases differ by more than the asymptotic salary difference, due to the dynamics of the salary adjustments process in the short-run. For example, after 10 years average teacher salaries for case A are nearly $2,000, or 5 percent, lower than those under case B.

How salary expenditures change over time also depends upon the salary structure. Consider the situation identical to case A with the exception that the salary schedule is as shown in figure 10, rather than figure 5. With the alternative salary schedule, the reduction in salary expenditures are only half as large.

The above examples have all maintained a constant number of teachers in order to isolate the factors affecting salary expenditures through the "aging" of an existing experience distribution. In each example, new teachers were hired only to replace those quitting. Extending the analysis to allow for an increase in the total number of teachers is straightforward. Suppose that the number of teachers employed increased from N_t in period t to N_{t+s} s periods later. With a fixed salary schedule, the total change in salary expenditures can be represented as follows:

$$S_{t+s} - S_t = N_t\left(\bar{S}_{t+s} - \bar{S}_t\right) + (N_{t+s} - N_t)\bar{\bar{S}}_{t+s}$$

The variable $\bar{S}_{t+s}$ is the average salary in year $t+s$ with the number of teachers held constant at N_t. Thus, $N_t\left(\bar{S}_{t+s} - \bar{S}_t\right)$ has been the focus of the above examples. $\bar{\bar{S}}_{t+s}$ is the mean salary of those teachers hired to increase

the total number of teachers from N_t to N_{t+s}. In the case where s=1, $\bar{\bar{S}}_{t+s}$ equals the salary for starting teachers. When s>1, $\bar{\bar{S}}_{t+s}$ is a weighted average of the salaries in the first s steps of the salary schedule. The weights depend upon the number of "expanders" at each step, either teachers hired to increase the total number of teachers or to replace hired expanders who quit.

Consider case A discussed above with the modification that the total number of teachers increases by 1 percent per year. It can be shown that the salary expense 10 years out associated with the expanders equals approximately seven percent of the total salary expenditure in the initial period. As discussed above, the "aging" of the initial distribution of teachers would result in salary expenditures 10 years out being lower by approximately 10 percent. In this example, the annual salary savings associated with the retirement of the boomer cohort would more than offset the annual expense of increasing the number of teachers for a number of years.

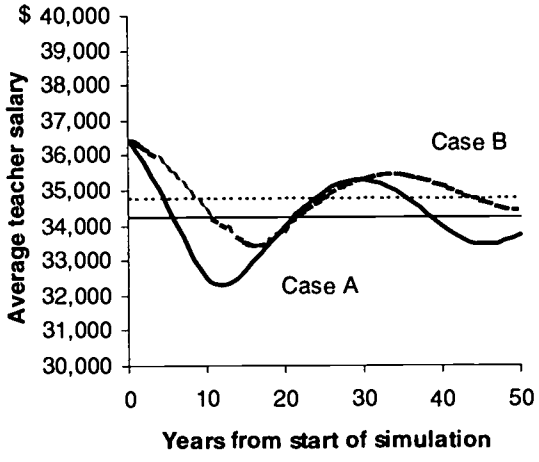
The above examples help clarify the channels through which current trends in student enrollment and teacher retirement could affect school budgets. If the salary schedule and student-teacher ratios remain constant, the net budgetary effect of these trends depends upon a complex interplay of the initial experience distribution of teachers, quit rates and the salary schedule in each district. The remainder of the paper explores how these relationships play out in New York school districts during the period 1987–88 to 2003–04.

Data and Method

The New York state teacher-level data used in this study have been extracted from the Basic Educational Data System (BEDS). The BEDS is an annual census of public school personnel, and provides a snapshot of demographic characteristics, assignments and salaries of teaching and non-teaching staff. Files for the 8 years, 1987–88 through 1994–95, are employed to examine actual behavior historically. Using estimated quit rates, the experience distribution is extrapolated to the year 2005. In a typical year, the file contains data for each of about 200,000 teachers.

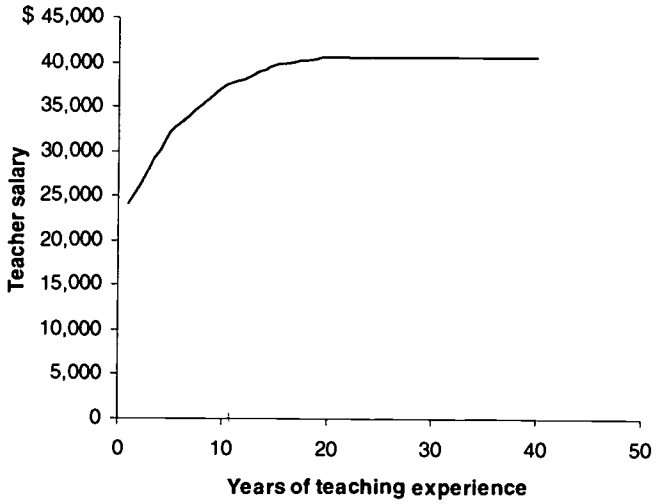
To estimate quitting behavior for extrapolation of the dataset, the files are merged by school district and individual, a quit being indicated if the individual is not present for 3 subsequent years. A quit function by the level of experience in the district is then estimated

Figure 9.—Simulated changes in average salary: Cases A and B



SOURCE: Simulation by authors.

Figure 10.—Alternative salary schedule



SOURCE: Hypothetical case.

for the years 1987–88 through 1991–92, aggregated into seven major location groups: New York City, Rochester, Syracuse, Buffalo, and Yonkers (the large cities), small city and suburban districts, and rural districts. The functions are then averaged and smoothed where necessary using moving averages. As teachers quit and enrollments change, new teachers are hired into the extrapolated districts. To estimate these extrapolated salaries, it is necessary to estimate the total teaching experience outside the district for newly hired teachers. This is done, again by major location group, and averaged over the 8 years of data. For reasons of consistency of the data, 33 school districts involved in mergers or consolidations between 1987 and 1995 have been dropped from the study. To project the number of teachers beyond the year 1994–95, necessary in order to calculate the rate of hiring of new teachers, student enrollment projections are employed (New York State Education Department, 1994). These growth rates, by county, are applied to the teaching staffs of districts in the respective counties, thus implicitly holding teacher-student ratios constant.

In order to control for changing salary schedules, including the effects of price inflation, in the historical record, and to estimate salaries in the extrapolation beyond 1994–95, two salary schedules are estimated for each district: one based on the years 1993–95 and a second for the years 1987–89. The creation of the 1993–95 schedule is illustrative: starting with 692 major districts from 1994–95, 141 have been set aside due to excessive missing values for salary, 70 districts have been removed due to too few teachers (fewer than 30); and 6 districts are not suitable for our salary regression model (below) due to inadequate distribution of experience levels or college degrees among the teachers, leaving 475 suitable districts. The 141 districts with missing salary information are then examined using 1993–94 data. Of these, 41 districts still had missing salaries, 5 have less than 30 teachers, and 2 suffer problems with experience and/or degrees, adding 93 more suitable districts to the first batch, and resulting in a total of 568 usable districts. A regression model of the salary schedule is estimated by district in a manner similar to that employed in Lankford and Wyckoff (1997). The salary structure is fit to a piecewise-linear function of in-district experience, with adjustments for highest degree obtained (the data limited the estimation to BA plus 30 credits; MA; and MA + 30) and for out-of-district experience. The kink points are set at 5, 10, 15, 20, and 25 years of experience, with a constant salary forced

above 25 years. For example, the New York City school district in 1994–95 yields the following: base salaries of $28,319, $29,598 and $34,009 for BA+30, MA, and MA+30 degrees, respectively; plus $960 for each year of experience up to 5 years (the first year counts as 1 year of experience); plus $1,270 for each additional year up to 10 years; plus $918 per year up to 15; plus $759 per year up to 20; plus $454 per year up to 25 years; and finally an additional $550 for each year of prior experience teaching outside of the district.

To control for the effects on district school budgets of changing salary schedules, in order to better view the effects of the changing distribution of experience, a fixed district salary schedule is used to estimate the teaching budget for each of the years 1987–95. To control for the changing number of teachers, in order to ask what might have happened to the budget were the number unchanged, the newly hired and returning teachers are apportioned to the category of "replacer" or "expander," according to the number of teachers leaving the district. The full-time-equivalent (FTE) of each entrant is divided proportionately in this way. A leaving "expander" was always replaced by another "expander."

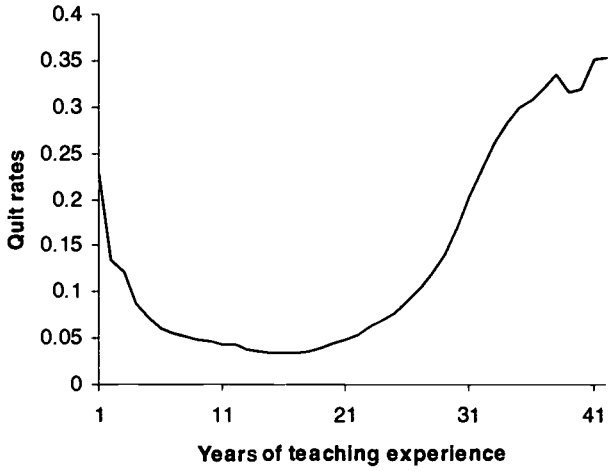
To extrapolate school budgets from 1994–95 out to 2003–04, average quit rates are applied to each teacher FTE. Growth rates are used to calculate the FTE deficit to be made up of created new hires with average characteristics. New FTEs are apportioned between those replacing quits and those expanding the number of teachers. Thus the effect of expansion of the teaching staff can be separated from changing distribution of experience on the budget, as in the historical analysis. Again, a constant salary structure is used to estimate salaries over time.

Teacher Salary Expense in New York Districts

We have divided teacher salary expense into a component attributable to the aging of the original workforce, including replacement of retiring teachers with new teachers, and a component attributable to increased enrollment. As described above, the salary expense attributable to the aging of the workforce depends on the interaction of teacher quit rates, the teacher experience distribution and the salary schedule. On average, teacher quit rates over the 20–35 year experience range are relatively low (see figure 11), and the teacher experience distribution moves a significant number of teachers through relatively steep portions of the salary schedule. Although the baby boom cohort largely works its way through the system by 2003–04 (see figure 12), these retirements do not result in substantial salary savings in most districts.

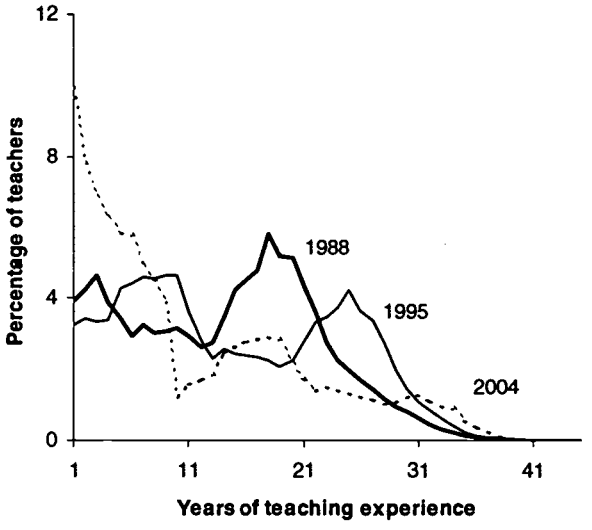
In fact, over the 1987–88 to 1994–95 period, the aging of the original workforce results in an increase in salary expense in the median district of about one half percent per year (see the "without early retirement incentive" columns of table 2). A district at the 10th percentile of salary growth saves about one half percent per year, while districts at the 90th percentile actually see their salaries grow by more than 1 percent per year. Once the enrollment growth that occurred over this period (see figure 1) is included, the total effect on teacher salary expense is 1.7 percent per year in the median district. Salary savings do occur over the 1994–95 to 2003–04 period, although they are quite modest. We estimate that the median district has its teacher salary budget reduced by about one half percent per year, or slightly more than 6 percent over the period. This result is very similar to that implied by Case B in figure 10. Districts at the 10th percentile experience savings of more than 1.2 percent per year, which over the 9 year period amounts to significant savings. However, few districts find themselves in this situation. When the enrollment growth is accounted for, the median district has a salary expense that increases only marginally over the next 9 years.

Figure 11.—New York teacher quit rates, by years of teaching experience



SOURCE: Based on calculations by authors using New York State Education Department Personnel Master File (NYSED PMF) data.

Figure 12.—New York teacher experience distribution



SOURCE: Simulation by authors.

How might these results be altered if districts were to offer early retirement incentives to teachers? Would such incentives entice teachers near retirement, who otherwise would have continued to teach, to retire in sufficient numbers to provide meaningful salary savings to districts? This is a complicated question that requires a behavioral model of teacher retirement decisions and how early retirement incentives would affect retirement decisions. Our data do not support such a model and there has been very little research that has developed such models.[12] We can explore these effects by making some reasonable assumptions about the effect of early retirement incentives on teacher quit behavior.

[12] Grissmer, Eisenman, and Taylor (1995) examine early retirement incentive plans for the military. They develop models to target retirement among specific age cohorts. It is analysis of this sort that is missing for teachers. Their work suggests that such plans are effective cost management tools for the military.

Table 2.—Annual average growth rates in New York teacher salary expense[1]

	Without early retirement incentive		With early retirement incentive[2]	
	Original workforce replacement	Total effect	Original workforce replacement	Total effect
1988 to 1995				
Median	0.49	1.76	—	—
10th percentile	-0.42	-0.48	—	—
90th percentile	1.25	3.98	—	—
1995 to 2000				
Median	-0.45	0.54	-1.18	-0.16
10th percentile	-1.32	-0.83	-2.61	-2.10
90th percentile	0.27	1.81	-0.22	1.30
1995 to 2004				
Median	-0.49	0.11	-0.49	0.09
10th percentile	-1.21	-1.15	-1.29	-1.12
90th percentile	0.09	1.37	0.09	1.38

— Not applicable.

[1] Employs the 1987–88 salary schedule.

[2] Increase the quit rates for teachers with at least 25 years of experience by 25 percent for the 1995–96 year only.

SOURCE: Based on simulation by authors.

New York school districts have offered early retirement plans in 4 of the 6 years from 1991 to 1996. The plans work as follows. Teachers who are at least 50 years old and have 10 years of experience are provided with an extra month of service toward retirement benefits for each year of actual service completed, up to 36 months of extra experience. Thus, a teacher with 24 years of experience could retire under the early retirement incentive with benefits comparable to someone with 26 years of experience retiring without the incentive. During years with early retirement incentive plans, the incidence of retirement among those who were eligible was about 4 percent greater than in years without early retirement incentive plans (an increase from 14.5 to 15.1 percent). These effects may be somewhat muted because plans were offered four times in 6 years and the plans do not have large incentives.

To provide some sense of the effect of incentive plans on salary savings we experiment with a plan that has the effect of increasing quit rates for teachers with at least 25 years of experience by 25 percent, but only for the 1995–96 year. As shown in table 2, the effect of such a plan on district salary expense is modest. Over the first 5 years, the median annual growth in total salary expense is estimated to be about 0.7 percent lower (from 0.54 to -0.16) with the early retirement incentive than without it. Most of these savings accrue in the first few years. For cash strapped districts these savings may be important, although our calculations do not include the increase in retirement payments resulting from the early retirement plan. The effects of early retirement plans on district salary expense is an important issue that deserves additional research attention.

Conclusion

The results of this research surprise us. We had expected that the retirement of most of the teachers hired in the late 1960s and early

1970s would yield considerable savings in many districts, and would offset the additional expense of enrollment increases. Instead there seems, at best, to be only modest savings from retirements. The simulations that examine the interplay of quit rates, experience distributions, and salary schedules illustrate why savings can be very illusive. They also show that relatively small changes in quit rates, especially in the high experience tail of the distribution, can change salary savings substantially. This would suggest that early retirement incentive policies can be effective in delivering salary savings. Even though beyond the scope of this research, it would be informative to explore the determinants of quit behavior and, in particular, the effects that steepness of salary schedules, the changing pool of individuals drawn into teaching, retirement plans, and early retirement incentive policies have on teacher quit rates.

Even though actual data employed in this paper comes from school districts in New York, there is good reason to believe that the results generalize to many other places. First, as noted in the introduction, trends in New York are similar to those in many other areas of the country. Enrollment growth in New York is very similar to that occurring on average throughout the country.[13] In addition, we expect that the New York salary schedule and experience distribution are similar to those found elsewhere. Quit rates, conditioned on experience, may also be similar. Second, the simulations suggest that under a broad range of circumstances sizable salary savings due to retirements are unlikely.

As a result, we are now convinced of the accuracy of the projections that enrollment growth will continue to be a source of fiscal pressure on many school districts. It is likely that in most cases savings from the retirement of an aging teacher workforce will be very small.

[13] Clearly there are many districts in the south and west that are experiencing enrollment growth at a substantially faster pace than that in New York.

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How School Districts Respond to Fiscal Constraint

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About the Author

Helen F. Ladd is a Professor of Public Policy Studies and Economics at Duke University and also Director of Graduate Studies in Public Policy. She earned her Ph.D. in economics from Harvard University and taught at Harvard's Kennedy School of Government before moving to Duke in 1986. Much of her current research focuses on education policy, particularly performance-based approaches to reforming schools. She is the editor of *Holding Schools Accountable: Performance-Based Reform in Education* (Brookings Institution, 1996). She currently co-chairs the National Academy of Sciences Committee on Education Finance; Equity, Adequacy, and Productivity.

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How School Districts Respond to Fiscal Constraint

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Introduction

Throughout the 1980s and early 1990s, many school districts were less fiscally constrained than they are likely to be in the future. Many state governments responded to the 1983 report, *A Nation at Risk*, by providing substantial additional resources to local schools to improve education. In addition, the 1980s expansion of the economy made it possible for districts to raise additional funds from local sources, and declines in student enrollment meant that per pupil spending could rise even in districts where spending was not increased. The situation in the early 1990s and the outlook for the future are less sanguine. Projections of increasing enrollment, less rapid growth in the economy, and increasing competition for funds at the state and local level mean that school districts are likely to experience significantly more fiscal pressure in the future than they have in the recent past.

Given the outlook for more fiscal constraint, it would be useful to know something about how districts typically respond to fiscal constraint. Hence the purpose of this paper is to determine how districts have responded to fiscal constraint in the past as a way of gaining insight into how they might respond in the future.

This question can be addressed in various ways. One approach is to use a panel data set for districts in a specific state to look at how school districts have responded over time to various pressures such as increasing enrollments, the growth in students requiring special education, or cutbacks in aid. A recent paper by Hamilton Lankford and James Wyckoff (1996) provides an excellent example of this approach. Using a rich data set for 693 districts in New York state covering the period 1960 to 1993, they found that a substantial fraction of the increase in education spending was allocated to special education. In addition, they discovered that districts adjusted their administrative spending asymmetrically in response to changes in resources: districts increased administrative spending more in response to an increase in resources than they decreased administrative spending in response to a reduction in resources. Moreover, because Lankford and Wyckoff were in effect model-

ing changes in budget allocations, they were able to use their estimated parameters to project how New York school districts were likely to respond to future changes in fiscal pressures. As is evident from their study, the use of a panel data set is clearly essential for examining the short run dynamic responses of districts to fiscal pressure.[1]

A second approach is illustrated in a recent paper by David Figlio (1996). He used data from the Schools and Staffing Survey (SASS) to examine how local tax limitation measures affected school inputs and some school outputs. Because property taxes account for almost all the tax revenue of local school districts, statewide constitutional amendments or statutory requirements that limit the local property tax can directly affect the ability of local school districts to raise money for education. Exploiting the fact that not all states have such limitation measures, Figlio found that such limitations were associated with larger classes, shorter instructional periods, lower starting salaries for teachers, and lower lifetime discounted teacher salaries. Figlio's use of the SASS data represents an innovative approach for examining the impact of tax limitations. It also represents a creative way to examine how districts respond to fiscal constraint, an approach that is marred only by the observation that until one does the analysis, one cannot be sure that the limitations are binding and that, therefore, the districts are constrained.

. . . My research strategy is to use cross sectional data at one point in time . . . to develop a measure of the fiscal condition of each district and . . . to examine the choices made by school districts that face differing degrees of fiscal pressure.

In the same spirit, Dye and McGuire (1996) examined the effects of property tax limits on school districts in the Chicago metropolitan area. Building on the observation that not all school districts in the relevant counties were subject to property tax limits, Dye and McGuire found that property tax limits reduced the growth in total education spending by about 3 percent and spending per pupil by about 2.5 percent. Interestingly, however, they found no statistically significant evidence of any reduced growth in instructional spending. Thus, in the face of binding tax limits school districts appear to have tried to preserve the growth of instructional spending.

In this paper, I develop a third approach, one with its own strengths and weaknesses. One of my initial goals was to develop a methodology that could be used for a large number of states using the Common Core of Data (CCD) generated by the National Center for Education Statistics (NCES). Because the CCD information on finances is available only for the fiscal years 1990, 1991, and 1992, it does not represent a long enough panel to examine the short run dynamics of school district responses over time. Instead, the data are better suited for cross sectional analysis. Hence, my research strategy is to use cross sectional data at one point in time first to develop a measure of the fiscal condition of each district and second to examine the choices made by school districts that face differing degrees of fiscal pressure. This strategy sheds no light on how districts are likely to respond in a short run, dynamic sense to changes in their fiscal constraints. Any predictions from this analysis about responses to **changes** in constraints must be made with caution. At best, the cross sectional results reported below apply to the effects of changes in fiscal constraints that are in place for a period of time long enough for districts to fully adjust.

In section I, I explain and present my preferred measure of a district's fiscal condition and in section II show how I implemented it for Texas. Unfortunately, the measure cannot be estimated based on the CCD data alone.

[1] In the same vein, other researchers have examined the dynamic responses to fiscal constraints in specific districts. For example, see Hess (1991) for an examination of staff cuts during the fiscal crisis of the Chicago School System in the early 1980s. Hess reports that in response to the fiscal crisis, employees with student contact (such as classroom teachers and aides) were cut 18 percent, administrative and technical personnel were cut 14 percent, and support staff (including clerical and maintenance personnel) were cut 17 percent (p. 24, table 1.3). Interestingly, the relatively large cut in personnel with student contact occurred not in the subcategories of teachers and educational support staff but rather in the category of teacher aides.

Hence, I had to turn to state-specific data. In section III, I examine the choices made by Texas school districts in response to their differing fiscal conditions. These choices are of three types: those relating to the allocation of the budget among spending categories, the pattern of staffing, and the quality of the educational environment as measured, for example, by the ratio of pupils to teachers. Data about these choices come both from state-specific sources and from the CCD. In section IV, I look at comparable choices made by the New York Districts based on the CCD data alone.

Measuring a District's Fiscal Condition

By the fiscal condition of a school district, I am referring to the gap between a district's capacity to raise revenue for education and its expenditure need, where both capacity and need reflect factors outside the immediate control of local school officials (see Ladd and Yinger, 1991 for the development of this approach and its application to major U.S. cities). The idea is to develop a measure that is independent of the district's specific spending and taxing decisions but that accurately reflects the fiscal constraints it faces in making those decisions. In contrast to simpler measures of fiscal condition that typically focus exclusively on a district's capacity to raise revenue, this measure also incorporates the fact that some districts must spend more money per student than others to attain a given level of educational services.

As I described in an earlier article, (Ladd 1994), a jurisdiction's revenue-raising capacity and its expenditure need can each be measured in two ways. The primary component of a jurisdiction's revenue-raising capacity is the amount of revenue it could reasonably be expected to generate from local taxes. The simplest approach to measuring that capacity is as a weighted average of the jurisdiction's tax bases, where the weights are state-wide average tax rates for each base. Because school districts rely almost exclusively on property taxes, this approach would focus only on the base of the property tax and would calculate how much revenue the district would generate per pupil if it taxed that base at an average rate. Implicit in this approach is the value judgement that the appropriate way to achieve comparability across districts is to ask how much revenue they each would generate if they had a similar tax rate.

A second, and conceptually more satisfying, approach would start with the income of the district's residents and ask how much revenue the district could generate if it imposed an average tax burden on its residents (defined as taxes collected from residents as a proportion of their income), taking into account that the taxes from residents would be augmented by tax revenue from nonresidents. Nonresidents bear part of the burden of the property tax either because they own property in the district or because the burden of part of the tax is shifted to them in the form of higher prices, lower wages, or lower returns to capital. In contrast to the first approach, this second approach achieves comparability across districts by treating all districts as if they were willing to impose the same tax burden on district residents.

. . . The fiscal condition of a school district . . . the gap between a district's capacity to raise revenue for education and its expenditure need . . .

Although the second approach is conceptually more appealing than the first approach, it is difficult to implement. Not only does it require information on the composition of the tax base in each district, but it also requires that estimates be made about how much of the tax burden on each type of property is shifted to nonresidents. Therefore, in this study, I rely exclusively on the tax base approach. Fortunately, the two measures are often highly correlated. For Minnesota cities, for example, Ladd, Reschovsky, and Yinger (1991) found that the correlation was 0.92. However, for New York the correlation is only 0.7 (Duncombe and Yinger, 1995). Nonetheless, practicality argues in favor of the tax base approach. Because even the more limited data requirements for this approach are not met in

the CCD given that the data base includes no information on the size of the property tax base, I must rely on state-generated data for at least part of the information needed to implement this measure of capacity. Note, in addition, that revenue-raising capacity has a second component, namely, revenue in the form of federal or state aid. Hence, the amount of intergovernmental aid received by a district must be added to the measure of own-source capacity to get a complete picture of a district's capacity to generate revenue.

With respect to expenditure need, the task is to determine how much it would cost per pupil for a district to provide an average level of services to its students . . .

With respect to expenditure need, the task is to determine how much it would cost per pupil for a district to provide an average level of services to its students, given that the costs of educational inputs vary across districts and some types of students are more costly to educate than others. Two approaches are available. With either approach, the goal is to measure differences in costs that reflect only those factors outside the control of local school officials. For example, consider a district that pays above-average salaries to its teachers. Whether these high salaries translate into above-average costs as defined here, and consequently into high need, depends on the reason the salaries are high. If they reflect the district's decision to recruit high quality teachers or its inability to bargain effectively with the teacher's union, then the high salaries are under the district's control and not part of the constraints it faces. However, to the extent that the high salaries reflect an above-average local cost of living which forces the district to pay more simply to attract teachers, then the high salaries are outside the control of school officials and are appropriately included.

One approach to measuring educational costs by district would be to combine measures of appropriately-measured differences in the costs of teachers and other inputs with estimates of the differential costs associated with educating different types of students, such as those with learning disabilities or those with limited proficiency in English. Note that both parts are needed. A resource cost index alone of the type developed for teachers, for example, by Jay Chambers would not be sufficient.[2] Even if Chambers' measure were extended to include the cost of inputs other than teachers, it would be necessary to supplement it. The cost index for teachers indicates the differential costs of hiring a teacher, but does not incorporate the fact that more teachers may be needed to educate certain groups of children. Thus, at a minimum the resource cost index would need to be supplemented with a measure of the differential costs of educating different groups of students. However, this approach is problematic because of the *ad hoc* nature of most of these cost estimates.[3]

A second approach to measuring interdistrict variation in the costs of providing an average level of education services is to estimate them from an equation explaining the variation in per pupil spending across districts. Provided that the equation controls for the other major determinants of spending differences, such as those associated with wealth differences across districts, the coefficients of "cost factors" can be used to develop a cost index for each district. This second strategy is the one I pursue in this study. For Texas, I have implemented the strategy with data generated by the Texas Education Agency. For New York, I relied on cost estimates produced by Duncombe and Yinger (1995).

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[2] The teacher cost index developed by Jay Chambers uses a hedonic wage model to determine what each district would have to pay for teachers with similar characteristics given the factors outside the district's control (Chambers and Fowler, 1995). These factors include the tightness in the labor market for teachers, the local cost of living, and the amenities (or disamenities) of the local region.

[3] See, for example, the discussion of adjusting for student needs in NCES (1995). The *ad hoc* nature of the student-need adjustments used in New York state's school aid formula is documented in a recent study of cost differentials in New York (Duncombe, Ruggiero, and Yinger, 1996).

Fiscal Condition of Texas School Districts

Table 1 provides the spending equation from which the cost indexes and expenditure need estimates were calculated for Texas school districts. Most of the data used to estimate the equation came from the Texas Academic Excellence Indicator System (AEIS), not from the CCD. The equation is based on 993 districts, all of which go through the 12th grade. Following Ladd and Yinger (1991), the equation models district spending per pupil as a function of demand and preference variables, and a set of cost factors. Although the effects of the cost factors are of most interest, other variables representing the local demand for education services must be included in the equation as control variables. The first seven variables in table 1 are included for that reason. They are: the market value of property per pupil, the percentage of the tax base that is residential, the average number of pupils per household, personal income in the district per pupil, federal and state aid per pupil, and transportation costs per pupil. The residential share of the tax base represents a "tax price" variable, in that the higher is the share, the higher is the share paid directly by residents. Because a higher price typically leads to lower demand, the sign is expected to be negative. All of the variables come in with the expected signs and, with the exception of the percentage of the tax base that is residential, all are statistically significant at standard levels.

Of more direct interest are the eight cost factors, all of which represent characteristics of the district that may affect the per pupil costs of educating students. These variables include the percentages of students who are in special

Table 1.—Expenditure equation used to estimate the cost index for Texas school districts (Dependent variable: log per pupil spending)

	Coefficient	t-statistic
Cost variables		
Property tax base per pupil (log)	0.162	12.50
Income per pupil (log)	0.079	4.09
Residential percent of tax base (log)	-0.011	-1.50
Students per household (log)	0.172	8.70
Federal revenue per pupil (log)	0.081	9.28
State revenue per pupil (log)	0.033	3.72
Transportation costs per pupil (log)	0.018	3.58
Cost factors		
Special education students as a percent of all students	0.003	3.12
Limited English speaking students as a percent of all students	0.002	4.13
Economically disadvantaged students as a percent of all students	0.002	5.77
Secondary students as a percent of all students	0.004	7.91
Student enrollment (log)	-0.335	-15.95
Student enrollment squared (log)	0.018	13.66
Cost of living (log)*	0.194	1.26
Rural - 1 if district is rural, 0 otherwise	-0.002	-0.21
Constant	5.283	7.13
Number of observations	993	
Adjusted R^2	0.77	

* Based on 1991 study by McMahon and Chang, as reported in NCES, 1995, *Disparities in Public School District Spending*, 1989–90. 95-300, Washington, DC.

SOURCE: **Except as noted, the data are from the Texas Academic Excellence Indicator System.**

education programs, have limited English proficiency, are economically disadvantaged, and are in secondary school; the logarithm of student enrollment and its square; a cost-of-living index; and an indicator variable that reflects whether or not the district is in a rural area. Higher percentages of each of the specified categories of students are likely to raise the per pupil cost of education and, as indicated by the positive coefficients, do so in all cases. The negative coefficient on the student enrollment variable and the positive coefficient on the squared term indicate the presence of economies of scale up to an enrollment of about 11,000 students beyond which costs per student begin to rise.

. . . The variation across districts in the simulated expenditure represents variation only in the cost factors . . .

The cost-of-living index serves as a proxy for the costs of educational inputs; in areas with a higher cost of living, school districts have to pay more to attract teachers and to purchase supplies. This index distinguishes between costs only in the major metropolitan areas and the nonmetropolitan areas.[4] In contrast to many other states, the variation across Texas school districts is not very great, which probably accounts for the variable's statistical insignificance. Although the rural indicator variable is not significant, it has been included for completeness given that many people believe that rural areas face special educational challenges.

From this spending equation, a cost index was constructed for each district using the following procedure. The per pupil expenditure of each district was simulated based on the assumption that the district had average values of all the control variables, but its actual values for all the cost factors. Hence, the variation across districts in the simulated expenditure represents variation only in the cost factors, that is, in characteristics of each district that are outside the immediate control of school officials and that are likely to affect how much it has to spend to provide a given quality of education. Dividing a district's simulated spending by average per pupil spending generates an index of costs for each district in which the district with average costs has a cost index equal to 1. An index above 1 indicates that a district must spend more than the typical district to purchase a given level of educational outcomes. An index below 1 indicates that the district has an advantage relative to other districts in that the cost of providing a given package of education services to its students is below the state average. A district's expenditure need is then calculated as state-wide average per pupil spending adjusted by the district's cost index.

The fiscal condition of each district is defined as:

$$FC_i = (RRC_i - EN_i)/RRC_i$$

where RRC_i is the district's capacity to raise revenue (including local taxes and intergovernmental aid) and EN_i is the district's expenditure need, both of which are measured per pupil. Fiscal condition greater than zero implies that the district has sufficient revenue-raising potential to meet its expenditure need, where both are measured relative not to an absolute standard but rather relative to other districts within the state. A negative value indicates that the district has a large expenditure need relative to its capacity to raise revenue and, hence, is in relatively poor fiscal

[4] The cost-of-living indexes were produced by McMahon and Chang (1991) and reported in NCES (1995), Appendix D. In place of the cost-of-living index, I could have used Chamber's cost index for teachers (see footnote 2). The cost-of-living index has two small advantages over Chamber's teacher-cost-index. First, it is relevant for the costs of all inputs, not just teachers, and second, as Chambers acknowledges, the teacher-cost-index may be slightly biased given that the hedonic wage equation from which it is derived does not fully control for teacher quality. One potential disadvantage of the cost-of-living index, namely that it does not account for the effect on salaries of variation across districts in the characteristics of students, does not apply in this case since student characteristics are also included in the spending equation reported in table 1. This means that the cost-of-living index—or the Chambers teacher-cost-index if that were used—picks up the effects on spending only of the differing costs of inputs and that the variables that characterize the students, such as the percent with limited proficiency in English, pick up the effect of such students both on the salaries of teachers and on the quantity of such teachers who are hired.

condition. The more negative is the index the greater is the fiscal pressure faced by the district. The index has a straightforward interpretation. For example, a negative index value of -0.20 indicates that the district would need a boost in its per pupil revenues of 20 percent to meet its expenditure need. Conversely, a positive index value of +0.20 indicates the district could raise 20 percent more revenue at the average tax rate than it would need to meet its expenditure need, and hence has the option of setting a lower tax rate or of providing an above-average quality of education.

The index of fiscal condition ranges from -0.31 to +0.93 across the 993 Texas districts, with a mean of 0.07 and a standard deviation of 0.15.[5] To reiterate, the fiscal condition measure should be interpreted strictly in state-specific terms: capacity to provide what is deemed an average quality of education in Texas could be deemed inadequate for a district in another state in which average spending, and presumably, the quality of education were higher. Moreover, what matters for the subsequent analysis is not so much the specific value of a district's fiscal condition as the condition of one district relative to another.

Table 2 presents descriptive information by districts grouped into quintiles by fiscal condition. As shown in the first column, the average index of fiscal condition ranges from -.08 to 0.31 across the five categories. The revenue shares and spending measures are calculated from both state-specific AEIS data and data from the CCD. As can be seen, the two data sources provide comparable information. The table indicates that the districts in the strongest fiscal condition receive a substantially larger share of their revenue from local taxes than do districts in poorer fiscal condition and that their share of revenue from the state government is correspondingly lower. Despite the fact that, by construction, additional intergovernmental aid adds to a district's capacity to raise revenue, it is the capacity to raise revenue from local sources that distin-

Table 2.—Sources of revenue and spending levels by categories of fiscal condition (Texas school districts)

Categories of fiscal condition (observations)	Average fiscal condition	Average share of revenue[1]			Average spending per pupil[1] (in dollars)	
		Local	State	Federal	Unadjusted[2]	Adjusted[3]
I - Poorest	-0.082	0.417	0.519	0.064	$4,252	$4,324
(198)		0.416	0.512	0.072	4,283	4,338
II - Poor	-0.002	0.412	0.517	0.071	4,367	4,544
(199)		0.407	0.517	0.076	4,327	4,493
III - Average	0.049	0.359	0.568	0.074	4,652	4,705
(199)		0.356	0.563	0.081	4,537	4,588
IV - Good	0.100	0.412	0.512	0.076	4,970	4,953
(199)		0.413	0.506	0.081	4,695	4,685
V - Best	0.309	0.602	0.333	0.065	6,221	5,806
(198)		0.594	0.339	0.066	5,942	5,562

[1] First entry in each cell is based on Academic Excellence Indicator System (AEIS) data. Second entry is based on Common Core of Data (CCD) data.

[2] Current spending per pupil not adjusted for estimated cost differences.

[3] Current spending per pupil deflated by estimated cost differences.

SOURCE: Based on data from the CCD and the Texas AEIS.

[5] Note that I could easily have normalized the index to have a mean of zero, but saw no compelling reason to do so. The fact that the mean is not zero simply reflects that some districts have disproportionately large tax bases.

guishes the districts with the strongest fiscal condition from those facing more fiscal pressure. The final two columns report average spending per pupil, adjusted and unadjusted for cost differences. Based on the CCD data (the second entries in each cell), average unadjusted spending varies from about $4280 per pupil to $5940 per pupil. After adjusting for the costs, using the cost index described earlier, per pupil spending ranges from $4320 to about $5560. This smaller range reflects the fact that the costs in Texas of providing a given quality of education services tend to be higher in the districts in good fiscal condition than in those in poor fiscal condition.

My empirical strategy is . . . to see how budget shares or staffing patterns are affected by a district's fiscal condition . . .

To summarize, as measured here, a district's fiscal condition is intended to represent the fiscal constraint under which the district operates, relative to that in other districts. On average, stronger fiscal condition is associated with higher cost-adjusted per pupil spending on education and presumably, to better educational outcomes.

Effects of Fiscal Constraint on Decisions of Texas School Districts

Armed with this measure of fiscal condition, we are now in a position to look at how fiscal condition affects the school district budget allocation and staffing decisions in Texas, using both AEIS data and the CCD. The locally generated AEIS data set is useful for its richness. The CCD data are advantageous in that results based on that nationally produced data set can be directly compared across states.

The analysis is designed to shed light on how school districts have adjusted to differences in their fiscal condition associated with any one of a variety of causes outside the control of local school officials, such as differences in the amount of intergovernmental aid they receive, differences in the value of their property tax wealth, and differences in the proportions of high-cost students they serve. This research strategy is not designed to look in detail at fiscal responses to each component separately. Instead, it captures all their effects in a single variable, fiscal condition.

My empirical strategy is straightforward. The idea is to see how budget shares or staffing patterns are affected by a district's fiscal condition, controlling for other obvious determinants of such patterns. Thus, the dependent variable in most of the equations is a variable such as the proportion of the operating budget allocated to instruction, or the share of the staff working in administration. The main explanatory variable is the district's fiscal condition, which is included in both its linear and squared form to allow its effects to be nonlinear. All equations also include four other control variables: student enrollment (and its square), personal income per pupil, and the fraction of students from economically disadvantaged households. These variables are included to control for the fact that budget and staffing decisions are likely to be influenced by the number of students in the district, the preferences of the district's taxpayers (as proxied by personal income), and the need for special programs as proxied by students from economically disadvantaged households. For example, to the extent that there are economies of scale in administrative expenditures, we would expect the share of spending on administration to be smaller in large school districts than in small districts. While the specific choice of control variables is somewhat arbitrary, it is important that a reasonable set be included so as to isolate the independent effects of fiscal condition.

Reported in the tables are three summary measures of how fiscal condition affects budget and staffing patterns. (Full equations are available from the author.) The first is the marginal effect of fiscal condition, calculated at the mean value of fiscal condition. The other two measures indicate the differences in the budget or staffing shares associated with differences from the mean of one standard deviation in either direction. The more nonlinear is the estimated equation, the more these

final two measures of impact differ. The entries in the final column are of most interest in that they indicate the impact on budget shares of fiscal constraint, where a fiscally constrained district is defined to be one that has a fiscal condition index that is one standard deviation below the average.

Given that most of the dependent variables are expressed as proportions or shares of the total, one must be careful in interpreting the results. First, consider a finding that fiscal condition has no measurable impact on, for example, the share of spending allocated to administration at the school level. This finding does not imply that a district in poor fiscal condition would spend the same **amount** on school administration as a district in strong fiscal condition. In fact, because weaker fiscal condition is associated with lower per pupil spending on education (as can be seen, for example, by the average spending patterns in table 2), the finding that fiscal condition exerts no impact on the **share** of spending devoted to administration simply means that administrative spending would vary across districts in line with the variation in per pupil spending.

Consider first the signs of the estimated marginal impacts on the shares. They indicate the direction of the nonproportional differences in the various spending and staffing categories associated with differences in a district's fiscal condition. As such, they indicate which categories of spending districts are likely to protect or disproportionately cut as part of their equilibrium response to a long-run deterioration in their fiscal condition. The signs in the following tables should be interpreted as follows. A **positive** marginal impact of fiscal condition implies that spending or staffing on the specified category is disproportionately higher in districts in stronger fiscal condition than in others. A **negative** marginal impact implies that spending or staffing on that category is disproportionately lower in districts in strong fiscal condition. As I noted earlier, the final column is of most interest. A positive entry in this column indicates that a constrained district spends a larger share on the indicated category. A negative entry indicates that it spends a smaller share.

It is worth emphasizing once again that the estimated impacts come from a cross sectional model and at best, reflect long run responses to changes in fiscal condition that are anticipated to continue for a long period of time. In the short run, the existence of long-term contracts and various types of political pressures may make school districts respond differently in the short run than in the long run to changes in their fiscal condition, especially if they expect the change to be temporary. In the short run, districts may not have much choice in how to respond to a deterioration in their fiscal condition; the question in the short run may well be not what would they like to cut, but what **can** they cut? The long run equilibrium nature of the estimates reported here mean that such short run considerations are not directly relevant.

Impacts on Budget Allocations

Table 3 reports results for a variety of budget categories. Looking first at the categories defined by the AEIS, and focusing on the results in the final column of the table, we find that fiscally constrained districts devote about 1.6 percent more of their operating budgets to instruction than do districts with average fiscal condition. This larger share comes at the expense of the shares devoted to instructional administration (down 4.8 percent), central administration (down 6.1 percent), and plant services (down 2.7 percent). The shares devoted to student support services, campus administration, and "other" do not vary systematically with a district's fiscal condition.

These estimates imply first that fiscally constrained districts try to protect instructional spending. However, they are not able to do so very effectively in that the small 1.6 percent increase in the share devoted to instruction applies to a significantly lower overall operating

. . . Fiscally constrained districts devote about 1.6 percent more of their operating budgets to instruction than do districts with average fiscal condition.

Table 3.—Estimated impact of fiscal condition on budget categories, Texas school districts[1]

Budget category (mean value)	Marginal effect of fiscal condition[2]	Impact of 1 standard deviation difference	
		Positive (%)	Negative (%)
As a proportion of operating budget (AEIS)			
Instruction (0.579)	-0.055	-1.4	1.6
Instructional administration (0.011)	0.004	5.6	-4.8
Student support services (0.044)	not significant	—	—
Campus administration (0.054)	not significant	—	—
Central administration (0.080)	0.031	5.5	-6.1
Plant services (0.106)	0.017	1.9	-2.7
Other (0.126)	not significant	—	—
As a proportion of total budget (AEIS)			
Operating (0.894)	-0.037	-0.7	0.6
Capital outlay (0.056)	0.052	13.9	-14.5
As a proportion of current expenditures (CCD)			
Instruction (0.592)	-0.059	-1.4	1.5
Support services (0.328)	0.068	3.0	-3.2
Central administration (0.080)	0.020	3.6	-4.0
Non-instruction (0.080)	-0.009	-1.6	1.8
As a proportion of total expenditure (CCD)[3]			
Capital outlay (0.078)	not significant	—	—

— Not applicable because of insignificant coefficient.

[1] The Academic Excellence Indicator System (AEIS) equations are based on data from FY 1994 and the Common Core of Data (CCD) data from FY 1992. See appendix for further explanation.

[2] Based on coefficients of fiscal condition and fiscal condition squared in a regression equation that also includes student enrollment, student enrollment squared, personal income per pupil, percent of students who are economically disadvantaged and a constant. The full equations are available from the author. The estimated impacts were calculated at the mean value of fiscal condition, 0.07.

[3] Capital outlays and total expenditures were both averaged over fiscal years 1990 to 1992. The figures were all deflated by the Gross National Product (GNP) deflator for structures as reported in the *1996 Economic Report to the President.*

SOURCE: Texas AEIS and CCD.

budget. Specifically, a one standard deviation decline in fiscal condition is associated with about a 13 percent decline in the operating budget.[6] Despite its somewhat larger share, per pupil spending on instruction is about 11 percent less in the fiscally constrained district than in the average district.

Constrained districts also spend less per pupil on central administration and instructional administration. In these cases the two effects move in the same direction: constrained districts have smaller operating budgets and on average devote smaller proportions of these budget to these administrative categories. Some observers might be tempted to conclude from these estimates that fiscal pressure is a reasonable way to induce districts to reduce their spending on administration. However, that conclusion would be simplistic and inappropriate. Even if cuts in administration, especially central administration, were deemed desirable, inducing reductions through cutbacks in the resources available to school dis-

[6] This estimate comes from an equation in which the operating spending (in logarithmic form and based on the AEIS) is regressed on fiscal condition, fiscal condition squared, and the four control variables. The equation implies that a difference in fiscal condition of 0.15 (equal to one standard deviation) is associated with a 0.13 difference in operating spending per pupil.

tricts would carry a large cost in the form of reduced instructional spending, and, as noted below, larger class sizes. Moreover, it could be the case that the long run equilibrium results reported here overstate the short run changes that are likely to occur in response to a deterioration in fiscal condition. As noted in the introduction, Lankford and Wyckoff (1996) find that in the short run, school districts decrease central administrative expenditures less in response to a deterioration in fiscal pressure than they increase such spending in response to an improvement in their fiscal situation.

The finding that fiscal constraint is associated with a lower share for plant services, that is for maintenance, is consistent with the finding in the next part of the table for capital outlays. Like maintenance, capital outlays (expressed as a proportion of the total budget) are positively related to a district's fiscal condition. The estimate implies that the share of spending that a fiscally constrained district devotes to capital spending would be about 14.5 percent below that in the district with average fiscal condition. Thus, poor fiscal condition imposes a double whammy in that overall spending is lower and a smaller share of that spending is devoted to building and maintaining school facilities than is true for better off districts. Thus, a district that is fiscally constrained over a long period of time is likely to end up with significantly worse educational facilities than other districts.[7]

A similar picture emerges from the CCD spending categories reported at the bottom of table 3. Again, better fiscal condition is associated with a decline in the share of the total expenditure allocated to instruction, and an increase in the share for support services. Support services in the CCD is a broad category that includes student support services such as guidance and health; instructional support and librarians; central administration; school administration; business, operation and plant maintenance; student transportation services; and central expenditure such as information services and data processing. The only subcategory for which data were available and which yielded a statistically significant impact is central administration.[8]

The results for this subcategory are comparable but somewhat smaller than those based on the CCD data : fiscal constraint leads to a 4 percent reduction in the share which contrasts with a 6.1 percent reduction according to the AEIS data. The share devoted to non-instructional spending, which includes food services and other auxiliary enterprise operations such as bookstores, is slightly negatively related to fiscal condition. Hence, fiscally constrained districts devote slightly larger shares of their budgets to this category than do other districts.

The final section of table 3 reports the insignificant relationship between fiscal condition and capital outlay based on the CCD data. This finding is surprising and contrasts quite sharply with the large impact that emerged from the AEIS data. I explored two measures of capital outlay. The first is simply capital outlay in 1992 as a share of total expenditures in 1992. Because capital spending can be lumpy, the second measure is calculated as the average capital outlay relative to spending over a three year period. The table reports the latter measure. However, for neither measure did a statistically significant impact emerge.[9]

Impacts on Staffing Patterns

As reported in table 4, the findings for staffing patterns tell a similar story. As shown

. . . A district that is fiscally constrained over a long period of time is likely to end up with significantly worse educational facilities than other districts.

[7] This finding about capital outlays is fully consistent with the findings reported by the NCES in their study of disparities in education spending (NCES, 1995).

[8] The general subcategory called "other" was not available for Texas school districts. This category includes, among other things, spending on maintenance.

[9] I have not been able to determine the cause of the different results for the AEIS and the CCD data. The two series are not very highly correlated which by itself is not too surprising given that the AEIS is for the 1993–94 fiscal year and the latest single year for the CCD is 1991–92. Because fiscal condition best reflects the more recent period, the AEIS estimates are preferred.

Table 4.—Estimated impact of fiscal condition on staffing patterns, Texas school districts[1]

Staff category (mean value)	Marginal effect of fiscal condition[2]	Impact of 1 standard deviation difference	
		Positive (%)	Negative (%)
As a proportion of professional staff (AEIS)			
Teachers (0.857)	-0.027	-0.5	0.5
Professional support (0.067)	not significant	—	—
Campus administration (0.045)	not significant	—	—
Central administration (0.031)	0.017	7.7	-8.7
As a proportion of total staff (AEIS)			
Professional (0.630)	-0.044	-1.0	1.1
Educational aides (0.103)	-0.005	-0.6	0.9
Auxiliary staff (0.266)	0.056	2.6	-2.8
As a proportion of total staff (CCD)			
Teachers (0.729)	not significant	—	—
Aides (0.142)	not significant	—	—
Special[3] (0.033)	not significant	—	—
School administration[4] (0.045)	0.011	3.6	-3.8
District administration[5] (0.026)	0.008	4.2	-5.0

— Not applicable because of insignificant coefficient.

[1] The Academic Excellence Indicator System (AEIS) equations are based on data from FY 1994 and the Common Core of Data (CCD) data are from FY 1993. See appendix for further explanation.

[2] Based on coefficients of fiscal condition and fiscal condition squared in a regression equation that also includes student enrollment, student enrollment squared, personal income per pupil, percent of students who are economically disadvantaged, and a constant. See appendix for sample size. The estimated impacts were calculated at the mean value of fiscal condition, 0.07

[3] Includes instructional coordinators, guidance counselors, and library/media specialists.

[4] Includes school administration, support staff, and student support staff.

[5] Includes local education agency (LEA) administration and support staff.

SOURCE: Texas AEIS and CCD.

in the final column, teachers account for a slightly larger proportion of the professional staff in fiscally constrained districts than in the typical district while central administration accounts for a smaller share. Because teachers account for so much more of the professional staff, the positive percentage impact on the share for teachers is tiny compared to the 8.7 percent reduction in the share of central administration. Once again, however, one must be careful in drawing policy implications: While fiscal constraint reduces the share of central administration, it does so at the cost of reducing the number of teachers. The middle panel indicates that fiscally constrained districts have slightly higher proportions of their total staffs in teaching positions and smaller proportions in nonteaching positions.

The CCD data yields a relatively comparable picture. The primary difference is that fiscal constraint appears to have no observable impact on the share of the professional staff employed as teachers, aides, or for special purposes. However, comparable to previous findings, fiscal constraint is associated with smaller shares of school administrative staff and district administrative staff. Hence, fiscally constrained districts have disproportionately fewer support staff to address the range of problems such districts face. They are clearly caught between a rock and a hard

place. The only way to maintain the share of administrators would be to reduce the number of teachers, teacher aides, and related personnel.

School Quality

Studies of school quality typically focus on three measurable school inputs: pupil teacher ratios (which are positively correlated with, but are not the same thing as, class size[10]), the experience of teachers, and the post graduate education of teachers. The extent to which these measurable school inputs affect student performance as measured by test scores remains in doubt. In a recent paper based on Alabama data, Ferguson and Ladd (1996) find evidence that smaller class sizes, and a greater proportion of teachers with post graduate degrees positively affect student performance. In contrast we find no evidence that years of experience matter. Here, I look at how fiscal condition affects school districts' decisions about the three types of school inputs.

As shown in the top section of table 5, fiscal condition directly affects pupil teacher ratios. More specifically, better fiscal condition is associated with lower pupil teacher ratios. The estimated marginal impacts imply that fiscally constrained districts are likely to have pupil-teacher ratios, and hence class sizes, that are 6–8 percent higher than typical districts. The findings in Ferguson and Ladd (1996) imply that this difference would translate into weaker student performance.

Table 5 also shows the impact of fiscal condition on the distribution of teachers in terms of teacher experience. Stronger fiscal condition is associated with smaller proportions of beginning teachers and those with 6 to 10 years of experience and larger proportions of teachers with more than 10 years of experience. For fiscally constrained districts (as shown in the final column), the shares of beginning teachers exceed those of the average district by 9 percent and their share of experienced teachers falls short of the typical district by 5.8 percent. Although the empirical linkage between fiscal condition and teacher experience is quite clear, the implications for student learning are less clear. Ferguson and Ladd's estimates suggest that these differences might have little effect on student learning. Finally, the bottom row of the table summarizes the effects of fiscal condition on several measures of the distribution of teachers by their educational background. For none of the included variables (such as proportion of teachers with a master's degree) did a statistically significant coefficient emerge.

The clearest story to emerge from table 5 is that fiscal constraint hurts students by making it necessary for schools to have larger classes.

. . . that fiscal constraint hurts students by making it necessary for schools to have larger classes.

New York School Districts

In contrast to Texas, New York school districts spend a lot more money on elementary and secondary education and exhibit greater variation across districts. These differences make New York an interesting state for exploring the generalizability of the Texas findings about how school districts respond to fiscal constraints. Unfortunately, I do not have access to the detailed data by district for New York that I had for Texas and must rely more heavily on the CCD data.

However, missing from the CCD data are some of the key variables needed to estimate a district's revenue-raising capacity and its expenditure need. With respect to revenue-raising capacity, the main missing variable is the

[10] Pupil-teacher ratios typically understate average class size since not all teachers spend all of their time in class. Moreover, the concept of an average class size may be misleading to the extent that it includes both very small classes for students with special needs and potentially much larger classes for regular students. Ideally, it would be preferable to measure class size from information on teacher files that indicates the class sizes for the regular classes that they teach. See, for example, Ferguson and Ladd, 1996.

Table 5.—Estimated impact of fiscal condition on measures of school quality, Texas school districts[1]

Staff category (mean value)	Marginal effect of fiscal condition[2]	Impact of 1 standard deviation difference	
		Positive (%)	Negative (%)
Pupils per teacher			
AEIS (13.61)	-6.89	-7.4	7.8
CCD (13.87)	-5.62	-5.9	6.3
Experience of teachers			
As a proportion of all teachers (AEIS)			
Beginning (0.066)	-0.039	-8.4	9.0
1–5 years (0.266)	not significant	—	—
6–10 years (0.197)	-0.067	-5.1	5.3
11–20 years (0.309)	0.087	3.9	-4.5
> 20 years (0.162)	0.061	5.4	-5.8
Post-graduate education of teachers	not significant	—	—

— Not applicable because of insignificant coefficient.

[1] The Academic Excellence Indicator System (AEIS) equations are based on data from FY 1994 and the Common Core of Data (CCD) data are from FY 1992. See appendix for further explanation.

[2] Based on coefficients of fiscal condition and fiscal condition squared in a regression equation that also includes student enrollment, student enrollment squared, personal income per pupil, percent of students who are economically disadvantaged, and a constant. The full equations are available from the author. The estimated impacts were calculated at the mean value of fiscal condition, 0.07.

SOURCE: Texas AEIS and CCD.

value of the district's property tax base. With respect to expenditure need, a crude estimate of a district's cost index could be estimated from CCD data, but state-generated data allows for a more complete estimate. Given these limitations of the CCD data, I chose to use cost indexes recently estimated for New York by Duncombe and Yinger (1995) with Ruggiero (1996) and also their data on property tax valuations. With these two additions, I then used the CCD data to estimate the fiscal condition of 632 New York school districts.

Duncombe and Yinger's cost index is similar in spirit to the one discussed in section I for the Texas districts in that the goal was to determine the average impacts on costs of a variety of cost factors. However, Duncombe and Yinger have refined the approach in two significant ways. First, because they had access to data on educational outcomes, they were able to replace the demand variables in the spending equation, such as income and the tax price variable, with what the districts actually chose, as measured by three educational outcome variables (percent of students with high test scores, the percent receiving the Regents diploma, and the percent who do not drop out). This substitution is appropriate provided that the authors recognize, as they did, that the outcome measures are simultaneously determined with public spending and therefore require the use of statistical techniques to account for simultaneity. Second, they included an efficiency index intended to control for differences in the efficiency with which districts provide education.[11] The cost factors used to construct the cost index include an estimate of teacher salaries (standardized for a given level of education and experience

[11] Their measure of inefficiency is based on a technique called data envelopment analysis, or DEA. This nonparametric programming technique compares the spending of each district with the spending of other districts that deliver the same quality of public services. See Duncombe and Yinger, 1995, p. 10 and Duncombe, Ruggiero, and Yinger (1996). Both the outcome variables and the efficiency variable were estimated as endogenous variables in the spending equation.

so as to minimize the potential for this to be a variable chosen by the district), student enrollment (and its square), and the percentages of children in poverty, of households that are headed by females, of students who are severely handicapped, of students who have limited English proficiency, and of students who are in high school.

Based on the same measure of fiscal condition as described earlier, the resulting measure of fiscal condition for 632 New York districts has an average value of -0.017, a standard deviation of 0.23, and ranges from -1.33 to +0.82. Thus, as measured both by the standard deviation and the range, the variation in fiscal condition across the New York districts exceeds that for the Texas districts.

Table 6 essentially replicates for New York the summary data presented in table 2 for Texas school districts. Notice the much larger variation across the district groupings in the share of revenue from local taxes and correspondingly from the state government. The average share of revenue from local taxes in the districts with the best fiscal condition is about twice that in the districts with the poorest fiscal condition. Also the share of revenue from the federal government is smaller in all five categories than it was in Texas, which largely reflects the much greater spending by New York districts. This spending is shown in the final two columns. Before it is adjusted for differences in costs, (see the first of the two spending figures), average per pupil spending varies from $6,722 to $10,491. That the lowest average spending emerges for the second rather than the first group of districts reflects the fact that many of the districts in the poorest fiscal condition face high costs. This explanation is confirmed by the next column, which represents per pupil spending adjusted by the cost index provided by Duncombe and Yinger, which is also the one used to construct the measure of fiscal condition. Note that once this adjustment for costs is made, the districts in the worst fiscal condition are seen to spend the least per student.

Impact of Fiscal Condition on Budget Categories

Table 7 reports the estimated impacts of fiscal condition on the budget categories for New York school districts. The marginal impacts reported in the first column are directly comparable to those reported for Texas districts in the bottom panel of table 3 and exhibit similar patterns. In particular, better fiscal condition is associated with a smaller budget share for instruction and a larger share for support services, which includes administrative expenditures and maintenance. The marginal impacts are generally smaller for New York but the implications are essentially the same: New York districts that are fiscally constrained devote smaller shares of their budgets to support services in return for an increase the share for instruction. Because instructional spending accounts for such a large share of current expenditure, the percentage reductions in shares for support services exceed the gain in shares for instructional spending.

. . . The districts in the worst fiscal condition are seen to spend the least per student.

Also, like the results for capital outlays based on the AEIS data for Texas (but, curiously, not the CCD data) differences in fiscal condition across New York school districts lead to the greatest variation in capital outlays. According to the table, fiscally constrained districts devote to capital outlays a share of the total budget that is about 10.4 percent lower than that in the typical district.

Impact on Staffing Patterns

Table 8 reports the impacts fiscal condition on district staffing decisions. The pattern with respect to teachers is as expected: better fiscal condition leads to a smaller share of teachers and poorer fiscal condition to a greater share of teachers. Virtually no effect emerges for teacher aides, although the squared term enters with a positive and statistically significant coefficient.

Table 6.—Sources of revenue and spending levels, by categories of fiscal condition, New York school districts

Categories of fiscal condition (observations)	Average fiscal condition	Average share of revenue			Average spending per pupil (in dollars)	
		Local	State	Federal	Unadjusted[1]	Adjusted[2]
I - Poorest (126)	-0.303	0.375	0.583	0.042	$7,042	$6,042
II - Poor (127)	-0.111	0.388	0.578	0.035	6,722	6,825
III - Average (126)	-0.028	0.438	0.534	0.028	7,064	7,612
IV - Good (127)	0.053	0.519	0.453	0.028	7,749	8,382
V - Best (126)	0.305	0.735	0.248	0.017	10,491	10,733

[1] Current spending per pupil not adjusted for estimated cost differences.

[2] Current spending per pupil adjusted by cost index from Duncombe and Yinger.

SOURCE: Common Core of Data (CCD) and data provided by William Duncombe and John Yinger.

Table 7.—Estimated impact of fiscal condition on budget categories, New York school districts[1]

Budget category (mean value)	Marginal effect of fiscal condition[2]	Impact of 1 standard deviation difference	
		Positive (%)	Negative (%)
As a proportion of current expenditure			
Instruction (0.639)	-0.025	-0.9	0.9
Support services (0.335)	0.026	1.8	-1.8
Central Administration (0.028)	0.008	6.8	-6.4
Instructional Staff (0.030)	0.006	4.0	-4.7
Other, including maintenance (0.196)	0.022	2.6	-2.6
Non-instruction (0.026)	-0.001	-0.8	1.1
As a proportion of total expenditure[3]			
Capital outlay (0.082)	0.036	10.4	-10.4

[1] The equations are based on budget data from FY 1991. See appendix for further explanation.

[2] Basic measure of fiscal condition is the measure described in text as the gap between a district's revenue-raising capacity and its expenditure need as a proportion of its revenue-raising capacity. The entries in this column are calculated from the coefficients on the fiscal condition variable and fiscal condition squared in a regression equation that also includes student enrollment, student enrollment squared, personal income per pupil, percent of children living in poverty, and a constant term. The estimated impacts were calculated at the mean value of fiscal condition, -0.017.

[3] Capital outlays and total expenditures were both averaged over fiscal years 1990 to 1992. The figures were all deflated by the Gross National Product (GNP) deflator for structures as reported in the *1996 Economic Report to the President*.

SOURCE: Common Core of Data (CCD).

Somewhat perplexing are the results for the shares of the staff devoted to school administration and central administration. Previous findings for both Texas and New York would have led one to predict that stronger fiscal condition would be associated with greater staffing shares devoted to both categories of administration and that fiscal constraint would be associated with lower shares. Yet, the patterns are just the reverse: compared to the typical district, fiscally constrained districts appear to have larger shares of their staffs in administrative positions.

The puzzle is most obvious for central administration. According to table 7, stronger fiscal condition is associated with a greater share of spending on central administration.

But table 8 implies the apparently contradictory conclusion that stronger fiscal condition is associated with a smaller share of staff in central administration. The most obvious explanation has to do with the likely pattern across districts of salary levels for administrative staff. It could well be that the fiscally constrained districts choose to keep former teachers employed by moving them into administration at relatively low salaries while the districts with stronger fiscal condition employ fewer administrators but at higher salaries.

Impact on Pupil Teacher Ratios

Finally, table 9 reports the impacts of the two measures of fiscal condition on the pupil-teacher ratio. As was true for Texas school districts, better fiscal condition is associated with fewer pupils per teacher. The implication for districts with poor fiscal condition are clear: such districts are likely to have larger classes than districts with average fiscal condition. Ferguson and Ladd's study (1996) suggests that if the resulting class sizes were in the mid to high 20s for the elementary grades, student test scores are likely to be lower than they would be with smaller classes.

Generalizability

The picture that emerges from the analysis of New York school districts is very similar to that which emerges for Texas school districts. Poorer fiscal condition is associated with a greater **share** of spending on instruction and a larger **share** of the staff in teaching. Nonetheless, their limited overall spending means that districts in poor fiscal condition are likely to spend less per pupil on instruction and to employ fewer teachers relative to the number of their students. The effect is larger pupil-teacher ratios and larger class sizes. That the New York findings generally confirm those for Texas suggests that the patterns reported for Texas are not idiosyncratic and that the story summarized here is apparently generalizable across states.

Table 8.—Estimated impact of fiscal condition on staffing patterns, New York school districts[1]

Staff category (mean value)	Marginal effect of fiscal condition[2]	Impact of 1 standard deviation difference	
		Positive (%)	Negative (%)
As a proportion of total staff			
Teachers (0.517)	-0.028	-1.2	1.4
Aides (0.069)	0.000	-0.2	0.1
Special[3] (0.023)	not significant	—	—
School administration[4] (0.101)	-0.019	-4.4	4.5
Central administration[5] (0.075)	-0.010	-3.2	3.2

— Not applicable because of insignificant coefficient.

[1] The equations are based on staffing data from FY 1993. See appendix for further explanation.

[2] Basic measure of fiscal condition is the measure described in text as the gap between a district's revenue-raising capacity and its expenditure need as a proportion of its revenue-raising capacity. The entries in this column are calculated from the coefficients on the fiscal condition variable and fiscal condition squared in a regression equation that also includes student enrollment, student enrollment squared, personal income per pupil, percent of children living in poverty, and a constant term. The estimated impacts were calculated at the mean value of fiscal condition, -0.017.

[3] Includes instructional coordinators, guidance counselors, and library/media specialists.

[4] Includes school administrators, support staff, and student support staff.

[5] Includes local education agency (LEA) administration and support staff.

SOURCE: Common Core of Data (CCD).

Table 9.—Estimated impact of fiscal condition on measures of school quality, New York school districts[1]

Measure (mean value)	Marginal effect of fiscal condition[2]	Impact of 1 standard deviation difference	
		Positive (%)	Negative (%)
Pupils per teacher			
Common Core of Data (CCD) (13.8)	-2.70	-4.6	4.6

[1] The equations are based on budget data from FY 1991. See appendix for details.

[2] Basic measure of fiscal condition is the measure described in text as the gap between a district's revenue-raising capacity and its expenditure need as a proportion of its revenue-raising capacity. The entries in this column are calculated from the coefficients on the fiscal condition variable and fiscal condition squared in a regression equation that also includes student enrollment, student enrollment squared, personal income per pupil, percent of children living in poverty, and a constant term. The estimated impacts were calculated at the mean value of fiscal condition, -0.017.

SOURCE: Common Core of Data (CCD).

Conclusion

This investigation shows that districts respond to fiscal constraints by trying to protect the level of instructional spending. Evidence for this emerges from the finding that the share of the budget allocated to instructional spending is slightly higher in fiscally constrained districts than in districts in average fiscal condition. However, despite these efforts, districts experiencing serious fiscal constraint are still likely to spend less on instructional spending than their better-off counterparts: a larger share of a smaller total pie still leads to lower spending on instruction. The primary consequences are a higher pupil-teacher ratio and the use of less experienced teachers. These results are consistent with those that emerge from David Figlio's 1995 study of the effects of property tax limitation measures in which he finds that tax limitations are associated with larger classes, shorter instructional periods, and lower teacher salaries.

A second finding is that central administration spending and staffing appear to be a luxury. That is, stronger fiscal condition is associated with a larger share of spending on central administration and conversely, poorer fiscal condition is associated with lower spending on administration—both because of lower overall spending and because the share of that spending devoted to central administration would be lower. This finding, it should be noted, runs counter to that of Figlio who finds no evidence that districts subject to property tax limitations reduced their spending on administration. In light of the finding reported here, some people might be tempted to argue for increasing fiscal stringency as a way to reduce administrative spending. However, this study shows that there could be significant costs associated with that strategy. Even if districts tried to become leaner and meaner, the evidence reported here suggests that muscle, in the form of instructional spending, would also be cut.

A third finding is that the category of capital outlays emerges as the most responsive to a district's fiscal condition. According to the best estimate for Texas (based on the AEIS data), capital spending in a district with fiscal condition one standard deviation below the average is likely to account for about 15 percent less as a share of total spending than in a district with average spending. When combined with the fact that the total budget in such a district is also likely to be lower by about 13 percent, this 15 percent decline in the share translates into about a 26 percent shortfall in capital spending relative to that in a district in

average fiscal condition.[12] New York districts also appear to respond to fiscal constraint by spending a smaller proportion on capital spending. While the magnitude of the response is a bit smaller than in the Texas districts, the overall conclusion is the same and fully consistent with, it should be noted, to the findings of a recent NCES study of variation in spending patterns across districts. Such a finding is not at all surprising given that politicians facing fiscal constraints have strong incentives to try cut the least visible spending categories. Yet the consequences are potentially severe. Annual shortfalls in capital spending and maintenance in response to an extended period of fiscal constraint are likely to leave some districts with serious deficiencies in their capital plants.

[12] This estimate was calculated as follows, where C is capital outlays, s is the budget share, and B is the total budget for a typical district. For a fiscally constrained district, the capital share is (0.85)s and the total budget is (0.87)B. Capital spending in that district is (0.85)(0.87) =0.74 times the capital spending in the typical district, therefore, capital spending is lower by 26 percent.

Appendix

The full equations underlying the results reported in the text tables are available from the author. As noted in the text, the dependent variable in most of the equations is a variable such as the proportion of the operating budget allocated to instruction, or the share of the staff working in administration. The explanatory variables are the district's fiscal condition (included in both linear and squared form), and the following control variables: student enrollment (and its square), personal income per pupil, and the fraction of students from economically disadvantaged households.

Texas

The Texas equations are all based on 1993 school districts. This set of districts represents those that remained after the Academic Excellence Indicator System (AEIS) and Common Core of Data (CCD) data sets were merged and observations not common to both were dropped. In addition, six observations were dropped because total property value was zero, six were dropped because the district reported no residential property, and six were dropped because the district reported no federal revenue. Finally, 14 outliers were dropped.

All AEIS information is based on fiscal year 1994, the staffing data are from the CCD fiscal year 1993, and all other CCD data are for fiscal year 1992.

New York

The New York equations are based on 632 observations which represents the set for which all data, including the cost index from Duncombe and Yinger, were available. The budget share equations are based on CCD data for fiscal year 1990–91. The staffing equations for fiscal year 1991–92. The cost index for New York is based on 1991 data.

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The Condition of Urban School Finance: Efficient Resource Allocation in Urban Schools

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Dale Ballou is an Associate Professor of Economics at the University of Massachusetts at Amherst. His research specializes in the economics of education, with particular focus on policies that effect teacher recruitment and performance. His work, much of it in collaboration with Professor Mike Podgursky of the University of Missouri, has appeared in the Journal of Human Resources, the Quarterly Journal of Economics, and the Industrial and Labor Relations Review, among other publications. Their book, *Teacher Pay and Teacher Quality*, was published by the W.E. Upjohn Institute in 1997.

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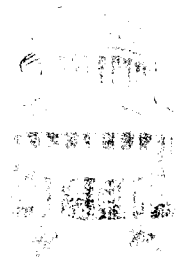

The Condition of Urban School Finance: Efficient Resource Allocation in Urban Schools

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Introduction

Urban schools have long been a focus of public attention. Much of this concern has centered on inter-district disparities in per pupil expenditure. However, as state governments have come to play a larger role in school finance, local tax bases have become a less important factor in determining educational resources. Today, per pupil expenditures in many (though not all) urban school systems match those of more affluent suburbs. Yet the performance of urban school systems (as measured by such indicators as student test scores, graduation rates, and a variety of student behaviors) continues to lag behind those of other systems (Lippman, 1996). There is no doubt that poor educational outcomes are due in large part to high concentrations of poverty and to other social and economic barriers faced by disadvantaged minorities in urban centers. However, critics have also charged urban schools with waste and inefficiency (Wilson, 1992). Many of these same criticisms have been directed at public schools in suburban and rural locations as well. Yet public dissatisfaction with schools appears to be particularly high in urban districts, as evidenced by the interest shown in these communities in such alternatives to traditional public education as charter schools and voucher programs. This dissatisfaction suggests it would be useful to look more closely at the way resources are allocated in urban schools to ascertain whether charges of inefficiency are warranted.

Methodology

The starting point for this investigation of urban education consists of several criticisms that have been made of public, if not specifically urban, schools. Policies pursued by public schools are said to be inefficient or wasteful in the following respects:

1. Too small a share of district resources actually make it to the classroom (i.e., are spent on instruction as opposed to administration or other support services) (Walberg, 1994).

2. Schools and school districts are too large. Students have been shown to learn

more effectively in smaller, less impersonal settings, offsetting whatever economies may be achieved by operating on a large scale (Walberg and Fowler, 1987) (Fowler and Walberg, 1991).

3. Public school systems are excessively bureaucratic (Chubb and Moe, 1990).

4. Teacher compensation is unresponsive to market conditions and provides little if any incentive to improve performance (Hanushek et al., 1994).

. . . This paper relies on a comparative methodology, contrasting urban public schools with public schools in suburban and rural communities.

While these criticisms provide a useful focus for the investigation, none of them specifies criteria for determining when urban schools (or, indeed, any) are inefficient. Benchmarks for efficient performance are missing. Consider, for example, the charge that public schools systems are excessively bureaucratic. Given that schools cannot function without some bureaucratic oversight, how much oversight is excessive? Similarly, without knowing what proportion of district resources should be devoted to instruction, it becomes difficult to determine when a given pattern of resource allocation is inefficient.

In the absence of a set of benchmarks for efficient performance, this paper relies on a comparative methodology, contrasting urban public schools with public schools in suburban and rural communities. In places the comparison is extended to private schools. A variety of indicators will be examined pertaining to the criticisms just cited. Systematic differences unfavorable to urban schools will be evidence of inefficiency. This is not fully conclusive, of course, for such differences might arise because urban schools are pursuing the most efficient policies. For two reasons this would be unlikely. First, there is probably at least some truth to each of the criticisms cited above. Thus, a finding that urban schools devote a smaller share of total resources to instruction than other school systems is prima facia evidence of inefficiency. To argue that such a pattern of resource allocation is actually the efficient one would imply that on the whole, public schools devote too large a share of resources to instruction.

Second, because private schools face market competition, they are under pressure to use resources efficiently. Significant differences between public and private schools will reinforce the conclusion that the former are not run efficiently; conversely, the more nearly alike the two types of schools are, the less reason there is for special concern about the practices of urban schools.

Share of Resources Devoted to Instruction

The National Center for Education Statistics (NCES) classifies school districts' current expenditures into three broad categories: instruction, support services, and non-instructional services. Instructional expenditures include salaries of teachers and teachers' aides, and classroom materials. Support services encompass counseling, administration, operations and maintenance, business office activities, and student transportation. Non-instructional expenditures cover food services and adult education and other community services.

To see whether the allocation of funds varies by district location, total dollars spent in each category have been summed for all urban districts, suburban/large town districts, and rural/small town districts.[1] (For conciseness, these groups will henceforth be referred to as urban, suburban, and rural.) The resulting totals are displayed as percentages of current expenditures in table 1. (Expenditures

[1] This classification scheme, which is also due to NCES, defines urban districts as those located in central cities of Standard Metropolitan Statistical Areas (SMSA). Suburban districts are located in SMSAs but are not in central cities. Large towns are outside SMSAs but have a population of at least 25,000 and are defined as urban by the Bureau of Census. Small towns are outside SMSAs and have populations between 2,500 and 25,000. Rural districts are found in places with a population less than 2,500.

Table 1.—Expenditure and staffing patterns			
Percent of current expenditures allocated to:	Urban	Suburban	Rural
Instruction	61.1	61.1	61.5
All support services	33.9	34.7	33.1
Administration	7.5	7.7	8.8
Staffing ratios			
All staff to teachers	1.76	1.78	1.78
All staff to teachers and teachers aides	1.49	1.55	1.52
Administrators to teachers	.16	.19	.17

SOURCE: Common Core of Data, Agency Finance Information (Expenditures), Fiscal Year 1992, Agency Staff Information, Academic Year 1992.

on non-instructional services, which are not displayed, are the residual item).

There is virtually no difference between urban schools and others in the percentage of current expenditures allocated to instruction, approximately 61 percent. Suburban systems spend slightly more on support services (and by implication, less on non-instructional services). Urban school systems actually devote a smaller share of current expenditures to administration, almost 15 percent less than rural districts.

Some caution is required in interpreting these numbers, since classification of school expenditures is problematic (Raywid and Shaheen, 1994). All districts do not follow the same accounting practices; there is disagreement even among experts on how to compute school expenditures. When working with district-level data, the problem is compounded by differences in types of districts. Some districts, for example, have been created exclusively to serve special education students. In other districts virtually all expenditures are for support services provided to other school systems.

It was for these reasons that table 1 was prepared by summing expenditures within the urban, suburban, and rural categories. The effect of variation in accounting practices will tend to average out in these aggregates. In addition, totals within these broad categories should not be sensitive to the establishment of special districts to perform limited functions. It is the total spending on the function (and not whether it is one district or another that performs it) that determines the entries in table 1.[2]

Given uncertainty about accounting practices, it is worth seeing whether alternative ways of measuring resource allocation present the same picture. The lower panel of table 1 displays statistics on staffing patterns: ratios of total employees to teachers and administrative staff to teachers. As above, these statistics are computed by first totaling the number of employees within urban, suburban, or rural districts without regard to the particular districts in which they are employed. The results confirm that there is little difference between urban public education and the other categories. The ratio of all staff to teachers is virtually the same across categories. When teacher aides are counted with teachers, urban schools

[2] It may be wondered if a few very large districts (such as the New York City school system, with a million students) have undue influence on the statistics presented in table 1, distorting the picture of expenditure patterns in smaller but much more numerous urban districts. The three largest districts in the United States are the New York, Chicago, and Los Angeles school systems. As a check on the information presented in tables 1 and 2, all statistics on urban districts were recomputed excluding these three systems. There was a very slight change in the findings: the share of current expenditures on instruction fell to 60 percent while those spent on support services rose to 35 percent. However, the ratio of all staff to teachers actually fell slightly (though by less than one-tenth). On the whole, it does not appear that the findings in tables 1 and 2 are distorted by spending and staffing decisions in the largest systems.

are found to allocate a slightly higher proportion of their staffs to teaching than do other systems, a slightly smaller share to administration.

Since urban districts serve a high proportion of disadvantaged students, it is of some interest to know whether the patterns in table 1 hold when urban districts are distinguished by students' economic status. For this purpose, urban districts in which more than 17 percent of school-aged children live below the poverty line have been compared to the remaining urban systems. (Data on this breakdown, not displayed in table 1, are available from the author.) It turns out that the poorer districts employ more, not fewer, teachers relative to administrators and relative to total staff. The administrative share of current expenditures is lower by 0.5 percentage points in these less affluent schools. (Instruction as a share of current expenditures is, however, the same in both groups, 61 percent.)

Scale Economies

As noted, urban schools spend proportionately less on administration and employ fewer administrative staff relative to teachers than either suburban or rural schools. Since urban districts tend to be larger than those elsewhere, these differences may reflect economies of scale. To explore this hypothesis, the two variables pertaining to administration in table 1—the share of administration in current expenditures and the ratio of administrative staff to teaching staff—have been regressed on a variety of district and community characteristics. Two measures of size were used to detect scale economies: district enrollment and the average number of students per school within the district. An inverse relationship between district enrollment and the share of resources devoted to administration presumably reflects economies in central office operations and district-wide services. Increasing the number of students per school would also be expected to save on administration through consolidation of positions (e.g., principals). Other regressors control for the community's demand for certain kinds of school services as well as the educational needs of the school-age population. These variables include the percentage of school-aged children living below the poverty line, median income of district households with school-aged children, and the percentage of household heads with a college degree. Current expenditures per pupil were introduced to allow for the possibility that spending on administration varies with district resources.[3] (For example, as the budget grows, administrators may find additional slack they can divert to their own staffs.)

Earlier remarks about variation in accounting practices across districts are relevant here. In an effort to enhance consistency, the estimation sample was restricted to independent school districts. This category excludes many districts that function in an auxiliary capacity by providing services to other systems and which therefore often exhibit extreme ratios of administrative to other expenditures. In addition, following the initial estimation, observations with extreme values of the dependent variables were dropped from the sample (5 percent at each end). Since the second set of estimates did not differ substantially from the first on the points of greatest interest, only the first is discussed here.

Regression results (table 2) confirm that urban systems spend proportionately less on administration than do rural systems and employ fewer administrative staff relative to teachers than do suburban systems, even with

Urban schools spend proportionately less on administration and employ fewer administrative staff relative to teachers than either suburban or rural schools.

[3] It may be wondered if the poverty rate, median income, household education, and per pupil expenditure do not represent too many ways of measuring the same thing, with the resulting multicollinearity yielding unstable and imprecise estimates. These variables are not, in fact, highly correlated. The largest pairwise correlation, between median income and education of the household head, is 0.75. None of the other correlation coefficients exceeds 0.4. Correlations between the estimated coefficients are generally lower. Estimates are only moderately sensitive to the exclusion of other variables from the model. This suggests the various regressors convey independent information.

controls with district characteristics. However, there appear to be few economies of scale in central office functions. An increase in the size of the district by 10,000 students reduces the share of current expenditures devoted to administration by only 0.01 percentage points. Although this estimate is somewhat imprecise (the coefficient fails conventional tests of statistical significance), all estimates within a 95 percent confidence interval are likewise very small. By contrast, average school size does have a statistically significant impact on resources allocated to administration: an increase of 100 students per school reduces the share of administrative expenditures by one-half percentage point. The impact on the ratio of administrators to teaching staff is smaller, at 0.2 percentage points.

Failure to detect savings in administration as district size increases is troubling, since such economies are to be expected. Moreover, given evidence that student achievement tends to suffer with increases in district size (Walberg and Fowler, 1987), if large districts cannot be justified on grounds of scale economies, it may be hard to justify them at all. It turns out that there are economies of district size, but they become apparent only when separate regressions run on subsamples of urban, suburban and rural schools, respectively. (These results, not shown in table 2, are available from the author on request.) In the urban subsample, where average district size is much greater (15,000 students, compared to 5,000 and 1,500 students in the suburban and rural subsamples, respectively), coefficients on district size are an order of magnitude smaller than the corresponding estimates for the suburban and rural samples and are statistically insignificant. This evidence strongly suggests that urban districts by and large exceed the size necessary to realize scale economies. The notion that there are diminishing returns to increasing district size is further supported by the fact that estimated district scale economies are greater for rural districts than for the suburban districts. Thus it

Table 2.—Regression analysis of administrative expenditures and staff (standard errors in parentheses)

Independent variables:	Mean of independent variables	Dependent variables: Administration percentage of current expenditures(%)	Administrative staff/teachers
Intercept	1.0	12.5 (.20)	.09 (.006)
Suburban	.19	.10 (.13)	.014 (.004)
Rural	.74	.51 (.12)	-.002 (.004)
District enrollment (1,000s)	3.15	-.001 (.002)	-.0006 (.00007)
Students per school (100s)	.367	-.51 (.01)	-.002 (.0004)
Median household income (1,000s)	33.4	-.03 (.004)	.0007 (.0001)
Percentage of school-aged children below poverty line	17.8	.002 (.003)	.0004 (.0001)
Percentage of household heads with college degree	15.9	-.005 (.004)	-.0005 (.0001)
Per-pupil current expenditures (1,000s)	5.07	-.032 (.017)	.015 (.001)
R^2		.18	.10
Number of observations	—	12,596	11,864
Dependent variable mean	—	9.7	.18

—Not applicable.

SOURCE: Common Core of Data, Agency School Information, School Year 1991, Agency Staff Information, 1992 School Year, Agency Finance Information, Fiscal Year 1992, Household Information, 1990 Census of Population.

would appear that scale economies at the district level are exhausted somewhere between the typical suburban size (about 5,000 students) and the average urban enrollment of 15,000.

To this point the discussion has considered administrative expenses only. Since there may be scale economies in other functions, it is useful to examine a broader measure that includes spending on operation and maintenance, the business office, student transportation, and food services. Table 3 displays selected results when per-pupil expenditures on these items are regressed on the district characteristics mentioned above. Since the level of spending may be affected by district wealth, in the second panel of table 3 the dependent variable is expressed as a percentage of current expenditure. A decline in this percentage as district or school size rises signals the presence of scale economies and means that resources are freed up for instruction or pupil support services.

As table 3 shows, there are few scale economies in these functions at the district level (and none among urban school systems). Increasing school size does produce savings, but the amounts are small. If one takes the estimates in panel two as more reliable, increasing mean school size by 100 students saves urban districts only 0.27 percent of their current per pupil expenditures, or $14 on average (=.0027 times $5,076). The average savings for all public school districts are $35 (.007 of $5,069), only slightly more than the reduction in administrative expenses reported in table 2. Whether it is worth increasing school size to achieve savings of this magnitude is much in doubt. A growing body of research has found evidence that smaller schools provide a superior learning environment to the large, impersonal, factory-like schools built in great numbers after World War II. In the final analysis, the answer turns on whether the money saved by realizing scale economies can be put to uses that will have a greater impact on student achievement than reductions in

Table 3.—Scale economies

Dependent variable	Sample	Dependent variable mean	Change in dependent variable from an increase in: District size (1,000 students)	Change in dependent variable from an increase in: Average school size (100 students)
Per pupil[1]	All	$1,555	0.2	-106.9[2]
	Urban	1,459	0.5	-75.5[2]
	Suburban	1,565	-8.3[2]	-0.2
	Rural	1,562	-15.9[2]	-147.4[2]
Percentage of current expenditures[1]	All	30.5%	0.01[2]	-0.7[2]
	Urban	28.0	0.00	-0.27[2]
	Suburban	27.2	-0.01	-0.02
	Rural	31.5	-0.03	-1.02[2]

[1] Administration, Operations/Maintenance, Business Office, Transportation, and Food Services

[2] Regression coefficient significant at 1 percent.

NOTE: Estimation samples restricted to Local Education Agencies (LEAs) which are Independent School Districts. Other regressors included percentage of school-aged children in households below the poverty line, median household income, percentage of heads of households who are college graduates, and indicators of urbanicity (in the combined samples).

SOURCE: Common Core of Data, Agency Finance Information (Expenditures), Fiscal Year 1992.

school size. It should also be recognized that the discussion here has focused only on current expenditures and that a full consideration of scale economies must take account of potential savings in capital costs. Unfortunately, data limitations prevent that investigation from occurring here.[4]

Non-Teaching Faculty

Schools have been criticized for assigning teachers to non-instructional jobs where they carry out administrative or even clerical tasks. In addition, some union contracts call for a specified number of teachers to be relieved of classroom teaching responsibilities in order to perform work for the union. Such practices reduce the real level of resources in the classroom in ways that are masked by such statistics as aggregate student/teacher ratios.

. . . Average class size exceeds the school-wide student/teacher ratio largely because teachers spend fewer hours in class each day than do students.

Unfortunately, it is not easy to examine how widespread these practices are. While it has been suggested that a comparison of the school-wide student/teacher ratio to the average class size reveals how many teachers have regular assignments outside the classroom (Picus and Bhimani, 1993), the comparison is misleading: average class size exceeds the school-wide student/teacher ratio largely because teachers spend fewer hours in class each day than do students. Discrepancies in these ratios do not mean, therefore, that some teachers have not been assigned regular classes of students, but rather that teachers are given prep periods and other breaks during the day that reduce at any point in time the number of teachers available to work with students.

This is evident in table 4, where the student teacher ratio measured at the school level (total students/FTE teachers) is contrasted with the average class size reported by teachers. As anticipated, the former ratio is always smaller than the latter. However, class sizes in urban secondary schools are unusually large, given the mean student-teacher ratio. The latter is smaller by 1.4 students than the ratio of suburban secondary school students to teachers, yet urban classes are larger by nearly two students. By contrast, in rural secondary schools, lower student-teacher ratios translate into smaller class sizes. These discrepancies (which are statistically significant at conventional levels) suggest that faculty in urban secondary schools are diverted from teaching in larger numbers than elsewhere. Other explanations, while possible, receive little support from the data. If urban teachers had more prep periods, class sizes would rise for that reason. However, the average number of classes is virtually the same for urban as suburban secondary school teachers. If students took more classes in the urban systems, average class size would increase, but there is no evidence of this, either.[5]

Teacher Effort

More than 90 percent of instructional spending is on salaries and benefits. Teacher absenteeism reduces the real level of classroom resources for a given dollar expenditure. Conversely, the time teachers put in outside school grading homework and preparing lesson plans augments these resources.

By some indications, teacher absenteeism is a greater problem in urban schools than elsewhere. The first rows of table 5 summarize teacher and administrator perceptions of teacher absenteeism in the Schools and Staffing Survey (SASS). The proportion of principals who believe faculty absenteeism poses

[4] The Agency Finance Information file on the Common Core of Data (CCD) contains capital outlay expenditures. However, without information on the vintage of structures and equipment, such data provide a very incomplete picture of true capital costs. There are no imputed rental values for buildings and durable equipment that have been fully amortized. Districts that have recently expanded or upgraded equipment will appear to have relatively high capital costs while other systems may appear to incur no capital costs whatever.

[5] The average length of the school day is the same in the two types of districts. The same number of credits are typically required for graduation.

Table 4.—Student/teacher ratios and class size (standard errors in parentheses)				
	Number of schools	Students/teachers (school)	Number of teachers	Average class size
Urban				
Elementary	1,025	19.1 (.16)	3856	26.6 (.29)
Secondary	725	17.1 (.21)	5005	27.0 (.28)
Combined	211	9.3 (.40)	750	16.7 (.54)
Suburban				
Elementary	1,051	20.2 (.16)	3738	26.9 (.25)
Secondary	904	18.5 (.29)	6264	25.4 (.22)
Combined	143	13.0 (1.1)	589	20.7 (.77)
Rural				
Elementary	2,165	18.6 (.13)	7218	25.6 (.22)
Secondary	1,979	16.4 (.14)	12071	23.5 (.16)
Combined	564	14.9 (.33)	2504	21.9 (.33)

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1993–94 Schools and Staffing Survey.

at least a moderate problem is 70 percent greater in urban schools. This perception is largely shared by teachers themselves: half again as many urban teachers believe faculty absenteeism is a problem as do their counterparts in suburban districts. In light of these beliefs, it is somewhat surprising that actual measures of teacher absenteeism reported in SASS do not differ more between urban and suburban systems.

The limitations of the data should be borne in mind: absenteeism rates in SASS refer to a single school day (on or just prior to the survey date). Clearly, absenteeism rates on any given day may vary considerably for a single district, though in a sample of many districts one would expect such variation to average out. Still, systematic differences may remain, as shown by differences in the absenteeism statistics based on the 1993–94 survey and the earlier SASS administered in the 1990–91 school year. For whatever reason, absenteeism was higher across the board in 1993–94. Teacher attendance was better in rural districts than elsewhere in both years, but evidence of an urban/suburban difference is much weaker.

When 1990 teacher absentee rates are regressed on a set of school characteristics including size, percentage of black and Hispanic students, and the percentage of students eligible for free or reduced-price lunch (a measure of the incidence of poverty), evidence of any difference between urban schools and others, apart from that explained by these controls, completely disappears. This is not reassuring, for absenteeism increases with higher percentages of poor and minority students. Thus, absenteeism is worst in precisely those schools that can least afford the loss of services of regular teachers. This may help to explain why urban teacher absenteeism is regarded as a greater problem in urban systems even though the measured difference is not large.[6]

The last eight rows of table 5 contain the time teachers report spending on school-related activities outside regular school hours. Responses, which refer to the most recent full week before the survey date, are again displayed for the 1990–91 SASS as well as the 1993–94 survey. Secondary school teachers spend substantially more time with students

[6] Other reasons are possible. Qualified substitutes may be in shorter supply. Urban classes may also be harder to control when the regular teacher is absent.

Table 5.—Teacher absenteeism, time outside class

	Urban	Suburban	Rural
Principals (%) perceiving teacher absenteeism as:			
Serious or moderate problem	17.6%	10.3	10.4
Not a problem	39.8%	50.3	48.4
Teachers (%) perceiving teacher absenteeism as:			
Serious or moderate problem	19.2	12.7	11.1
Not a problem	35.9	45.2	46.7
Teacher absenteeism (%)[1]			
1993–94	5.8	5.8	5.0
1990–91	4.9	4.4	3.9
School-related activities involving students (hours)[2]			
1990–91:			
Elementary teachers	1.7	1.6	1.5
Secondary teachers	4.5	4.6	5.4
1993–94:			
Elementary	1.8	1.6	1.9
Secondary	4.3	4.7	5.5
Other school-related activities (preparation, grading papers, parent conferences, etc.)[2]			
1990–91:			
Elementary	8.5	9.5	8.3
Secondary	7.6	7.5	7.1
1993–94:			
Elementary	9.1	10.1	8.7
Secondary	8.1	8.7	8.0

[1] Data refer to most recent school day. Absentees include part-time teachers.

[2] Time spent outside regular school hours during most recent full week. Full-time teachers only.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Surveys, 1990–91 and 1993–94.

outside school (e.g., coaching). Elementary teachers devote approximately one more hour per week to activities that do not involve students directly (e.g., grading papers). Differences by district location are less pronounced, with urban teachers occupying an intermediate position. Relative to rural teachers, they spend less time outside school in student activities, but more on other school-related tasks. When compared to suburban teachers, the pattern is reversed, with the biggest difference at the elementary level. These differences shrink slightly when controls are added for teacher experience, marital status, number and age of child dependents, subject taught, and region.

Since teachers are frequently compensated for the time they spend in after-school activities with students, hours spent on tasks like grading papers and preparing lessons may be a truer measure of the extra effort they are putting in. The increase in this variable between 1990–91 and 1993–94 suggests that recent efforts to raise academic standards are having an effect, at least where teachers are concerned. However, while urban teachers compare favorably with rural instructors, they fall behind those in suburban districts.

Table 6.—Categorical aid and special education

	Urban	Suburban/town	Rural
Categorical aid as a percentage of instructional expenditures	15.3	9.8	11.7
State funds for special education, as percentage of instructional expenditures	5.4	4.9	4.3
Percentage of students in special education	9.1	8.3	8.7
Predicted increase in percentage of special education students from:			
25% increase in students below poverty line	0.06%	0.98%**	0.32%*
$10,000 decrease in median family income	-0.15%	0.45%***	0.66%***
10% increase in percentage of students from households where English is spoken 'not well' or 'not at all.'	-1.4%**	-1.15%**	-1.11%***
Regression R^2	0.01	0.05	0.02
Number of observations in estimation samples	841	2,175	8,199

*** (**) (*) Regression coefficient significant at 1 percent (5 percent) (10 percent).

NOTE: Sample restricted to independent school districts.

SOURCE: Common Core of Data, Agency Finance Information (Expenditures and Revenues), Fiscal Year 1992, Household Information (1990 Census of Population).

Excessive Bureaucratization

While we have seen that urban school systems (and large systems in general) actually devote a smaller share of total resources to administration, this is an imperfect way of gauging the degree to which schools suffer from top-heavy bureaucracies. To explore this matter further we need to consider the qualitative side of school management (e.g., how cumbersome and restrictive are the rules under which principals and teachers must operate?).

Resources are often provided by the federal government and the states in the form of aid tied to specific programs. When revenues arrive with strings attached, administrators are denied the flexibility to rebudget as local circumstances require. Arguing for program consolidation in special education, McLaughlin (1996) writes:

> "[T]here is a long way to go in creating the types of flexible educational systems that are being promoted in current federal and state restructuring initiatives...[A] deeply embedded culture of program separation appears to support turf guarding and reinforce the belief that 'different types' of students need very different educational experiences."

Other researchers have commented on increasing specialization and bureaucratization in elementary and secondary education, in which a proliferation of mandates and targeted programs results in "the creation of specialties with an ever-narrowing realm of expertise for each specialist" (Raywid and Shaheen, 1994). As responsibility for school operations is parcelled out among a variety of administrators, each focused narrowly on the program(s) for which he is accountable, opportunities are diminished to balance competing interests in order that reasonable tradeoffs be made among various goals.

> "Is there some way...that we can hold officials responsible in any significant way for more than their own operations?... Ultimately, this is the

sort of question that must be addressed if we are ever to make major improvements as to the cost-effectiveness of all schools... Solutions are difficult, but it seems safe to conclude that minimally it will require removing the present incentives to focus narrowly and to deliberately ignore the broader context" (Raywid and Shaheen, 1994).

Are such problems particularly serious in urban schools? Table 6 displays the proportion of instructional expenditures financed with categorial or "tied" aid. Included are revenues from state or federal sources for the following programs: special education, compensatory or basic skills education, bilingual education, programs for the gifted and talented or children with disabilities, and Chapter 1 aid. Funds received for non-instructional purposes (e.g., child nutrition, transportation) are excluded from this figure. As before, summary statistics are presented for urban schools as a group, for suburban schools, and for rural schools. Because so much attention has focused on the growing share of resources devoted to special education, state aid received for special education is broken out in row two. For purposes of comparison, an alternative measure of the relative size of special education programs—the proportion of students with individualized education programs (mandated by law for all special education students)—is also provided.

Growing special education expenditures have attracted particular concern.

Urban districts finance a significantly higher share of instructional expenditures from categorical aid. While one might suspect that this difference is due to higher concentrations of poverty and other social problems in inner-city neighborhoods, this turns out not to be the case. When the share of categorical aid is regressed on the household characteristics that appear in table 2 plus the percentage of households in which English is spoken 'not well' or 'not at all,' the estimated gap between urban and other districts widens to more than 8 percent. The percentage of children below the poverty line is, of course, a strongly significant predictor of the amount of categorical aid a district receives. An increase of one standard deviation in the poverty rate—about 13 percent—raises the share of categorical aid by 4 percentage points. But unmeasured factors contribute importantly to the amount of federal and state aid received in these categories.

Growing special education expenditures have attracted particular concern. Apart from the fact that special education has proven to be enormously expensive, absorbing resources that could be devoted to general education, questions have been raised about the appropriateness of many placements. Reports in the press have described a variety of abuses: students who are placed in special education because they speak English poorly; racial and ethnic minorities who are discriminated against by teachers who underestimate their cognitive abilities and misread behavior shaped by unfamiliar cultural backgrounds; districts that place large percentages of students into special education to obtain extra state and federal revenues. To investigate these concerns, the percentage of students placed in special education was regressed on the household characteristics in table 2 plus the following additional regressors: the percentage of households in which English is spoken not well or not at all, the percentage of school-age children who belong to racial or ethnic minorities (blacks, Hispanics, Native Americans, Asians) and per-pupil current expenditures less state aid received for special education. Inclusion of this last variable allows us to examine whether districts with fewer resources apart from special education aid respond by placing more students in special education, other things equal.

The lower panel of table 6 presents selected results. While there are doubtless problems in some districts, these results do not support the notion that special education plays a disproportionate role in the schooling of the economically and socially disadvantaged. Very large changes in median income or pov-

Table 7.—Principals' influence and autonomy

	Public			Private	
	Urban	Suburban	Rural	Urban	All
Percent of principals/heads indicating they have 'a great deal' of influence over:					
Curriculum	17.9	20.0	23.4	65.4	63.6
Hiring	52.5	62.0	61.4	81.6	80.2
Discipline policy	52.5	58.7	56.7	82.0	80.8
How budget is spent	36.2	36.3	28.3	63.5	63.0
Percent of principals/heads indicating school or governing boards have little or no influence over:					
Curriculum	12.9	13.6	17.9	33.5	35.4
Hiring	35.6	34.1	21.0	46.5	44.7
Discipline policy	8.9	8.1	6.7	34.0	31.9
How budget is spent	15.0	12.3	6.8	25.4	25.5
Percent of principals indicating little or no influence by state department of education, district staff, or school board over:					
Curriculum	.6	.85	.4	—	—
Hiring	9.5	10.5	8.5	—	—
Discipline policy	4.4	4.8	3.7	—	—
How budget is spent	6.6	4.9	2.8	—	—

— Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1993–94.

erty rates within the district have virtually negligible impacts on the percentage of special education students. There is no evidence that students with English language problems are being shunted into special education on a systematic basis, either in urban districts or elsewhere. Except in rural systems, an increase in the percentage of minority students actually reduces special education placements, though the effects are very small. The very low R^2 in each of these equations is reassuring, as it implies that special education enrollments are not a function of students' socioeconomic characteristics.

In summary, while this analysis has not found signs of systematic abuses in special education placement (and certainly no evidence that there is more abuse in urban systems than elsewhere), urban districts do receive a significantly higher proportion of revenues as programmatic aid. If the views cited above are correct, the regulations and oversight that accompany such funding may constrain local decision makers. This is only one reason why urban administrators and teachers might enjoy less autonomy and flexibility than educators elsewhere. In addition, the well-publicized problems of urban schools may have prompted efforts to fix the system from above by imposing additional rules and constraints on teachers and principals. The sheer size of urban school systems is apt to enhance the power and prerogatives of central district bureaucracies. As a result, administrators at the school level may find themselves unable to allocate funds as cost-effectively as possible or to hire job applicants of their own choosing in a timely manner, to cite only two policy concerns.

Describing reforms in school finance that would provide a foundation for higher student achievement, Allan Odden identifies "a focus on the school as the key organizational unit" and the "devolution of power over the budget

and personnel to schools" as key components (Odden, 1994).

> "Findings from multiple strands of research suggest that a decentralized, high involvement organization and management strategy (i.e., school-based management) should explicitly be made part of systemic reform. This research concludes that SBM would work most effectively if information, knowledge, power and rewards are decentralized to the school level."

How far public schools are from realizing this objective is shown, in part, by principals' perception of the limits of their authority. The top panel of table 7 displays responses to the 1993–94 SASS on the part of public school principals and private school heads when questioned about their influence over curriculum, hiring, discipline, and the budget. While urban principals generally indicate they have less influence than do their counterparts in suburban and rural districts, the most striking contrast is between public principals and private school heads, who have substantially more say about the way their schools are run in each policy area.

Also important is the extent to which principals' managerial prerogatives are constrained by decisions taken at higher levels. The middle panel displays the percentage who indicated that school boards (governing or diocesan boards in the case of private schools) exercised little or no influence over policy. Again, responses show that private school heads are far more likely to run their schools without interference from above. In fact, these responses understate the magnitude of this type of interference in the public sector, where state Departments of Education and central district offices also exercise regulatory oversight and shape educational policy. The bottom panel of table 7 displays the percentage of public school principals who indicated that none of these other bodies had appreciable influence over policy in the same four areas. As one would expect, the percentages are very small.

This is not to suggest that public schools would be better managed if school boards and Departments of Education exercised no regulatory oversight. Under the present system of public education, this oversight is the principal means by which schools financed with taxpayer dollars are held accountable to the public. What the comparison with private schools reveals is that alternative mechanisms for preserving accountability exist that offer school heads considerably more autonomy. The chief mechanisms within private education are, of course, the competitive market and consumer sovereignty.

Much of the current interest in school choice within public education derives from the belief that educational performance will improve if public schools are also exposed to competitive market forces. By creating opportunities for parents to select other schools if they are not satisfied with the school to which their child was assigned by virtue of residential location, choice plans put pressure on administrators and teachers to correct deficiencies in their programs.

Much of the current interest in school choice within public education derives from the belief that educational performance will improve if public schools are also exposed to competitive market forces.

Responses to the 1993–94 SASS show that nearly half of all urban school systems offer parents some form of school choice. One-fifth have established one or more magnet schools, one-fourth offer choice of schools within the district, and nearly 40 percent allow parents to choose schools outside the district. An almost equal percentage accept students from other districts. All of these measures are higher than the corresponding rates among non-urban schools.

Whether these plans are likely to improve efficiency is another matter, however. Parental participation rates are much less impressive. Only 7 percent of the students in urban systems containing magnet schools actually attend one of these schools (though this is more

Table 8.—Salary incentives in public schools				
Purpose of incentive and location	Percent of districts	Percent of schools	Percent of teachers	Percent of schools with unfilled vacancy
Shortage subject				
Urban	9.3	23.6	30.4	37.2
Suburban	8.8	13.5	13.6	23.8
Rural	8.3	8.7	8.9	14.2
Undesirable location				
Urban	4.4	11.1	13.7	17.2
Suburban	2.8	6.9	6.7	9.4
Rural	5.2	5.3	5.4	4.9
Merit pay				
Urban	15.0	16.5	16.3	14.7
Suburban	5.9	10.7	10.7	9.6
Rural	12.1	13.4	13.7	13.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1990–91.

than twice the rate of suburban and rural systems). Participation rates in other choice plans are still lower and do not differ systematically by urbanicity. In those urban districts that allow within-district choice, only 11 percent of students actually exercise it. Ratios are substantially lower for inter-district plans. There is, moreover, a significant difference between urban districts and others in the direction in which students are likely to travel: while urban systems are more likely to receive students from other systems than to see their own students leave, the reverse is true of suburban and rural districts. This may indicate that urban students are at a relative disadvantage in learning about opportunities outside the district or finding transportation into neighboring communities. It may also show that these communities have found ways to discourage the participation of inner-city students.

In sum, urban systems are more likely to offer various types of school choice than are suburban or rural districts. However, participation rates are low. Combined with evidence that urban students may have fewer de facto opportunities to attend schools outside their home districts, it seems doubtful that school choice, at least in most communities where it is found, operates on the scale needed to have a significant effect on school performance.

Teacher Salaries

Teacher compensation in public schools is determined by salary schedules that reward teachers for experience (and/or seniority in the district) and for earning advanced degrees or college credits. As a rule, schedules make no distinction by subject taught or quality of teaching performance. Compensation for subject area knowledge of teaching expertise is generally provided, if at all, through add-ons such as merit pay or policies that allow administrators to make exceptions to the schedule (e.g., placing a teacher on a higher step than he would be entitled to on the basis of education and experience). These special provisions aside, the use of single salary schedules to determine the compensation of all teachers in a district has been criticized for (1) inflexibility in the face of varying market conditions; (2) rewarding attributes that bear little or no observed relationship to teaching effectiveness (e.g., advanced degrees); (3) providing no incentive for improved performance.

As shown in table 8, the majority of school districts do not use special incentives to recruit teachers in subjects where there is a shortage of qualified instructors, to staff positions in undesirable locations (e.g., high-crime, high-poverty inner city neighborhoods), or to reward merit. Urban districts are somewhat more likely to use these incentives than other systems. District size also has an important influence on whether pay incentives are available to recruit teachers in shortage areas: although the percentage of urban systems that use such incentives is only 9 percent, fully 30 percent of urban teachers work in these systems. Similarly, almost 14 percent of urban teachers work in systems that reward teachers for accepting a position in an undesirable location (though only 4.4 percent of districts use incentives for this purpose). Finally, schools were more likely to use these incentives if they had one or more unfilled vacancies, suggesting that salary flexibility is more likely to be found in districts that have trouble recruiting.

Table 9 displays further information on this point. Schools are distinguished not only by urbanicity but also by the ease with which they recruited teachers in the seven subjects listed. Schools classed as D reported that they found it very difficult or impossible to fill a vacancy in these subjects; the remainder, ND, found it easy or only moderately difficult. (Schools that did not recruit in these subjects are omitted from the analysis.) Two things stand out. As a rule, schools that had trouble filling positions were more likely to use some kind of incentive pay for teachers in that subject. This is especially true of urban schools. However, in no category did the use of incentive pay even approach 50 percent. Thus, too few schools use these incentives, while in those that do use them, the extra pay does not appear to have solved the problem: recruitment in these subjects remains a problem.

Unfortunately, SASS did not ask teachers who received these incentives how much extra compensation they obtained. As a result, this question must be investigated by estimating teacher earnings equations. The estimation sample comprised full-time teachers from the 1990–91 SASS. The dependent variable was the natural logarithm of a teacher's base salary plus bonuses. Independent variables included controls for starting pay within the district and for a teacher's education and experience. The data contained discrepancies: some teachers claimed to receive extra compensation from districts that did not acknowledge using the incentive in question. Statistical analysis suggested that most of these cases represented response error on the teachers' part.[7] As a result, only those teachers who claimed to receive extra compensation from districts affirming the use of such an incentive were treated as bona fide recipients.[8]

Selected results are displayed in table 10. Coefficients on incentive pay in the public sector equation are small and almost always statistically insignificant. The largest in magnitude, for teaching in an undesirable location, are actually of the wrong sign (though imprecisely estimated). Only merit pay in rural schools enters with a significant positive coefficient.

Although there were not enough observations in the private school sample to estimate separate coefficients for urban schools, the overall results suggest that merit pay makes a significantly larger contribution to the salaries of private school recipients. In fact, the difference is considerably understated by the coefficients in table 10. Further analysis of re-

. . . schools were more likely to use these incentives if they had one or more unfilled vacancies, suggesting that salary flexibility is more likely to be found in districts that have trouble recruiting.

[7] As a group, these teachers were paid no more than other instructors at the same schools (controlling for experience and education). In fact, there was marginally significant evidence in the case of self-styled merit pay recipients that they received less.

[8] A second set of dummy variables identified all teachers (not just recipients) employed in districts with special incentives for teaching in shortage fields and undesirably locations, for merit, and for mentoring. These additional controls were introduced so that the coefficients on incentive recipients would not pick up purely district level effects.

Table 9.—Percentage of schools using pay incentives to recruit teachers, by shortage area

Subject area	Urban		Suburban		Rural	
	Not difficult	Difficult	Not difficult	Difficult	Not difficult	Difficult
English as a second language	35.7	29.3	6.5	4.5	7.3	7.7
Biology	3.5	27.2	2.6	0.0	1.9	2.8
Physics	4.5	32.4	2.9	0.0	1.7	7.5
Mathematics	7.6	30.4	3.8	7.0	2.9	8.2
Special education	17.1	24.0	8.9	15.7	4.9	6.1
Foreign languages	4.0	12.8	1.7	5.7	1.4	2.7
Vocational education	4.4	7.2	1.8	5.5	1.9	2.3

NOTE: Schools that did not recruit in specified subjects were not used in computations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1990–91.

Table 10.—Teacher earnings (standard errors in parentheses)

Percentage change in salary for	Public	Private[1]
Shortage subject		3.6 (5.4)
Urban	1.2 (1.3)	
Suburban	-.4 (2.5)	
Rural	-.3 (2.1)	
Undesirable location		([2])
Urban	-1.1 (1.9)	
Suburban	-3.2 (3.3)	
Rural	-5.4 (3.6)	
Merit pay		8.7 (2.5)***
Urban	1.3 (1.4)	
Suburban	.7 (1.3)	
Rural	2.6 (.9)***	
Elementary level	-.5 (.2)***	-3.7 (.8)***
Number of observations	38,069	3,576
R^2	0.76	0.69

*** Coefficient significant at 1 percent.

[1] Excludes teachers employed in schools that do not use salary schedules and teachers contributing services for less than market wages (e.g., members of religious orders).

[2]Not asked of private school teachers.

NOTE: Additional regressors included district's starting pay for new teacher with a bachelor's degree, additional pay for new teacher with master's degree, average annual increment in pay for each additional year of experience (censored at 20 years), previous part-time experience, possession of sixth-year certificate or Ed.D., marital status, race (black), ethnicity (Hispanic), age, gender. Private school sample also includes binary indicators for teachers receiving in-kind compensation (tuition for faculty children, meals, housing), Catholic and other-religious schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey, 1990–91.

sponses to the 1990–91 SASS shows that most private schools using merit pay award it as a step increase on the salary schedule or build it into the teacher's base in some other manner. Fewer than 30 percent make one-time cash awards. By contrast, more than 60 percent of the public schools that use merit pay award it as a one-time cash bonus. Thus, not only are merit awards larger at a single point in time in the private sector, but these awards are more likely to be received on a recurring basis.

Table 10 also shows that public elementary school teachers earn virtually the same salaries as secondary teachers. This is not surprising, of course, given the widespread adoption of uniform salary schedules for all teachers in a district. It also shows how unresponsive public school salaries are to market conditions. By every indication schools have little difficulty recruiting elementary teachers. Eighty-four percent of the public schools that recruited elementary teachers reported to SASS that it was 'easy' to fill these vacancies. By contrast, the percentage for physics was 50 percent, for mathematics 58 percent, and for foreign languages 42 percent. Yet teachers in all subject areas are paid according to the same schedule.

On this score, compensation policies in the private sector appear to be just about as rigid, since the estimated difference for elementary teachers in the private school equation is also small, just under 4 percent. However, the model controlled for starting pay at the school as well as the salary increments (again at the school) for teachers who obtain a master's degree and for an additional year of experience. Since most of the difference between elementary salaries and secondary salaries in the private sector arises between schools rather than within a school, the coefficient in table 10 substantially understates the amount by which elementary and secondary salaries differ. This is clearly seen when school-level controls are removed from the model and teacher pay is regressed on teacher experience, education, and a dummy variable for school level: elementary school teachers in the private sector earn an average of 16 percent less than secondary teachers with comparable degrees and experience. The difference remains substantial (13 percent) when controls are added for race, gender, marital status, and age. When the same equation is run for the public sector, the gap between elementary and secondary pay on average is only 2 percent. With the addition of demographic variables it falls to 1 percent.

Summary and Conclusion

In some respects, urban public schools compare favorably with public school systems elsewhere. The proportion of current expenditures allocated to instruction is no lower than in suburban and rural districts. Urban districts are more likely to use pay incentives to recruit teachers, particularly in areas where qualified instructors are in short supply. They are also more likely to offer students and their parents some form of school choice. They occupy an intermediate position between suburban and rural districts with respect to the time teachers devote to school-related activities outside regular school hours. Although a slightly larger percentage of urban students are enrolled in special education, there is no evidence of systematic abuses (i.e., increasing special education enrollments associated with poverty, race, ethnicity, or use of language other than English at home). This is not to say that urban schools could not accomplish more with the resources they have, only that on these counts they appear to be following as effective a set of policies as public school systems in suburbs, towns, and rural communities.

By several indications, however, there are problems with the urban policy mix. First, there is virtually no evidence that urban school systems are benefitting from economies of scale at the district level. The average district has three times the enrollment of the average

[While], in some respects, urban public schools compare favorably with public school systems . . . there are problems with the urban policy mix.

suburban district, yet there appear to be no savings in administration or other central office operations. This suggests that the typical urban district exceeds the size at which scale economies have been realized. Similarly, while there is evidence of scale economies at the school level, the savings per student is quite low, on the order of $25 to $50. Given findings in the education production literature that students benefit from smaller, more personal learning environments, one must question whether savings of this magnitude justify current school sizes.

Some of the comparisons that appear to favor urban schools turn out to be less favorable when one looks beneath the surface.

A larger proportion of urban revenues is received as programmatic aid, a circumstance that tends to increase administrative costs and deprives local officials of flexibility. Teacher absenteeism appears to be a greater problem, though not necessarily because absentee rates are actually higher. Rather, urban districts may have more difficulty finding (or affording) capable substitutes or dealing with the disruptions caused when regular classroom teachers are not present. There is some evidence, albeit indirect, that urban systems also employ more teachers in non-teaching roles: class sizes tend to be larger, though aggregate student/teacher ratios are actually lower.

Some of the comparisons that appear to favor urban schools turn out to be less favorable when one looks beneath the surface. Although more urban systems have established school choice programs, the proportion of students who actually participate in these programs is low and not very different from that found in suburban and rural systems. On paper there is choice, but in reality few families exercise it. Similarly, while a much higher proportion of urban systems indicate that they use salary incentives to recruit teachers, especially in shortage subject areas, most of the districts that do so continue to experience difficulty recruiting. Moreover, analysis of teacher salaries fails to find any evidence that teachers who receive these incentives (by their own report) are actually paid more than those who do not.

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Reinventing Education Finance: Alternatives for Allocating Resources to Individual Schools

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He holds a BA, MA, and Ph.D. from Stanford and undertook postdoctoral study at Harvard in economics and public finance. He is the author or co-author of ten books, and more than 200 professional and scholarly articles. He is the president of a private management consulting corporation, Management Analysis and Planning (MAP) which specializes in education finance and litigation support, which has offices in Sacramento, California, and Washington, DC. He resides in Nashville, Tennessee.

Selected Papers in School Finance

Reinventing Education Finance: Alternatives for Allocating Resources to Individual Schools

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Introduction

This paper alludes to the conventional manner in which the United States has chosen to finance its public elementary and secondary schools and suggests that these mechanisms should be altered to empower individual schools more fully. The paper's principal thesis is that education governance mechanisms have evolved in a manner which disconnects them from the practical operations of schools and the functional integrity of the latter has been badly impaired as a result. Presently, both accountability and practical decision making authority are misplaced. Those empowered to make education decisions do not operate schools. Existing financing mechanisms exacerbate this condition. Selective incremental changes, such as mandating that 90 percent of revenues be allocated to schools and that states require each district to maintain accounts for individual schools, or more radical reforms such as charter schools, contracting out, or vouchers could begin to alter the imbalance between governing authority and operating discretion. The data availability alterations which might accompany school by school financing, could also enhance our analytic capacity and, eventually, render schools more efficient.

What is the Problem and What Explains It?

American public education apparently exhibits a kind of institutional schizophrenia. On one hand it is said to suffer from such an excess of democracy that it is overly vulnerable and dysfunctionally responsive to virtually every special interest that can print a letterhead and manage to mount a protest or campaign.[1] On the other hand, analysts claim that the loosely coupled manner in which public education's operating arm is connected with the governance systems renders schools remarkably resistant to any fundamental change shaped by the formal authority of the political system.[2]

[1] See Chubb and Moe (1990).
[2] See Weick (1982).

This dual personality exposes public education to criticism of every imaginable stripe. There are those who claim that contemporary schools have lost their purpose amidst a bewildering sea of constituent demands for AIDS education, classroom prayers, multicultural sensitivity, consumer awareness, environmental consciousness, self esteem enhancement, feminine liberation, drug and alcohol prevention, driver education, etc. Similarly, there are other critics who contend that public education is the helpless captive of narrow self interests such as educationists, teacher unions, committed egalitarians, or professional administrators all of whom steadfastly resist any significant change.

America's public education system has evolved governance and finance arrangements which are inappropriately or inadequately aligned with arenas of action.

Its public nature, political vulnerability, and operational magnitude make American education virtually a Rorschach test. Critics can impute to it almost any societal flaw or personal disappointment. It is almost as difficult to gain agreement regarding what is wrong with education as it is to reach consensus about a solution. However, the most widely publicized and currently fashionable governance and finance solutions, appear to have a common theme embedded within them. Proponents of breaking up big city districts, relying upon magnet schools, allowing open enrollment, establishing charter schools, permitting private contractors to operate public schools, and advocates of voucher plans seem to share several critical elements.

America's public education system has evolved governance and finance arrangements which are inappropriately or inadequately aligned with arenas of action. In effect, when it comes to the nation's public schools, power is poorly positioned to produce performance.

A succession of twentieth century governance and finance reforms has left a set of education officials publicly visible and politically vulnerable while simultaneously eroding the functional integrity of the very institution responsible for instructing students, the individual school. State legislators and governors and local school board members and their superintendents have decision making authority and they can be held accountable. They are formally authorized to make policy for America's education systems and they can be elected, diselected, censured, recalled, and fired. Indeed, individuals in these offices turn over with regularity. However, these individuals, regardless of how important they appear on a formal chart of government organization, do not actually operate schools or provide instruction. Moreover, they have remarkably little ability to influence those who do.

Conversely, individuals who actually operate schools, upon whom the success or failure of a school is tightly tied, have exceedingly little formal authority, frequently have virtually no control over budgetary matters, and are virtually invulnerable to the conventional mechanisms of accountability. These are principals and teachers. It may indeed be just that since they are so poorly empowered they should be so powerfully protected from the consequences of poor performance.

How did matters come to be so disconnected? When it comes to public education, how come those in charge can do little and those who could do much have been empowered to accomplish so little? This misplaced authority and control over resources was not a conscious creation. It is the unintended result of numerous well meant education reforms. Size is the principal culprit. We have encouraged the formation of huge school districts which have outrun our capacity to manage. However, dysfunctional scale is not the only problem. Excesses resulting from Progressive Era political reforms, the "Scientific Management" movement among school administrators, community severing judicial decisions, and 1960s and 1970s federal and state government categorical aid fusillades have all contributed to this governance impasse. State school finance arrangements, by assuming the district as the central operating unit, reinforce the status quo and typically do little to improve the situation.

Everything Got Bigger: The School District Consolidation Movement[3]

America continues to be a nation of relatively small school districts. In 1990, 90 percent of the local school districts in the nation each enrolled 5,000 or fewer students. Smaller yet, 80 percent of all districts each enrolled fewer than 2,500 students. What then is the size problem?

The problem is on the other end of the distribution. Fifty percent of the nation's public school pupils are enrolled in only 5 percent of the nation's school districts. These large districts include the nation's premier cities such as New York, Los Angeles, Chicago, Washington, DC, and Dallas. They also contain the largest concentrations of low income, dropout prone, and low achieving students. These are the very districts whose elite populations have come most to depend upon private schooling. These are the districts most jeopardized by past and impending middle class flight. These are the very districts whose pupil populations are at the greatest risk of educational failure, and for whom one could argue the nation should have the greatest concern. Yet, these are the very districts in which the governance impasse is the most intense. The further irony is that the reforms which led to this condition were intended originally to make everything better.

In 1931 there are 127,531 U.S. local school districts.[4] Thereafter, state officials responded to a coordinated plea by business leaders, college professors, and National Education Association experts to eliminate small, usually rural school districts and consolidate them into larger administrative units. The campaign was remarkably successful. Consolidation advocates made a common-sensical appeal asserting that small districts were educational ineffective and economically inefficient. They amassed almost no empirical data in support of their position. Nevertheless, within a 50 year period, even with major distractions such as the Great Depression, World War II, and the post war baby boom, the number of local districts was reduced eightfold, to slightly fewer than 16,000. This figure has continued to shrink, though at a slower rate. Today, there are estimated to be approximately 15,200 local school districts. (All but a few dozen of the non-operating districts have been eliminated.)

Among the less heralded consequences of this dramatic reduction in units of government is the status of representativeness. The number of school board members nationwide was reduced accordingly from a pre-reform estimate of more than 300,000 to today's level of approximately 50,000 to 55,000. Of course, the nation's population increased along the way. Thus, whereas there used to be a school board member for every 300 or so citizens, each such office today must represent approximately 5,000 constituents. Distribution around such mean figures is enormous. Central city school board members in districts such as New York and Los Angeles represent a million constituents. A few small districts conceivably have more school board members than students.

Fifty percent of the nation's public school pupils are enrolled in only 5 percent of the nation's school districts.

The school district consolidation movement may have created larger numbers of larger districts. However, it did not create large cities. They existed before the 1930s and their school districts already had large numbers of students for whom they were responsible. Something more must have been operating to transform these systems, which at the turn of the century were thought to have the nation's best schools, into the stultifying bureaucracies which critics claim they have become.[5] The something more came in two waves. The first, before World War II, came in the form of a

[3] Data in this paragraph were derived from the *Digest of Education Statistics, 1990*. See U.S. Department of Education (1991).

[4] These and other data in this paragraph were derived from *1991–92 Estimates of School Statistics*. See National Education Association (1992).

[5] See Kozol (1967).

cadre of professional administrators, and growth of political centralization. The post World War wave came in the form of judicially imposed racial desegregation plans and a spate of Johnson Era categorical aid programs.

"Scientific Management" and the Growth of Educational Administration

Frederick Winslow Taylor (1911), an industrial engineer who pioneered widespread employment of time and motion studies and efficiency applications to business production was a cult hero in his time.[6] He was a turn-of-the-century counterpart of contemporary business advisers and organizational gurus such as Demming, Drucker, Covey, Peters, and Senghe.

. . .Taylorism had quite a dramatic impact. It vastly abetted school administration as a profession . . . "Scientific Management" assisted the field in transforming itself into one which had professional legitimacy.

Taylor and his colleagues' efficiency and time use notions, which came to be labeled "Scientific Management," were quick to be adopted by the fledgling field of school administration. Who could resist rendering schools more efficient and who better to apply the new efficiency principles than trained school administrators. The long lasting effects upon instruction were few. Nevertheless, Taylorism had quite a dramatic impact. It vastly abetted school administration as a profession. While the growth of big city schools had already created the need for managers, which further eroded the sovereignty of school board members, it had not yet spawned a "profession." Early big city administrators were more civil service clerks. "Scientific Management" assisted the field in transforming itself into one which had professional legitimacy. Because they "knew" how to operate schools efficiently, they could command authority and in that way began to draw power from school board members.

Progressive Era Reforms

The excesses uncovered by turn of the century literary "Muckrakers" were not restricted to the meat packing industry scandals disclosed in Upton Sinclair's famous novel, *The Jungle.* Public institutions, particularly, in cities managed by big political machines, were found to suffer from similar corrupt practices such as rampant nepotism, illegal rebates, and sweetheart contracts. Progressive Era reformers diagnosed the problem as an excess of partisan politics and prescribed a heavy dose of government centralization as a cure. Their reasoning was that if small, relatively invisible, ward based decision making bodies were consolidated into highly prominent central city school boards, often appointed or selected in a manner which would separate their members from the dirty partisanship politics of machines, they would attract citizens of a higher caliber, more likely to make decisions in the best interest of the overall community.

Big city school districts all over the nation, but most particularly on the eastern seaboard and in the midwest, underwent a series of governance changes as a consequence. Ward based elected school boards were generally eliminated. Central city boards, often appointed, replaced them. Corruption probably was diminished. However, yet greater authority came to rest in the hands of fewer individuals. Close links to constituents probably suffered in the process. The biggest winners of all may have been the school managers just then beginning to burgeon as a profession.

Racial Desegregation[7]

The Warren Court's unanimous 1954 decision to render racially segregated dual school systems unconstitutional must surely be one of the most significant domestic decisions of

[6] See Taylor (1911).

[7] See Kluger (1975) and Horowitz (1977).

the twentieth century. The repercussions are still being experienced five decades later. However, once the judicial genie of desegregation was released, it could not be restricted to the South.

The legal logic which impelled the U.S. Supreme Court to find explicitly segregated schools to be unconstitutional also persuaded state and federal district courts that more subtle forms of segregation were also illegal. Hence, cities as far from the South as Boston, Denver, and San Francisco found themselves wrestling with court ordered desegregation plans. Desegregation opponents resisted both militantly and passively. White dominated southern state legislatures rescinded compulsory school attendance statutes. One Virginia county (Prince Edward) actually suspended public schooling. White students flowed in droves to private, racially segregated "White Academies." Resistance outside the south was sometimes more subtle, but often more effective. Many middle income white families sought refuge in the de facto segregated public schools located in suburban districts.

Where desegregation actually occurred, it was often black households which bore the brunt of transportation burdens. They disproportionately rode buses to attend schools outside their immediate neighborhoods. The numbers of black and white students attending school together may have increased. However, there was a price to pay. Particularly for many black households, an easy interaction with a conveniently located neighborhood school was no longer possible. Also, from the standpoint of many desegregating school districts, there was a new government authority with overarching power, a supervising federal judge. These judges were not simply another elected official with whom one negotiated on matters in conflict. Unlike a fellow school board member, a city council official, or a mayor, these judges held all the cards. Negotiations were not typically a part of their modus operandi. School governance and finance was all the more complicated as a consequence. Accountability was diluted also.

Federal and State Categorical Aid Programs

The early years of Lyndon Johnson's administration benefited from a remarkable coincidence of political and economic circumstances. Johnson's 1964 landslide Presidential victory over Barry Goldwater provided him with a hundred seat Democratic margin in the House of Representatives as well as a comfortable Senate majority. The economy, fueled by a Vietnam war military buildup, had recovered from a recession. These conditions, when mixed with Johnson's master command of the political process provoked an outpouring of social legislation such as had not been seen since the Great Depression.

Among the bills were many that concentrated on education, K–12 schooling particularly. The centerpiece was the 1965 Elementary and Secondary Education Act (ESEA). However, professional development, vocational education, international education, bilingual education, and migrant education were also included in the President's portfolio. The momentum was sufficient that even when LBJ forwent a second elected term, the bills kept coming under President Nixon. For example, as an aid to racial desegregation the Nixon Administration sponsored the Emergency School Assistance Act and education research initiatives. Subsequently, President Carter endorsed the Education for All Handicapped Children Act and the formation of a separate federal Department of Education.

While federal authorities were enacting new school programs, state officials were similarly engaged. Thus, the decade from mid-1960s through the middle of the 1970s witnessed literally dozens of new categorical aid programs, some state, some federal, intended to aid local school districts in coping with specialized problems.

While federal authorities were enacting new school programs, state officials were similarly engaged.

. . . State finance mechanisms reinforce existing dysfunctional relationships and big city budgeting procedures exacerbate [. . . the disjuncture in America between education's political accountability and practical authority].

An unanticipated outcome of this proliferation of special programs was a substantial increase in special program administrators. Both federal and state governments were anxious to ensure that their funds were appropriately deployed. Hence, they promulgated rules and the rules had to be properly overseen. Most federal and state categorical programs required a local school district central office administrators to assist individual school sites. These administrators drew their legitimacy not from the superintendent or local school board, but from more remote authorities in state capitals and Washington, DC. School principals now were beholden not only to the conventional chain of command, running up through their central office to the superintendent, but also to a categorical chain of command running from their central office, bypassing the superintendent, and leading to a state or the nation's capital. Administrative complexity resulted, and accountability at the school level was dealt yet another blow to the organizational solar plexus.

The Consequences for Education and for Schools

The above-described changes in education and education governance have accrued to three major consequences. First, district level decision making has become remote, diffuse, and divorced from the operating authority of schools. School board members and superintendents are accountable to the public, but they have relatively little direct influence over the operation of schools. Conversely, the persons who do operate schools, principals and teachers have been stripped of the governing and financing authority they need to perform effectively.

Second, the operational integrity of the school has been dysfunctionally disrupted. It is difficult for a principal and his or her staff to forge a unified vision of the manner in which a school should operate. Principals, and to some degree teachers, are perpetually being second guessed by an authority structure which relies upon court decisions, state and federal categorical aid programs, teacher union contracts, and statutes which empower districts not schools.

Third, accountability mechanisms have become misdefined and misaligned. The proliferation over the past half century of out-of-school decisions makers has led to an enormous set of local district, state, federal, and judicial rules by which schools are expected to operate. These rules are relied upon by remote authorities to ensure that revenues are expended in a legal and equitable manner. The rules are seldom oriented toward ensuring either good practice or enhancing academic performance. The net result is that school administrators are now held responsible for complying with rules rather than creating and sustaining schools which power student achievement.

Principals, particularly in our largest school districts, are seldom significant decision makers. Personnel, budget, curriculum, special program, and even instructional material decisions are often made "Downtown." When decisions are made elsewhere, the accountability machinery is impeded. The answer to the question posed of schools, "Who is in charge here?" The answer is "Everybody is in charge here." When everyone is charge, it is difficult to hold anyone responsible.

Where Does School Finance Fit In All of This?

State level school finance arrangements are not the root cause of the disjuncture in America between education's political accountability and practical authority. Other predisposing conditions must assume the principal blame. However, state finance mechanisms reinforce existing dysfunctional relationships and big city budgeting procedures exacerbate the problem significantly.

State Distribution Mechanisms

Virtually since there were states, this level of government has possessed plenary authority for education. However, unlike most other nations, the United States has opted to exercise this authority through rules of law, rather than by constructing an institutional basis for state control over schooling. The financing of schools is part of this abstract state legal structure. State statutes assume the primacy, for school finance purposes, of local school districts. Taxation and distribution policies take the district to be the responsible operating unit upon which the state bases its calculations regarding effort and subsidy. It is also the local school district which is the recipient of categorical aid revenues and it is the local district which is fiscally accountable to the state.

These state mechanisms assume and reinforce the dysfunctional schism between accountability and authority. State statutes assume that local school district officials will make appropriate decisions regarding the allocation of revenues to schools. In fact, the majority of large districts have opted for a procedure which is mechanically easy and provides the appearance of fairness. However, they seldom opt for distribution procedures which enhance effectiveness or ensure equity.

Delimiting the Debate

Before condemning all of school finance, it should be understood that the problem is not all encompassing. Revenue generation, regardless of its many faults and accompanying inequalities, is not flawed by school district size, categorical aid programs, scientific management, etc. In fact, revenue generation has been, on some dimensions, aided or at least made more equitable by the United States having consolidated many small rural districts.

Similarly, the vast majority of United States districts do not suffer from the disjuncture of governance and operation. The 80 percent of districts which serve 2,500 students or fewer, and perhaps even the 90 percent of districts which serve 5,000 or fewer students, are not the ones for which finance distribution reform is a major problem. These smaller districts enroll approximately one-half of the nation's public school students.

Where is the Problem? In the Other (Larger) Half

The "problem" is most acute in America's large, and particularly in its largest, school districts. Fifty percent of the nation's public school students are enrolled in only 5 percent of the nation's school districts. These big, and usually big city, school districts typically rely on formulaic or mechanical budgeting procedures which, under the guise of promoting equity, actually eviscerate accountability and productivity and may well harm equity in the process.

Revenue generation, regardless of its many faults and accompanying inequalities, is not flawed by school district size, categorical aid programs, scientific management, etc.

In most large school districts, important resources are assigned to schools using mathematical formulas.[8] What a school receives will depend on a few basic numbers, such as number of students and size of building. These numbers are inserted into district developed official formulas to allocate teachers, administrators, support staff, books, supplies, and other major resources.

Allocation of Teachers. Teachers will usually be allocated according to the number of students expected to enroll in a particular school and according to the class size the district seeks for that level of school. Total projected enrollment, divided by desired, or contractually determined, class size, will produce total teachers allocated to a school.

[8] See U.S. Department of Education (1989).

Typically, the allowed class size is smaller at the secondary level than at the elementary level. For example, a district central office may allocate one teaching position for each 25 students at a high school and one teaching position for each 28 students at an elementary school. Thus, a high school of 1,500 will then receive 60 regular classroom teaching positions, while an elementary school of 700 will receive 25.[9]

These allocations, like other personnel allocations, may be counted in numbers of "full-time equivalencies" or "FTEs." When part-time staff are used, or a single person divides time between several school sites, the building is listed as having a fraction of an FTE. The FTE count gives a more precise sense of how a school is staffed than a statement which counts full-time and part-time staff equally.

Most districts are firm about using these formulas, because they are seen as essential to ensuring equity among schools . . . [However,] exceptions may . . . be allowed when a school faces unusual circumstances.

Allocation of Other Personnel. Some other positions are also likely to be allocated according to number of students. A vice principal may be assigned, for example, for every 500 students. Librarians, clerks, department chairs, social workers, and so on may be assigned on the same basis.

Some positions, such as custodians and groundskeepers, may depend on other factors, such as building size. Custodians may be allocated based on size of the facilities, and gardeners or groundskeepers may be a function of total square footage around the school building.

Allocation of Materials. Many school supplies will be allocated on a per-pupil basis. Thus, the textbooks, chalk, paper, science materials, and student workbooks may be assigned based on expected enrollment. Alternatively, the school may be allocated a dollar amount per pupil to cover these costs, giving the principal or teachers some discretion about just which items to procure. If there is any discretion allocated to school site personnel regarding the budget, this is a likely category.

Exceptions to the Formulas. Most districts are firm about using these formulas, because they are seen as essential to ensuring equity among schools. The district may make exceptions to provide a minimum level of staffing for a small school. For instance, if the standard formula allows a counselor for every 700 students, a school may receive one counselor even if it only has 500 students. Exceptions may also be allowed when a school faces unusual circumstances. For example, a school may have a good case for an additional teacher or counselor if it receives a sudden influx of students who do not speak English.

Centralized Services. Not all the district's revenues in the budget will be allocated to individual school sites. Some noninstructional functions are provided at the district level, such as legal services and business. Some other functions serve two or more schools—such as transportation or a district maintenance office and these may also be organized centrally. Depending upon district practice, a greater or lesser amount of the total budget will be held centrally, its allocation determined by districtwide administrators.

There are large segments of school district resources which could easily be allocated to individual school sites, but typically are not. These budget lines are held centrally. For example, individual schools frequently do not have a substitute teacher budget, a line item for minor maintenance and repair, or a line item for utilities. The unwillingness to allocate these resources to school sites triggers inefficiency. Not believing they have responsibility for or control over utilities, for example, erodes school level inducements to turn out lights or save on heating or air conditioning. Substitute teacher use is an even larger problem.

[9] Class size is typically a function of state law regarding maxima, teacher union-school district labor contracts, practices in surrounding and competing districts, and history.

An Important Omission. Capital costs are seldom allocated to schools. What is cost over time to construct and renovate a school are costs frequently born through some kind of debt instrument. These costs while borne by the taxpayers of a local school district or states are almost never conceived of in public school systems as something that should be embedded in data used for making school site decisions. Most American public school principals take their building for granted. A private school operator, of course, particularly one who rented instructional facilities, would have a far more intense conscious understanding of capital costs.

Inequality. Most districts have a clear policy of trying to provide equal education to all students. However, very few districts end up providing equal resources to each school.

One significant explanation for why two schools with similar enrollments may receive different dollar allocations is the conventional teacher salary schedule system. In the first place, teacher salaries and benefits are usually determined by seniority and training. A school district's highest paid teachers will generally be paid about twice as much as the lowest entry-level teachers. In the second place, senior teachers usually are granted greater discretion in where they are assigned. If senior teachers, with the highest salaries, all prefer a given school, their individual choices in the aggregate can create a situation in which total expenditures for that school are far higher than they are at a school with many newer teachers.

What is the Evidence That Anything is Wrong?

Existing resource allocation procedures, principally in large school districts, contribute to three kinds of problems, efficiency and productivity and equity both appear to suffer.

Efficiency and Productivity. Almost any reader is familiar with the general, and lamentable, pattern of student performance in America's large city school districts. The litany of problems regarding low academic achievement, high dropout rates, frightening pupil mobility, widespread parent dissatisfaction, and rampant school violence constitutes one of the nation's most worrisome conditions. Clearly, the full blame for this situation cannot be laid at the doorstep of existing school finance conditions. If school based management or some other simple means for restoring the connection between authority and operation were instituted tomorrow, it is not clear that student achievement would soar. It is likely that an integrated set of changes is need.

Still, until the reconnection occurs between authority structures and accountability, the probability is great that schools will be incapable of contributing forcefully to the solution of these problems. Thus, while school finance reform is by itself an insufficient remedy, it is still very much a necessary condition for improving matters in city schools.

Equity. Prevailing large school district budget allocation formulae exhibit a regrettable irony. Their principal justification is to ensure equitable treatment of students. Preliminary analytic results, reviewed below, suggest that they have an opposite effect. In fact, by virtue of allocating teaching positions, and then permitting the salaries of teachers actually holding such positions, to fluctuate based on criteria disconnected from instructional performance, resource allocation procedures result in substantial inequities.

Prevailing large school district budget allocation formulae exhibit a regrettable irony. [While] their principal justification is to ensure equitable treatment of students . . . preliminary analytic results . . . suggest that they have an opposite effect.

The analyses displayed in table 1 are based upon National Center for Educational Statistics (NCES) collected data for the 1992–93 academic year for a major midwest state. These analyses are restricted to the 24 largest districts in the state. The districts range in size from an enrollment low of 42,000 to a high of 70, 000. The analysis removes from consideration whatever is spent by the central office. Elementary and secondary school spending is considered separately within each district. The

Table 1.—Intradistrict per pupil spending differences in 24 of the largest districts of a Midwestern state

Statistics	Elementary schools		Secondary schools
High $ per pupil	2,092	High $ per pupil	1,475
	1,850		1,470
	1,810		1,429
	1,777		1,250
	1,520		1,241
	1,421		1,221
	1,390		1,183
	1,245		1,119
	1,225		984
	1,165		966
	1,138		926
	1,097		925
Per pupil $ mode	1,024	Per pupil $ mode	866
	950		806
	946		663
	850		656
	729		428
	726		400
	709		390
	656		362
	631		300
	552		279
	546		232
	494		194
Per pupil $ low	268	Per pupil $ low	118
Per pupil $ mean	1,074	Per pupil $ mean	779
Classroom multiple (25 pupils per class)	$25,850	Classroom multiple (30 pupils per class)	$23,370

SOURCE: Results from the author's analysis of NCES data on school-by-school spending of all districts within two large states.

table displays the range of intradistrict per pupil spending for each schooling level, elementary and secondary, for each of the 24 districts.

The fiscally most fortunate school in the district with the highest intraschool per pupil spending difference is expending in excess of $50,000 per classroom more than the lowest expending elementary school in the same district. The secondary school extreme in the same district is spending in excess of $35,000 more per classroom than its less fortunate low per pupil spending counterpart.

Assuming the mean elementary per pupil spending difference of $1,074, the more fortunate school expends in excess of $25,000 per classroom more than the lower spending schools in the same district. The secondary analog spends in excess of $23,000 per classroom more than the least spending school in the same district.

Even at the low end of the intradistrict spending disparity continuum, the per classroom elementary school spending difference is $6,700. The same figure at the secondary

Table 2.—Intradistrict per pupil spending disparities related to selected school characteristics

Variable	State A	State B
School type (elementary or secondary)	$565	$491
School size (enroll)	($.62)	($.61)
Percent poverty	($493)	$2.00
Percent minority	$9.00	$6.00

SOURCE: Results from the author's analysis of NCES data on school-by-school spending of all districts within two large states.

classroom level is almost $3,000 per classroom. While not mindboggling, these are significant dollar differences. These resource amounts would help substantially in the purchase of instructional supplies and materials. The very existence of such spending differences, within systems which purport to allocate resources rationally is surprising. It probably is illegal.

Again, relying upon NCES collected intradistrict per pupil spending data from two large industrialized states, a different kind of analysis was undertaken. The data set includes per pupil spending, by school, for every school in every district in the state.[10] Here, a "Random Effects" statistical regression model was used in an effort to determine, within individual school districts, total operating per pupil spending (the dependent variable). The "independent variables" used to predict per pupil spending by school were (1) grade level served or school type (elementary or secondary), (2) size of the school (in terms of enrollment), (3) percent of the student body listed as eligible for free and reduced-priced meals, and (4) percent of the student body classified by the school district as "minority." The results are summarized in table 2.

These analyses display the per pupil financial advantage in each of the two states for secondary schools. State "A" spends $565 more per pupil in secondary schools, contrasted with elementary schools and state "B" spends $491 more per secondary pupil. These spending differences are consistent with what is known regarding the programmatic differences between elementary and secondary schools. What is new here is actually having dollar data on the magnitude of such differences.

Larger enrollments schools, within districts in these two states, spend less per pupil than small enrollment schools. In fact, this method of statistical analysis suggests that each additional student in a school results in a decrement of approximately 60 cents per pupil for all student in that school. Put in the converse, small schools within districts receive approximately 60 cents more per pupil, the smaller they are.

Finally, schools within districts receive added resources if they serve low income and minority students. For each 1 percent increase in either poverty or minority students, a school within a district receives anywhere from $2.00 to $9.00 additional per pupil.

The dramatic exception to this statement, an exception of a magnitude so great as to warrant further exploration, State "A" displays a spending decrease of $493 per pupil for each 1 percent increase in a school's poor students.

The data displayed in table 2 are interesting from several viewpoints. First, one cannot help but be struck by the fact that despite these data being generated in industrial states in widely differing parts of the nation (one in

[10] Schools serving disabled students exclusively were eliminated from these analyses.

the midwest and the other in the west), the direction and magnitudes of the dollar figures are remarkably similar. The exception to this pattern is the per pupil spending decrement in state "A" related to poverty status. Second, a reader should keep in mind that these per pupil spending differences are occurring under systems which are intended to distribute financial resources to schools equitably.

What are the Alternatives?

Contemporary proposals for altering education finance and governance can be arrayed on a continuum, the underlying theme of which is size of decision making unit. The abovementioned New York City deconsolidation serves as a good anchor for one end, the large end, of the continuum. An unregulated voucher plan which enfranchises individual households to decide upon their children's education can anchor the other. Between these poles are a variety of alternative arrangements, some more obvious of which are illustrated below.

Contemporary proposals for altering education finance and governance can be arrayed on a continuum, the underlying theme of which is size of decision making unit.

School Based Management[11]

This genre of finance and governance reform retains decision making in the public sector but repositions it, or repositions some significant segment of resource allocation decisionmaking at school sites. Who is able to participate in decisions, only the principal, principals and teachers, professional educators and parents, all the above plus citizens, are questions which routinely are posed and generally are answered differently in different settings. The Chicago school district decentralized decision making endeavor, still underway, to redistribute decision making discretion is perhaps the best, at least the largest, example of such a reform effort.

What is crucial to the success of such a school based management effort is that resources are allocated to schools, in dollars, not in staffing positions. Schools, then have an opportunity to determine the manner in which resources are used. This may well involve a transition period wherein the amount of practical discretion evolves. Senior, and presumably high paid, teachers cannot simply be turned out. However, as retirements and other forms of attrition take place, the amount of dollar discretion at a school can be expanded.

Achieving these kinds of reforms is not particularly popular politically. A number of well established interests are threatened by the allocation of resource decisions to individual schools. However, achieving school based management can be approached in relatively small policy increments. For example, a state statute requiring that a specified percentage of district generated per pupil revenues (e.g., 90 percent) must be allocated to individual schools sites) in tandem with a statutory provision requiring districts maintain expenditure accounts school-by-school might have a dramatic effect.

Charter Schools[12]

In the mid-1990s this has become a particularly fashionable idea. The spirit of the reform is to permit individual schools to remain in the public sector, but to divest themselves of allegedly burdensome local school district regulations. More than 20 states have enacted some form of statute authorizing formation of charter schools. These statutes vary widely in the decision making discretion that individual schools can assume and in the manner in which schools can take advantage of an opportunity to opt out of their local school district governance apparatus.

[11] See Guthrie (1986).

[12] See Finn, Mano, and Bierlein (1996).

Contracting[13]

This idea involves a private sector firm bidding upon and ultimately contracting with a local school district to operate one or a larger number of schools, perhaps even all the schools in a district. The publication of the book *Reinventing Government* by Osborne and Gaebler sparked particularly intense interest in the idea. While not advocating it for education specifically, The "Reinventing" book inspired municipal and state governments to contract with private providers for a variety of conventionally managed public services. The Osborne and Gaebler book was given added visibility by President Clinton's enthusiasm for the ideas during his 1992 campaign.

In education, however, this reform option has not been launched with great success. A major private sector entrepreneur, Christopher Whittle, who had earlier initiated a successful in-school television advertising venture, has undergone various insolvencies and has had, as a consequence, to vastly curtail his Edison Project. At its outset, this plan entailed the startup of 1,000 private schools. Recently, the grandiose plan has been scaled back, and Edison is now bidding on the operation of individual schools in a select few local school districts.

Another private sector firm, Education Alternative Incorporated (EAI), has had two large operating contracts, Baltimore, Maryland and Hartford, Connecticut, and has faded away in each. The company even announced formally that it would try its brand of managing public schools under contract to school boards in suburbs because the plans were seemingly not taking well in large cities.

Another smaller firm Alternative Public Schools (APS), continues against virtually all odds, certainly against militant teacher union opposition and repeated court challenges, to operate a single elementary school in Wilkinsberg, Pennsylvania and Chelmsford, Massachusetts. It would seem too early to judge this venture.

Vouchers[14]

This reform is simple in concept. It would involve government providing each family with a financial chit, a voucher, redeemable only for schooling. Thereafter, presumably, the household becomes the fundamental decision making unit. However, depending upon the restrictions placed upon use of the voucher, the idea can become practically complicated quite quickly.

[Vouchers] . . . involve government providing each family with a financial chit, a voucher, redeemable only for schooling. Thereafter, presumably, the household becomes the fundamental decision making unit.

Voucher advocates have also lurked in the shadows of education governance reform for a long time. Putting aside voucher principles stemming from the writings of John Stuart Mill, contemporary proponents of using the market place to shape education decisions trace their more modern roots to Milton and Rose Friedman's book *Capitalism and Freedom*.[15] This volume devotes a chapter to education and vouchers and provides an ideological underpinning for the notion.

The Office of Economic Opportunity (OEO), a now defunct Johnson Administration War on Poverty agency, actually conducted a voucher experiment in Alum Rock School district, east of San Jose, California.[16] However, OEO was unsuccessful in its efforts to persuade an entire state to experiment with vouchers. Even New Hampshire, the motto of which is "Live Free or Die," took the idea to be too radical and refused OEO financial inducements to operate a statewide voucher plan. These OEO experimental efforts were motivated more from of a sense of providing low income students with equality of opportunity,

[13] See Hill, Pierce, and Guthrie (in press).

[14] See Coons and Sugarman (1978).

[15] See Friedman, Milton, and Rose (1962).

[16] See Weiler (1974).

than they were propelled by a notion that big city school governance had gone awry.

Despite potential complexity and controversy, this reform continues to attract remarkable interest, even though it has had little operational acceptance. Congress has inserted a voucher bill, applicable only to the District of Columbia, in the District's FY 1996–97 appropriations bill. It has passed the House of Representatives. As of this writing, its Senate fate has not been determined. However, the fact that it would proceed so far in the national legislative process is testimony to the attraction of the idea.

When coupled with other compatible reforms such as a statewide or even a districtwide achievement performance measurement system, school based management comprises the crucial components of a forceful accountability system.

A statewide voucher initiative was placed on the California and Colorado ballot in 1992, and 1993, respectively; it was roundly rejected. State legislative body after body has debated the matter with, as of yet, no widescale plan taking hold. The Wisconsin and Ohio legislatures are partial exceptions. They have been willing to support a gradually expanded voucher plan for inner city Milwaukee and Cleveland students, permitting them to use public funds to attend private schools. The legislation authorizing these actions is being challenged in the courts, and may well lead to a U.S. Supreme Court decision.

Voucher proponents seem increasingly sophisticated, having learned to adapt their reform vehicle to the many objections which have been made to the idea of an unregulated voucher plan. However, as with school based management, charter schools, and contracting, voucher proponents would be hard pressed to point to a widely successful model.

Rebuilding State Systems to Restore School Capacity

What would it take to reconfigure state school finance systems in order to empower individual schools, restoring the operating capacity that has been so dramatically eroded over the past century? There are two kinds of answers to this question. One addresses the politics of the situation. The other deals with the technical side of the equation.

Political Prospects for Change. Site based management is an idea that makes much logical sense, is relied upon heavily in the private sector, and is utilized productively in some surprising settings such as the military. However, it is an idea for which it is difficult to mobilize a political constituency in education. When coupled with other compatible reforms such as a statewide or even a districtwide achievement performance measurement system, school based management comprises the crucial components of a forceful accountability system. If schools had control over their resources, and outcomes were fairly and accurately measured, then it would more possible to attach consequences to school performance. That is a frightening prospect to some.

Many school board members are disquieted at the prospect of school based management. They fear it will diminish their ability to micromanage. They will claim, with some accuracy, they can now be more responsive to their constituents under the current system. Of course, it is precisely some of this responsiveness which is causing schools to be unproductive. Many school principals fear school based management because it will expose them to accountability. Teacher union officials are often opposed to the idea because it might erode their districtwide base of influence. Parents and other citizens who might benefit most from having productive and high performing schools are the least informed regarding the idea. Indeed, the information costs to them are sufficiently high that many have little idea regarding the concept and probably even less willingness to advocate for it politically.

Thus, the dismal short run answer is that school based management, and the changes in state school finance systems which would permit or encourage it are unlikely to take place. For the political controversy that site

based budgeting and accounting might provoke, see the hypothetical scenarios appearing at the end of this piece.

Technically. As with many good ideas, there is far less technical complexity to implementing school based financing than there is a political challenge. A set of small statutory changes is all that is needed. These technical components are explained in greater detail below. However, they summarized by Pierce in the following manner:[17]

- Revenues should be conceived of as belonging to schools, not school districts.
- Revenues should follow pupils if they transfer from school to school.
- Per pupil allocations to schools should contain virtually the full cost of educating pupils including capital costs.
- Revenues allocated to schools should be highly fungible, permitting discretion between personnel and other items.
- Schools should be permitted substantial discretion in purchasing, using a local private sector firm, for example, instead of the school district for services or items such as maintenance or supplies.

To implement school based financing, existing revenue generating systems need not be altered. This is not an endorsement of the revenue generating status quo. In many states, there continue to be uneven burdens placed upon classes of taxpayers and uneven indulgences granted selected groups of property owners and incomes classification. However, restricting the consideration to school based financing alone, there is no reason to alter state school finance revenue mechanisms.

On the distribution side, only a few additions have to be made to most state formulas. Here again, this is not intended as an endorsement of the means by which states now allocate funds to local districts. Many current formulas continue to result in unequal charters of wealth for some districts and often promote inefficiency as well. Nevertheless, keeping the focus on redirecting funding to schools, all that need be done statutorily is to require that some fixed percentage of per pupil funding pass through district offices and be allocated to operating school sites. The precise percentage can be debated. However, approximately 90 percent would be a useful beginning point. This would retain 10 percent of per pupil funding for district office[18] operation.

Schools, once empowered with their own funding, might well decide to pool their purchasing for some purposes. They might also contract among themselves for services or with the central office. No doubt wherever schools could identify useful economies of scale, they would do so. However, they are probably better able to determine such economies themselves than having them dictated to them by central offices, the current arrangements.

States might also alter accounting rules, requiring that each district's financial accounting system ensure school site accounting, allowing the ability to determine with precision what resources are spent by each operating school site.

Certainly there are many other complexities, problems that would have to be solved. For example, a transition period would be

Schools, once empowered with their own funding, might well decide to pool their purchasing for some purposes. They might also contract among themselves for services or with the central office.

[17] Specified in remarks delivered before the American Education Finance Association annual conference in Salt Lake City, March 1996.

[18] In a forthcoming publication undertaken for the National Academy of Sciences National Research Council panel on school financing, Allen Odden displays technical allocation mechanisms relied upon in the United Kingdom and Victoria Australia to channel revenues directly to individual schools. These are formulae which take into account the numbers of pupil attending a school, their age and grade, family income, and disability characteristics, and offer an opportunity to be regionally price adjusted.

needed to smooth teacher salaries between schools within a district. However, these are not matters which need occupy state officials, at least in a technical sense. Similarly, making a transition from the present command and control system over matters such as maintenance to a system by which individual schools assumed responsibility for such functions would be required. However, this need not be a matter of state law.

Beyond Individual School Operation, What Might Such a New System Contribute?

Imagine the year 2010 when the following three scenarios occur in the United States:[19]

State senator, James LaMorte is sitting at the Apple computer in his Atlanta legislative office. He chairs the Senate Appropriations Committee and the markup session for the fiscal 2011 budget begins the next morning. He is working on a spreadsheet which displays a 10 year pattern of public school spending by subject matter and grade level. He is networked to the state education data base which enables him to access categories of spending data and an assortment of school process and outcome data such as student performance on state subject matter achievement tests. These data are stored in a manner which permits disaggregation to the school site of origin.

The Georgia Association for Guidance, (GAG) an intensely focused interest group representing guidance counselors in the state, contends that added spending for counselors would enhance the proportion of female students majoring in math and science. They are lobbying for a categorical spending feature in the upcoming appropriations bill.

Generally, Senator LaMorte detests earmarked spending limitations on school site personnel. Nevertheless, he decides to explore the matter. Both his sisters were themselves quite gifted mathematically and he has always been interested in expanding the career opportunities of women. Consequently, he is quite open to any reasonable means which would enhance gender equity on this dimension.

Senator LaMorte asks himself the question: "Will added spending on counselors likely enhance female science and math enrollments and achievement levels?" If the answer is "yes," he is quite willing to increase state appropriations for these purposes. To answer this question, he has accessed 10 years of school spending data and an assortment of other input and output information from the state education department data file. He makes the key strokes necessary to array these data on a school-by-school basis, scrolls to the new S4P (Super Social Science Statistical Program) under TOOLS, and applies the programmed weighting controls for student social background characteristics. He then begins to search for Georgia high schools with the highest and lowest proportions of female science and mathematics majors.

Once identifying the top and bottom 10 secondary schools on this dimension, he quickly computes the mean per pupil guidance expenditure in each set of schools. He uses his super social science statistical package again, in order to control for student achievement levels, and concludes, alas, that higher levels of guidance spending bears no relationship either to gender decisions or achievement levels.

Ten years of precise accounting for functional and subject matter spending, school-by-school, simply does not reveal any systematic relationship between added levels of spending on guidance counselors and student decisions about academic major, numbers of courses taken, or subject matter achievement.

[19] These hypothetical scenarios first appeared in Guthrie (1996).

All of these results hold even after having applied the most stringent statistical controls for student characteristics.

Senator LaMorte searches further through his data base, looking for possible relationships to high levels of student math and science achievement, and finds that the most likely spending linked variable is teacher training in advanced science and mathematics courses and inservice education in these areas.

Senator LaMorte firmly believes in permitting school site professional educators to make resource allocative decisions. Further, he has little doubt that literally dozens of Georgia principals have already done the kinds of analyses that he has just conducted in the last fifteen minutes. However, he had now verified for himself that added resources, if allocated in a categorical aid bill directed specifically at guidance spending, would unlikely lead to favorable outcomes. He now had an answer when he met the next morning with GAG advocates. They would not be happy with his response and his refusal to include them in an earmarked section of the appropriations bill. Still, he thought to himself, the data he had just analyzed were every bit as available to them as to him. Why had not they done the analyses themselves? Then they might have had a better idea.

Twenty-five hundred miles to the West:

In his office in the Los Angles Municipal Court building, the facility which had been made famous 15 years before by the trial of O. J. Simpson, Anthony Serrano was sitting at his networked computer. Almost two decades had past since the Los Angles Unified School District had consented, in Rodriquez v. Los Angles USD to allocate financial resources on an equal per pupil basis. Serrano, the grandson of a lead plaintiff in a famous interdistrict equal protection school finance suit, was a court appointed master charged with ensuring that the school district was complying with the intradistrict equal protection agreement.

The school district had been fumbling for years in achieving per pupil spending parity. To do so had been an intense challenge because senior teachers had filed their own suits claiming a violation of union contractual agreements regarding seniority transfer privileges. The school-by-school budgeting which had resulted from the original Rodriquez consent decree had left many schools in the San Fernando Valley, in the upper income reaches of the city, short of the resources to employ senior teachers with their higher salaries. In effect, parents on school site councils had generally opted for smaller class sizes, in contrast to more highly-paid senior teachers and the inevitable concomitant of large classes. Many of the district's more senior teachers were finding that they were having to accept the forced choice positions available to them in central city schools, and they were not pleased with the prospect of having either to move their residence or undertake a long daily commute. Of course a number had resigned, but a significant percent had filed suit and had delayed the consent decree implementation as a result.

. . . parents on school site councils had generally opted for smaller class sizes, in contrast to more highly-paid senior teachers and the inevitable concomitant of large classes.

By 2010, most of these problems had been resolved by the court, and Serrano was now using the LAUSD data bank to test for anomalies in school site budgets. The consent decree still permitted a degree of disparity. Judge Ito, formerly of the criminal justice division but now hearing civil cases, had decided that the same decision rule which applied to school spending for the state of California, 95 percent of all pupils in the state had to fall within a prescribed per pupil spending band, would also hold inside a school district. It was Serrano's task to monitor this band and report to the court if resource allocation disparities exceeded the limit. He was now preparing his quarterly report for the court.

In mid-continent

In a Chicago suburb, Emma Coons sits at her computer. The screen is filled with school-by-school budget and program comparisons. As she scrolls through available data regarding spending and program profiles of Chicago area secondary schools, she reflects fondly upon the distinguished career of her grandfather, John E. Coons, a forceful and thoughtful advocate for school choice plans. Here she was, as a school choice adviser, living out the hopes of her famous relative by advising families regarding the fit between their schooling preferences and the offerings and results of area public and private schools.

The widespread availability of school-by-school accounting data, and the later addition of program information coded by school, had created a remarkable opportunity to enable parents to make informed choices about schooling for their children. Emma was one of thousands of certified advisers who, for a fee, counseled households regarding the relative advantages of schools.

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Exploring Alternatives for School-Based Funding

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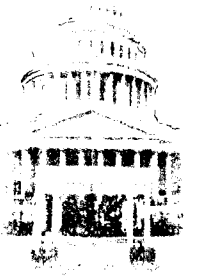

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Introduction

Recent studies report that school finance and governance mechanisms in large school districts are weakly linked to effective operations of modern schools.[1] Central offices and boards of education determine budgets, hiring policies, textbook purchases, curriculum, hours of operation, personnel evaluation systems, and student assessment policies. Individual schools respond to central policies and directives, with the result that decision making authority for those closest to students is limited and direct accountability for results is compromised.

A similar conclusion set forth by school finance and governance experts is that district resource allocation is inappropriately aligned with areas in which decisions should be made to improve student performance.[2] Allocation formulas fail to consider current and past performance or state and local performance expectations. Experts argue that because existing financing mechanisms focus on inputs rather than outcomes, they exacerbate the problems arising from the disconnection of decision making and school purposes. For example, larger districts allocate resources to campuses using mathematical formulas that take into account grades served, school size, class size, and attendance.[3] In most large districts, teacher positions are allotted to schools according to enrollment and class-size requirements rather than academic strengths and weaknesses of students.[4] Counselors and nurses may be assigned on the basis of total enrollment. Supply and material budgets may be allocated based on enrollment by grade, rather than on the basis of program need. The practical effect of this approach is that most school principals have their input units identified and purchased for them before school begins in the fall. Many administrators and edu-

[1] See Twentieth Century Fund Task Force on School Governance (1992); Chubb and Moe (1990); and Bimber (1994).
[2] See Guthrie (1996); Odden (1993); and Wohlstetter and Van Kirk (1996).
[3] See Kehoe (1986) and U.S. Department of Education (1989).
[4] See Mosteller (1995).

cators view this approach as an even-handed way to share resources, but the end result is that campus administrators have very few resources with which to respond to unique campus needs. Further, the situation creates an environment where central decision makers may decide to respond to educational needs by increasing spending and responsibility at the central level, for example, by adopting a reading program for all elementary schools in the district rather than providing resources directly to schools to respond to instructional needs.

To improve equity and instructional efficiency as well, . . . districts [could] allocate a higher percentage of resources to schools directly in dollars, not in staffing positions and allotments keyed to school size characteristics.

According to Guthrie (1996), the problem of disjuncture in decision making and school operations is most acute in large school districts which rely on formulas to distribute resources and services to schools.[5] And despite the belief that formula funding is fairer, there are wide disparities of per-pupil resources reported among schools in large districts.[6] Guthrie suggests that the major source of disparities is the teacher salary system. A school with experienced and higher-paid teachers gets more resources in the typical system than a school with many inexperienced teachers. If teachers with seniority can select where they work, the least desirable schools will be left with less experienced teachers and fewer total resources. To improve equity and instructional efficiency as well, Guthrie (1996) recommends that districts allocate a higher percentage of resources to schools directly in dollars, not in staffing positions and allotments keyed to school size characteristics.[7] Schools will then determine what inputs are needed and specify the quantity they want to purchase, including the number and expertise of the teachers. One approach could be a funding system where a high percentage of state resources flows directly to schools in block grants.[8] Another approach is to establish law or policy requiring school districts to allocate a fixed percentage of revenue directly to schools.[9] If a fixed percent were allocated to schools, districts would pass along all but a fraction of total revenue to the schools.

This study examines the practical application of targeting a large percentage of school district resources for direct pass-through to schools. A background section sets the context for the study and describes the data sources. We use data from Texas school districts and campuses to explore expenditure patterns among districts and campuses under current law. Then, again using Texas data, we simulate the results of pre-established allocation percentages. The study also explores the relationship between teacher salaries and expenditures to test the hypothesis that teacher salaries are the major driver of resource differences. The final portion of the study describes two approaches to school-based funding in Texas. We conclude with a summary of the issues and problems related to the school-based funding approaches.

Background

Micro-level School Finance

Numerous studies have explored the levels and uses of resources directed toward the school.[10] Micro-level studies examine the equity of resource distribution across campuses and analyze the efficiency of resource use at the site level. Using data from the 1987–88 Schools and Staffing Survey and the U.S. Bureau of the Census, Census of Governments, 1987, Picus (1994) examined district as well as school spending patterns. He found spending patterns to be similar across districts, re-

[5] Guthrie (1996) p. 10.
[6] See Hertert (1996).
[7] Guthrie (1996) pp. 10–11.
[8] See Odden (1993).
[9] See Guthrie (1996) and Odden (1993).
[10] See Cooper (1993); Monk (1992); Rossmiller (1983); and Odden (1993).

gardless of other characteristics, but patterns among individual schools were different.[11] Overall, he found that when real per-pupil resources increased, the additional revenues were spent primarily at the school level. About 40 percent were allocated toward reducing class size (with more teachers) and 10 percent to increasing teacher salaries. The remaining 50 percent provided more services for schools and students. Additional studies underway at Cornell University (Monk), Fordham University (Cooper), and the University of Wisconsin (Odden and Busch) will add to understanding of resource distribution across schools within districts or systems.

Micro-level school finance has become a productive field of study for enhancing our understanding of where and how dollars make a difference in producing educational outcomes. Better use of limited resources for improving educational attainment for all students will require administrators and teachers to know the most productive and effective application of resources.[12] Studying school-based funding is a first step along this path.

Sources of Data to Study School-Based Funding

Several issues have confronted those who are exploring equity and efficiency of school-level funding. A major concern is the quality of the data to be used for such studies.[13] They should be accurate, complete, comparable across schools within a district, and comparable across schools within a state. Researchers also hope they will be easy to obtain and use.[14] The quality of information for individual schools may be good within individual districts, but there are disparities from district to district regarding function and object definitions, collection time periods, and data base formats for the school-level data. In some instances, accounting practices are primitive, making it difficult to gather data from the schools and compounding problems with cross-school comparisons.[15] In fact, many states have no school-level data available. In the face of these obstacles, many researchers who are working in this field gather data by visiting individual districts because states do not have detailed campus budget and expenditure data in a form that can be used for research.

Texas data for school districts is of high quality and has been used repeatedly for studies of school finance.[16] Many Texas districts code expenditures for campuses as well, but procedures for campus allocations are not uniform, and the state does not audit campus expenditure reports for conformity across schools or districts. However, fiscal reporting for an indicator system that was established in 1990 has provided a source of reliable campus information that is available to researchers. The Academic Excellence Indicator System (AEIS) includes some of the school data collected in Texas through the Public Education Information Management System (PEIMS) and the Texas assessment system. To create PEIMS, school districts report information about finance, personnel, student characteristics, attendance, and student course enrollment. The Texas Comptroller of Public Accounts provides tax rate and property value information. Testing contractors provide the Texas Education Agency with detailed score reports for the standardized tests that are administered statewide. Within Texas, AEIS is used for accountability ratings for each of over 6,400 schools and 1,044 districts in the state. Report cards are also produced for each school using the

Better use of limited resources for improving educational attainment for all students will require administrators and teachers to know the most productive and effective application of resources.

[11] Lawrence O. Picus, "The $300 Billion Question: How Do Public Elementary and Secondary Schools Spend Their Money?" paper presented at the Annual Meeting of the American Educational Research Association, April 1994.

[12] See Odden (1996) and Monk (1992).

[13] See Busch and Odden (1997).

[14] See Picus (1997).

[15] See Herrington (1996).

[16] For example, see Picus and Hertert (1993); Picus (1993); Legislative Education Board (1992); Public Education Team (1997); and School Finance Working Group (1997).

data, and the Agency prepares district profiles each year in a publication called "Snapshot."

This study uses the 1994–95 school year AEIS data set available at the Texas Education Agency site on the Internet or by request from the Agency. The AEIS data are in two major groupings, one set of files pertaining to districts and the other to schools. AEIS further subdivides the data into several subject matter files within the district and campus groupings. We created a school-level research data base for this study using only variables of interest, eliminating many of the program and student demographic characteristic variables in the larger data set. Several of the variables in our data base are district-level values that were either extracted from one of the AEIS district files or else aggregated across all of the campuses of each type (elementary, middle, and high school) in their respective districts. District values were then entered into the records of each campus for ease of use. For example, we created a district size variable to be included in each campus record. The district-level data in the campus files also include the district identification number, the district total enrollment, the sum of teacher salaries for each type of campus, the sum of enrollment for each campus type, and the number of campuses in the district of the same type.

By function, roughly 60 percent of operating expenditures are related to instruction.

The resulting data set included 1,043 school districts and 5,949 schools serving elementary, middle and high school grades. We excluded Houston Independent School District (ISD) with 263 campuses because the data set for that district was incomplete. We also excluded another 250 schools either because they were special schools, had missing data, or were not of a "type" that was easy to categorize as elementary, middle, or high school. For example, we excluded schools serving only early childhood and kindergarten grades. Our data set included 99 percent of Texas districts and 92 percent of Texas schools.

Many of the expenditure analyses in the following sections are applied to the set of schools in all Texas districts and then separately to schools in the set of 200 large districts, excluding Houston ISD. Examining the effect on all districts permits us to consider implications for system wide change. We examine the largest districts separately because it may be practical to consider school-based funding only for districts that are large enough to have several campuses.

Expenditures in Texas School Districts and Schools

We were interested in exploring the effect on Texas districts and schools of allocating a fixed percentage of district resources directly to schools. In order to do this, we describe the current pattern of resource allocation to Texas schools, followed by an analysis of the revenue shifts when fixed percentages of resources move to the school level.

The first task was to examine current expenditure patterns reported by Texas school districts in 1994–95. State average operating expenditures per student are shown by object of expense in table 1. State average operating expenditures per student by function appear in table 2.[17]

By function, roughly 60 percent of operating expenditures are related to instruction. This is consistent with findings from other states and from national studies.[18] Payroll costs form the object of most expenditure functions. Unfortunately, school-level data by object and function are not available in AEIS data files. Other researchers have also reported this difficulty, but have not developed a standard way to prorate costs to districts.[19] Researchers could ask for school-level PEIMS files, but the size of the data base makes it impractical for use in many environments.

[17] See Casey (1995).

[18] See Picus and Fazal (1996).

[19] See Picus (1997).

Table 1.—Texas school district operating expenditures per student, by object		
Object	1994–95 state average, budgeted	Percent of total
Payroll	$3,648	81%
Purchased and contracted services	399	9%
Supplies and materials	375	8%
Other operating expenditures	102	2%
TOTAL	$4,524	

SOURCE: *TASB/Bench Marks 1994–95* (Austin, TX: Texas Association of School Boards, 1995), p. 7, Table 2.

Table 2.—Texas school district operating expenditures per student, by function		
Function	1994–95 state average, budgeted	Percent of total
Instructional services	$2,635	58%
Instructional-related services	$123	3%
Pupil services, co-curricular, transportation	$695	15%
Administration	$537	12%
Plant maintenance and operations	$520	11%
Community services	$14	1%
TOTAL	$4,524	

SOURCE: *TASB/Bench Marks 1994–95* (Austin, TX: Texas Association of School Boards, 1995), p. 7, Table 3.

The AEIS data include campus total instructional expenditures and certain operating expenditures. Using the research data set, we aggregated operating expenditures across schools for each district. These data were then merged with additional operating expenditures reported only at the district level to create a measure of the full level of operating expenses. We then calculated the percentage of total district operations expense accounted for by the campuses. Calculations were conducted for all school districts in Texas and separately for the largest districts, based on student enrollment. The 199 largest districts enroll 3,800 or more students.

In Texas, roughly two-thirds of total operations expenditures are allocated to schools, mostly in the form of personnel assignments and supply allocations. Total operations expenditures in Texas in 1994–95 were $17.3 billion, with $11.8 billion or 68.1 percent attributable to campus-level operations. Total enrollment was 3,468,000. Dividing campus operations expense ($11.8 billion) by enrollment (3,468,000) yields average school operations expenditures per student of $3,402. Table 3 displays operating expenditures as a percent of total expenditures for all districts and for the set of large districts.

We explored the distribution of operations expenditures in more depth for the largest districts in Texas. First, to determine the distribution of school-level operations expenditures, we grouped the districts by decile according to percentages of operations expenditures attributable to the school. Our results in table 4 show that at the 90th percentile district, 71 percent of expenditures are tied to the school. In other words, in ten percent of the districts the percentage of operating expenditures attributable at the school level exceeds 71 percent. Of the largest districts, the maximum value was 75.3 percent. This means that to distribute more than 75.3 percent of total district resources for operations to the schools goes beyond the current experience of most Texas districts.

Table 3.—Percentage of operating expenditures allocated to schools in Texas: 1994–95

School operating expenditures	All districts	Largest districts
Mean percent	68.1%	68.8%
Standard deviation	4.0	2.7
Minimum percent	48.6	59.6
Maximum percent	83.0	75.3

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

Figure 1 shows the relationship between district enrollment and the percentage of total district expenditures for operations that occur at the school level for the largest school districts.

Table 4.—Percentage of operations at the school level, by decile, for Texas school districts

Percentile	All districts*	Largest districts*
10	64.9	65.3
20	65.2	66.7
30	66.7	67.8
40	67.9	68.6
50	68.2	69.0
60	69.0	69.4
70	69.8	70.2
80	70.4	70.7
90	70.9	71.9

*Mean operating expense, school level.

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

The horizontal line at 68.8 percent represents the mean of these averages. The logarithm of district enrollment was plotted on the horizontal axis. (The logarithm compresses the values horizontally.) The most extreme right-hand point represents Dallas ISD, the second largest district in the state. The only visible relationship between the variables is a reduction in the variation around the mean as district enrollments increase. If it were supposed that in the larger districts the district administration and other activities would encompass increasingly larger proportions of total operations expenditures, the figure would look different. There would be an upward trend to the data as size increases. The data show that the highest as well as the lowest percentages are found among the smaller of these districts (districts with fewer than 10,000 students).

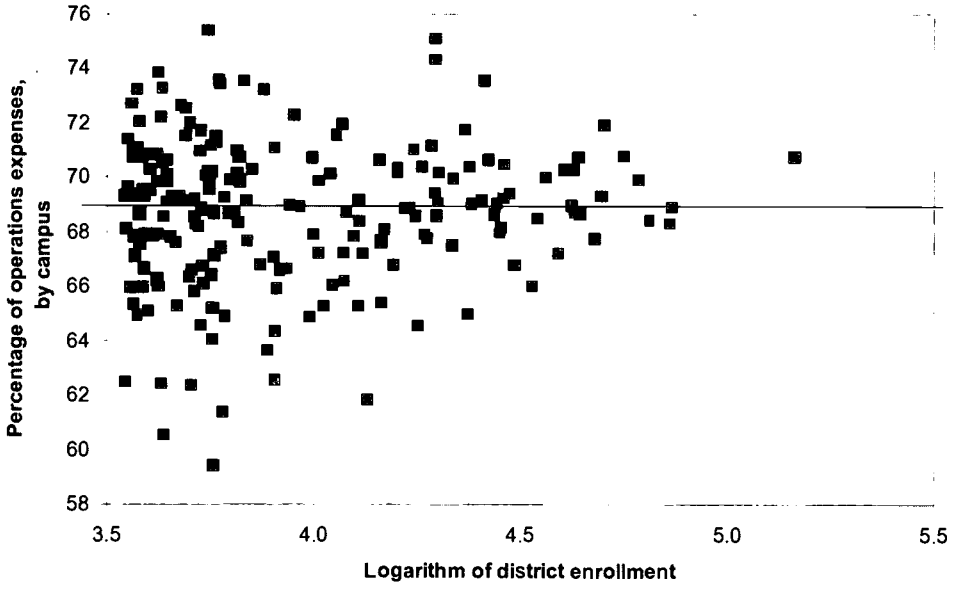
Simulation of Direct Allocations to Schools

After we determined current expenditure patterns, we explored the effect of transferring more operating resources to the school level. Previous calculations indicate that, on average, 68 percent of total operations expenditures take place at the campus level. We performed calculations for all districts, estimating on a district-by-district basis the amounts that would have to be transferred to the campus level (or to campus control) in order that schools in each district would be collectively responsible for 75 percent, 85 percent and 90 percent of total district operations expenditures.

Tables 5 and 6 present descriptive statistics for reallocation of resources at three fixed percentages. Table 5 shows 1,043 districts, and Table 6 presents information for the largest districts. The variables are defined as:

- % CHANGE SCHOOL Percentage change in school-level operations spending when the district allocates 75 percent, 85 percent, or 90 percent of operations spending to the schools.
- % CHANGE DISTRICT Percentage change in district-based operations spending as a result of moving 75 percent, 85 percent, or 90 percent of operating expenditures to the schools.

Figure 1.—Relationship between percentage of operational expenses by campus and district enrollment



SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

- $ CHANGE PER PUPIL Change in dollars allocated from the district to the school on a per-pupil basis when 75 percent, 85 percent, or 90 percent of expenditures are allocated to the schools.

Tables 5 and 6 show similar patterns of results. Allocating 75 percent of resources, instead of 68 percent, moves less than $500 per pupil to the school level, but the percentage change at the district level is close to 20 percent. A shift to 85 percent campus-level allocations would increase the average operating expenditure at the school to $4,401 ($3,402 plus $999) in the case of all school districts, or $4,190 ($3,402 plus $788) among the largest districts. Under Guthrie's recommended scheme, 90 percent of resources would move directly to schools. In Texas, $11.8 billion (68.8 percent) currently flows from districts to schools. Moving 90 percent of resources to schools would result in an additional $3.6 billion, or $15.4 billion in total, flowing to schools. School operations expenditures would increase by 32.6 percent, representing an additional $1,290 per student. Resources per student at the school would rise to about $4,692 ($3,402 plus $1,290). In large districts, the increase is $1,031, and the total amount per pupil is $4,433. District offices would have roughly 68 percent of their resources redirected. The effect on administration and support strategies would be dramatic. Most likely, school district offices would eliminate many central programs and services, and schools would have to undertake many of those activities themselves or contract with the district office or other providers.

Given the magnitude of changes displayed in the tables, it would be most practical to implement a change of this type gradually, increasing the percentage by perhaps 5 percent each year, with an end-goal of 90 percent school-based funding after 5 years. This would permit schools and central offices time to adjust to new levels of resources and changing responsibilities.

Table 5.—Results of changes allocating a greater percentage of operating expenditures to schools*			
	75 percent	85 percent	90 percent
% Change school	10.51%	25.24%	32.61%
% Change district	- 20.39%	- 52.23%	- 68.16%
$ Change per pupil	$416	$999	$1,290

*All Texas school districts (n=1043).

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

Table 6.—Results of changes allocating a greater percentage of operating expenditures to schools*			
	75 percent	85 percent	90 percent
% Change school	9.21%	23.77%	31.06%
% Change district	-19.36%	-51.62%	-67.74%
$ Change per pupil	$303	$788	$1,031

*Largest Texas school districts (n=199).

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

Expenditures and Teacher Salaries, Experience, and Pupil-Teacher Ratio

Salaries and Experience

Guthrie suggests that teacher seniority is a major source of variation in current campus expenditure levels. We use Texas data in an attempt to verify this assertion. Texas law requires school districts to pay teachers at least a minimum monthly salary for a 10-month contract year. In 1994–95, the salary schedule for first-year teachers started at a minimum salary of $1,700 per month. The schedule was constructed so the monthly base increased every year for ten years. Veteran teachers received at least $2,840 per month.[20]

In practice, many districts pay above the base in order to attract teachers and compete in local labor markets. In addition, many district salary schedules do not mirror the structure of the state's minimum schedule. So long as a district pays at least the minimum for each step in the scale, it remains in compliance with the law. The state does not dictate the structure of a district's locally adopted pay schedule once the minimum is met.

In order to examine the strength of the relationship between salary and years of experience, we specified a linear relationship where average teacher salary per pupil (TSAL) at the school is the dependent variable and average teacher years of experience (YREXP) at the school is the independent variable.

$$TSAL = a + b_1 YREXP + e$$

Regressions were computed for all districts and for large districts according to school type. Table 7 reports the adjusted R-squared values.

[20] Texas Education Code §16.056 (1994) governed teacher salaries for the period during which these data were gathered. Texas Education Code which took effect September 1995 requires a 20-step schedule. The schedule was adjusted upward in 1997 to reflect increased resources appropriated for the foundation program (Texas Education Code §21.402).

Data in table 7 reveal that in Texas teacher salaries are weakly related to years of experience, despite a salary schedule that rewards seniority in the early years. Information gathered from an annual school board and administrator survey suggests that pay practices in Texas school districts vary widely, with some districts offering high starting salaries to attract new teachers and others offering stipends for advanced degrees, regardless of years of experience. About 10 percent of districts pay extra to teachers who complete continuing education, to teachers who take on extra academic teaching duties, and to teachers who have good attendance. A few districts offer hiring bonuses.[21]

At least two other features of Texas salary data may affect the computations that underlie table 7. First, Texas has experienced teacher salary compression over the past 10 years. This results when many currently employed teachers are at the top of the salary scale and when school districts establish pay practices that compress salaries. The average experience for Texas teachers is 11.5 years, so teachers in districts that pay the base salary do not receive compensation increases with years of experience beyond the first decade of teaching. In districts with pay practices that differ from the state schedule, the relationship of compensation to experience once teachers pass the ten-year mark is a matter of locally established policy. Second, Texas teachers are not organized for collective bargaining. This may result in salary variation within the state that is not strongly related to experience. The weak relationship between experience and salaries indicates that there are characteristics of the Texas data that make it less suitable for testing Guthrie's hypothesis about the dominant effect of teacher salaries, particularly those of experienced teachers. It also may indicate that the specification of the mathematical relationship between salaries and experience requires further scrutiny.

Table 7.—Relationship of teacher salaries to years of experience

School level	Adj. R-squared
Elementary school	
All districts	0.031
Largest districts	0.032
Middle school	
All districts	0.035*
Largest districts	0.044*
High school	
All districts	0.001
Largest districts	0.002

* Indicates significance at 0.01 level or better.

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

The Effect of Teacher Salaries on School-Level Expenditures

In order to explore the relationship between average teacher salaries and school resource levels, we first computed the Pearson correlation coefficients between salary and two resource variables: instructional expenditures per pupil (INEXP) and operating expenditures per pupil (OPEXP). Table 8 shows the results.

Salary and operating expenditures are strongly and positively correlated. The strength of the relationship increases when salary is correlated with instructional expenditures.

The Effect of Teacher Experience and Pupil-Teacher Ratios on School-Level Expenditures

Next, we specified a linear expression where expenditure per pupil at the school level was the dependent variable and teacher experience (YREXP) and pupil-teacher ratio (PTRATIO) at the school were the independent variables. We used the two measures of school expenditures that appeared in the previous computation: instructional expenditures per pupil and total school operating expenditures per pupil.

[21] See Texas Association of School Boards (1996).

Table 8.—Correlation between average teacher salary per pupil and expenditures*

	All districts	Largest districts
Elementary		
INSTR	0.710	0.707
OPEXP	0.660	0.678
Middle school		
INSTR	0.737	0.827
OPEXP	0.688	0.788
High school		
INSTR	0.718	0.717
OPEXP	0.686	0.700

* All correlations are statistically significant at the .01 level.

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

$$INEXP=a+ b_1(YREXP) + b_2(PTRATIO) + e$$
$$OPEXP=a+b_1(YREXP)+ b_2(PTRATIO) + e$$

The value of adjusted R-squared was computed for the set of data with all campuses, by grade groups. Table 9 shows the results. Table 10 shows the results using schools by grade level for the largest Texas districts.

In both sets of regressions, the coefficients for years of experience and pupil-teacher ratio show the expected signs, where teacher experience is positively related to expenditure levels, and higher expenditures are related to lower pupil-teacher ratios. However, the combined effect of teacher experience and pupil-teacher ratio (a proxy for class size) is not powerful in explaining expenditures. Only the values for middle school are large enough to be important.

We assumed that instructional and operating expenses would be driven by teacher experience and class size, but this study suggests that there may be other important factors at work affecting this relationship. What might explain these results? One possibility is that the relationships between salary and pupil-teacher ratios are not correctly specified by the simple model presented here.[22] Another explanation is that pooling campus data across a wide range of districts obscures meaningful statistical relationships that result from policies or practices within individual districts. For example, districts may provide stipends for service in difficult school settings, regardless of teacher experience. Or, districts may establish class-size policies related to types of programs offered, something we could not explore with AEIS data. It may be useful to look at school-level data within large districts rather than across them. From our previous work, we believe that levels of school operating expenditures and teacher salaries are probably highly dependent on the resources schools have to spend.[23] This, in turn, is largely a function of tax rates and revenue in Texas school districts which we did not include in this analysis.[24]

An Approach to Implementing School-Based Funding in Texas

In this section, we present ideas and concepts for restructuring the Texas school finance system to implement school-based funding. The first approach calls for the state to calculate a "campus foundation program allotment" at the same time it calculates the foundation school program allotments for school districts described in current law. Districts would direct campus foundation program allotments to the schools in the form of budget dollars rather than resource inputs. Calculations for this approach reflect the basic scheme in Texas law for equalizing resources based on pupil needs, district wealth, and tax rates. The major difference in the system is the state directive to districts to shift most of their state and local resources to the schools.

[22] The appendix to this article discusses the mathematical relationship among teacher salaries, average salaries, and teacher-pupil ratios.

[23] See Clark and Casey (1994); Picus and Toenjes (1994).

[24] See Toenjes (1996).

Table 9.—Relationship of school expenditures to teacher experience and pupil-teacher ratio for schools, by type, for all Texas school districts

Dependent variable	Independent variable		Adj. R-squared
Elementary schools (n=3,531)	YREXP	PTRATIO	
INEXP	74.4 (1.51)	-189.3 (-4.32)*	0.006
OPEXP	74.6 (1.42)	-240.6 (-5.13)*	0.007
Middle schools (n=1,225)			
INEXP	204.7 (6.38)*	-437.9 (-14.97)*	0.174
OPEXP	1133.4 (6.13)*	-1386.7(-8.23)*	0.075
High schools (n=1,193)			
INEXP	1.86 (0.01)	-108.4 (-2.96)*	0.006
OPEXP	1.67 (0.01)	-159.9 (-2.81)*	0.005

* Indicates significance at the .01 level or better.

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

Table 10.—Relationship of school expenditures to teacher experience and pupil-teacher ratio for schools, by type, for the largest Texas school districts

Dependent variable	Independent variables		Adj. R-squared
Elementary schools (n = 2,550)	YREXP	PTRATIO	
INEXP	87.5 (1.26)	-262.8 (3.81)*	0.006
OPEXP	94.1 (1.27)	-319.3 (-4.33)*	0.007
Middle schools (n= 758)			
INEXP	334.4 (6.90)*	-615.4 (-14.57)*	0.251
OPEXP	1910.4 (6.35)*	-2152.1 (-8.21)*	0.120
High schools (n = 565)			
INEXP	-63.6 (-0.25)*	-205.3 (-2.82)*	0.011
OPEXP	-86.2 (0.22)*	-302.8 (-2.67)*	0.009

* Indicates significance at the .01 level or better.

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

The second approach requires the state first to restructure the tax and revenue system to generate more state funding for schools. The state would then calculate school allotments in the form of block grants based on enrollment and programs. School districts would be required to raise additional resources for administrative activities, central services, and tax administration.

These descriptions are intended to illustrate the basic mechanisms by which equalized funding to schools could be achieved, if desired; they are not recommendations for action.

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The Campus Foundation Program

The state would gather PEIMS and tax data to compute foundation school program allotments for school districts as described in current law.[25] School districts would levy taxes for the local funding requirement of the foundation program and for enrichment funding beyond that level. Districts would continue to levy a property tax for voter-approved debt. School tax laws would not change under this scenario.

At the same time it computes district foundation program allotments the state would use PEIMS data to calculate a campus foundation program (CFP) allotment for each public school in Texas. Policymakers would establish a "campus basic allotment" or minimum per-student funding level for the regular education program. The campus basic allotment (CBA) should reflect the cost of a basic, accredited education in Texas. As a practical matter, it would be less than or equal to the basic allotment in law.[26] In current law several district adjustments are made to the basic allotment to reflect the geographic variation in known resource costs, costs of education due to factors beyond the control of the school district, and adjustments for district size and population sparsity. Such adjustments would continue to be part of the district foundation program calculation but would not be included in the CFP calculation.

The CFP calculation would begin with computation of the cost for students in the regular education program by multiplying regular program ADA by the CBA. Then special program allotments would be calculated, as shown below, using program weights. The state could use weights in current law or some other weighting system. In current law, full-time-equivalent (FTE) student counts in career and technology education have a weight of 1.37; students identified for gifted and talented education receive a weight of .12; students identified for bilingual and ESL programs receive a weight of .10; special education FTEs are assigned a weight based on the services received; and students identified for compensatory education (those who qualify for the federal nutrition program) have a weight of .20.

These weighted funds represent, roughly, the first tier of the Texas foundation program excluding the transportation allotment. An additional calculation should be included to account for operating revenue that flows from tier two, otherwise the CFP allotment is likely to be an amount less than the resource level currently allocated to campuses (68 percent). A simple approach is to assign a fixed percentage of second tier dollars for allotment to the campuses, such as 90 percent. That portion could be distributed to the schools based on enrollment, ADA, or weighted ADA.

Using our AEIS data set for 1994–95, we estimated the results of calculations for the seven steps shown above for each campus. We added $1,170 per student to the result, or roughly 90 percent of the revenue that would flow through the second tier of the finance system, as estimated for 1994–95. The result-

[25] Texas Education Code, Chapter 42, subchapters B, C, E, and F.

[26] The basic allotment is $2,387 (Texas Education Code §42.101).

Campus Foundation Program (CFP) allotment for Texas public schools

1. School regular program allotment = CBA x regular program ADA
2. School career and technology allotment = CBA x FTE students x 1.37
3. School gifted and talented allotment = CBA x students x .12
4. School bilingual/ESL allotment = CBA x ADA x .10
5. School special education allotment = CBA x FTE x weight[27]
6. School compensatory education allotment = A x ADA x .20
7. School technology allotment = ADA x $30

ing calculation was a statewide average CFP per student of $4,007. This is about 78 percent of operations expense. Table 11 shows this result and compares it with percentage allocations estimated above (Table 5).

The correlation of CFP values for each campus with the campus allocation of expenses computed using the AEIS data set was 0.74. If our system for computing allocations to campuses perfectly mirrored reported allocations to campuses, the correlation would be 1.00. Variation due to local policies related to school allocations and special circumstances of schools due to location or student characteristics may weaken the relationship.

CFP values for elementary, middle, and high schools are $4,087, $4,016, and $3,792, respectively. Computed CFP allocations to elementary schools are somewhat higher because elementary students are more likely to be identified for compensatory education funding and because school districts tend to concentrate funds for bilingual education at the elementary level. Correspondingly, the high school CFP is likely to be lower because students may be under identified for certain programs that receive higher funding. The correlation of computed CFP values with actual campus allocations for 1994–95 was 0.76 for elementary, 0.68 for middle school, and 0.63 for high school. These correlations are still strong, but somewhat weaker than the overall correlation.

If it were desired to increase the percentage of district resources allocated to schools through CFPs from about 78 percent to 85 percent or higher, additional resources would have to be loaded into the CFP calculation process. There are many candidates for weights and adjustments—high poverty concentrations, school size, student performance, class size ratios, alternative education students, and others. At this time, we have research to suggest weights for class size and alternative education programs that could be incorporated into a CFP.

Texas requires classes in grades K through 4 to have no more than 22 students. This imposes certain inefficiencies on operations. Research by state agencies more than a decade ago suggested an add-on factor of .20 for each student in grades K through 4 to compensate for the inefficiencies, although such a factor has not been used in Texas school finance formulas. We suggest that it be incorporated here with the qualification that schools should not receive this funding when the class size mandate is not met.[28]

Class size allotment = CBA x K-4 ADA x .20

[27] In Texas, funding weights are assigned to different special education instructional arrangements. Homebound education has a weight of 5.0; resource room has a weight of 3.0; off-home campus has a weight of 2.7; mainstreamed students and speech therapy have a weight of 1.10 per ADA (not hospital class, and self contained home FTE), vocational adjustment class has a weight of 2.3, and non-public day school has a weight of 1.7

[28] See Walker (1988).

Texas now requires every district to establish an alternative education program (AEP) for disruptive and violent students. An AEP may be offered within an existing school or in a separate program location. Typically, students spend a portion of the school year in an AEP and return to a regular campus when their behavior problems are remediated. Research completed in 1997 reported that the costs for all AEP arrangements exceed foundation program costs for the regular program because of the necessary separate arrangements and because the district must create two educational environments for the student—the regular school that sent the student and will enroll him again, and the AEP. The researchers recommend an add-on weight of 2.09 per FTE student in an AEP, although this weight has not been considered for inclusion into the school finance formula.[29]

School AEP allotment = CBA x FTE x 2.09

Policymakers may want to include an element in the calculation of the CFP that recognizes the school's results on the state accountability system. In this way, funding could be used to reward performance, and it could also be used to target resources to particular student learning needs.

The CFP system described here preserves current inter-district equity levels in Texas school finance and could improve intra-district equity as well. Schools would have control over significant amounts of money and be able to respond to unique local circumstances, but they would also gain responsibility and accountability for managing large budgets. Based on state aid and formula elements for the 1996–97 school year, the statewide average CFP allotment per student would be $4,007. For a school with 400 students, that represents a campus budget of about $1.6 million. A school with 1,500 students could have a budget of over $6 million.

Policymakers could choose to incorporate other funding elements into a school-based system. Special program funding could be complemented with categorical programs to which either the district or campus could apply. For example, a school or a district could apply for optional extended-year grants in the way Texas districts do now.[30]

State Block Grants to Schools

The approach outlined for this alternative would permit the state to achieve two goals: implementation of school-based funding, and substantial increase in the state's share of public education funding.

The approach is keyed to tax restructuring to increase state revenue. This has proved to be a difficult task. In 1997, the Texas Legislature explored changing the tax system to increase the state's share of school support and to provide tax relief to homeowners. The House Select Committee on Revenue and Public Education Funding drafted a bill that split the tax roll for purposes of funding school maintenance and operations. Homeowners

Table 11.—Estimates of school-based resources under different calculations

	1994–95 Actual	1994–95 School operations expense, computed			1994–95 CFP, computed
Percent allocated to schools	68.1%	75%	85%	90%	78%
Amount per student	$3,402	$3,818	$4,401	$4,692	$4,007

SOURCE: Derived from the Academic Excellence Indicators System data set, 1994–95, Texas Education Agency.

[29] See Lieblong and Hooker (1997).

[30] Texas Education Code §29.082.

would have had a local school property tax rate of $0.50 (per $100 of value) and business property owners would be taxed by a state tax rate of $1.00 (per $100 of value). Both of these rates fall below the average maintenance and operations tax rates adopted by school districts in 1996. Debt service taxes for schools would be levied on all property, business and residential, using locally determined rates. To replace lost property tax revenue the bill proposed raising more state revenue through elimination of numerous sales tax exemptions, expansion of the state business franchise tax, a change in the calculation of the portion of the tax owed by multi-state business operations, and other features. The net effect of the legislation, in the initial draft, was to shift state funding from about 47 percent to 85 percent, and individual homeowners would receive substantial property tax relief. The bill did not pass through the legislature, even in an amended form. The Texas House expects to consider tax reform again in 1999.[31] Research conducted for the Texas Legislature in 1997 shows that Texas could create a school finance system funded 85 percent by the state. The major barrier is taxpayer reluctance to support major tax shifts that might affect them or their businesses.

If state resources were available, the state could implement school-based funding by providing state resources in block grants to schools. Using PEIMS data, the state could determine the appropriate grant level using a foundation program calculation similar to the one devised for the campus foundation program approach. This would permit the grant to vary, depending on student program needs. Alternatively, it could devise a different method.

One alternative is for the state to determine the base cost of education per student at the elementary, middle, and high school levels, taking into account increased graduation requirements, the performance expectations in the new Texas Essential Knowledge and Skills, and other mandates and requirements. The base costs would include teachers, administration, utilities, building maintenance and repair, transportation, food service, technology, books and materials for the regular program, security, insurance, and other factors that would apply to any school, regardless of the special program needs of students. The sum of base costs per student would be the campus base cost to which would be added program cost factors. Program costs could be handled like categorical allocations or they could be computed using a system of weights applied to the base cost. New research to determine the additional cost of programs could yield the information needed to construct the formulas. A system of weights could resemble the system in current law or be revised to reflect new priorities such as early elementary reading, or high school Advanced Placement programs.

The state would estimate school block grants in the spring when schools and districts begin budget planning. Final estimated blocks would be calculated in the summer so that schools and districts could complete the regular budget process in August. Payment directly from the state to schools could flow in equal quarterly payments or some other form that would permit school operations to flow smoothly.

School boards would levy a maintenance and operations tax and use it to fund central administrative functions, services to schools, tax administration, and other activities. Local support for schools would be equalized using a guaranteed yield approach. Districts would set a minimum tax rate of roughly 25 cents, and the state could guarantee a yield of $28 per penny of tax per student. The result would be that in every district, a 25 cent tax rate would

. . . the state could implement school-based funding by providing state resources in block grants to schools, . . . [determining] the appropriate grant level using a foundation program calculation.

[31] The Interim Charge for the Select Committee on Revenue and Public Education Funding, prepared September 24, 1997, calls for the Committee to continue the study of methods and formulas by which schools are funded and to review the laws and rules that govern all state and local taxes. The Committee must study the relative tax burden on various sectors of the Texas economy and consider economic development incentives.

yield $700 per student from a combination of state and local resources. Districts could be given some flexibility to adopt tax rates of up to 30 or 35 cents to fund schools or administrative functions. With this alternative, the state could create a fully equalized system by requiring revenue recapture from districts with a tax yield exceeding $28 per student per penny of tax (districts with taxable wealth of more than $280,000 per student). If school property values change because of split tax rolls, little or no recapture may be required.

This type of system could be part of an overall tax and governance restructuring effort. Policymakers would be confronted with a requirement to examine the real cost of education since the state would be responsible for supporting most of it. It might be an attractive approach for those who want to put an end to "business as usual," though the system would present new challenges, not the least of which could be increased overall funding and reconsideration of systemwide equity. Additionally, the school-based approach provides an opportunity to link funding to school performance as reported on the Texas accountability system. Because of the indeterminate nature of tax reform, it was not practical to estimate block grants to compare with actual student computations, as we did for the CFP system. Block grant funding would be a *de novo* approach, and policymakers could establish virtually any funding goals and expectations, so long as the revenue could be raised.

. . . the school-based approach provides an opportunity to link funding to school performance as reported on the Texas accountability system.

Issues and Problems in School-Based Funding

The two approaches outlined here are sketchy and fail to account for many important features of school finance systems such as facility funding; educator salaries, retirement, and benefits; tax rate limitations; unequalized local revenue; transportation revenues; and federal funds and programs. However, these approaches suggest, in broad terms, some of the cross-cutting issues that school-based funding raises.

One issue is the preparation of school personnel to plan and manage large budgets. School professionals currently receive little or no training in managing public funds so they would need special preparation. The state could work with educator associations and institutions of higher education to mount a program of training. Alternatively, schools could seek to hire operations managers from the existing labor pool of individuals with general management experience to handle purchasing, contracts, budgets, investments and so forth. In the short run, finding such managers would not be an adequate solution because the supply of qualified professionals is probably not sufficient to staff over 6,400 public schools.

A second issue concerns the hiring and compensation of professional staff. One key to school control is the ability to configure and manage staff to gain the desired outcomes. Would schools have the freedom to hire both certified and non-certified employees, as Texas open-enrollment charter schools do now? What about the salary schedule in law? Should it be retained? This research suggests that teacher salaries represent a sizeable percentage of school inputs. Being able to adjust salaries and terms of employment would give principals or school administrative officials flexibility to use dollars in ways that appear to be more effective. However, the response of over 250,000 Texas teachers to elimination of the salary schedule is likely to lead to low morale and general unrest. Even if schools indicated they would pay teachers higher salaries, the change could drive some professionals from teaching to other careers, an undesirable result in a state with high growth. A practical approach to turning control of personnel matters over to schools would be to implement the change gradually and institute safeguards. Hiring and compensation systems could become more flexible over time.

A third issue is whether thousands of small operating units-the schools-will be more efficient than 1,044 school districts. If schools

can better match resources with needs, efficiency can be improved and student performance may increase. If schools spend more time and money in administrative activities, and if they pay more to purchase smaller quantities of supplies and materials, efficiency may be reduced. We expect that schools would, over time, form purchasing cooperatives and find ways to stretch their dollars, but the efficient management of individual schools may present a greater challenge. It is likely that school staff would link funding to student learning by purchasing more staff development and improved technology. However, it is also possible that some schools will focus efforts on increasing salaries and benefits.

Determination of formula parameters such as the basic allotment, weights, and other elements is a critical prerequisite to establishing a system that provides high-quality education for all children. School districts will not be able to prop up under-funded programs if they must direct nearly all funds to the schools. The schools themselves will be unable to raise taxes to cover shortfalls. It is important to get the formula parameters right so that program quality and student performance do not decline.

Governance of districts and schools would change dramatically if school-based funding were implemented. Schools would assume much greater authority and legal liability for decisions related to finance, personnel, and policy. The public in large districts and cities would be likely to find that keeping up with matters in public education is much more complicated. Even if budget and policy decisions are considered during open meetings at schools, stakeholders in the community will have more difficulty following what is going on. This, in turn, may drive support from the public schools or increase public cynicism about the system itself. To protect the interests of children, oversight and responsibility needs to be established either through traditional school board mechanisms, or some other approach. This is particularly important in the early years of implementation.

Summary and Conclusions

This study examines the practical application of targeting a fixed percentage of school district resources for direct pass-through to schools. In Texas, roughly two-thirds of total operations expenditures are already allocated from districts to schools. Total operations expenditures in 1994–95 were $17.3 billion, with $11.8 billion or 68.8 percent attributable to campus-level operations. If 90 percent of resources move directly to schools, an additional $3.6 billion would flow to schools, and school-level operating expenditures would increase by 32.6 percent. At the same time, district-level resources would drop by more than 68 percent. Given the magnitude of this change, it would be most practical to implement a change of this type gradually, increasing the percentage each year to reach a desired level.

It is important to get the formula parameters right so that program quality and student performance do not decline.

One possible explanation for current variations in school-level expenditures is teacher compensation and class size. Using Texas data to explore this idea, we determine that Texas teacher salaries statewide are weakly related to years of experience. Certain features of Texas salary data may affect these results. Salary compression has occurred because of the structure of the state minimum salary schedule and district pay practices. In addition, salary variation may be related to other aspects of teaching, such as extra duty, advanced degrees, incentives, and bonuses. While teacher salaries are strongly and positively related to expenditures, teacher experience and class size are not, by themselves, strongly predictive of expenditures at the school level. We suspect that school and district policies also affect school-level expenditures.

School-based funding approaches can be devised that maintain school finance equity and that recognize student need and program costs. This study outlines two different approaches

to restructure Texas school finance to implement school-based funding. The first is a campus foundation program allotment that would flow revenue from the district to each school, based on calculations of campus allotments. The second is a block grant system that depends on major tax restructuring to generate additional state revenue for education. Both hypothetical systems present major challenges in areas of school capacity to plan and manage budgets, hire and compensate staff, and use resources more efficiently.

Appendix

The relationship among teacher salaries, average salaries, and teacher-pupil ratios is at one level an identity and can be expressed as

(1) $TTS = (\text{å}SAL_i/nT)(nT/nP)nP$

where TTS is total teachers salaries, SAL_i is the salary of the i^{th}, nT is the number of teachers, and nP is the number of pupils. The summation sign indicates a sum going from 1 to nT (in this instance and below).

A simple form of teacher pay schedule can be described as

$$SAL_i = A + BY_i,$$

where A is beginning teacher salary, B is additional salary for each year of experience, and Y_i is number of years of experience or seniority of the i^{th} teacher. If this expression is summed over all nT teachers at a given campus, or within a given district, we get

$$\text{å}SAL_i = \text{å}\ (A + bY_i)$$

$$= \text{å}\ A + \text{å}\ BY_i$$

or

(2) $\text{å}SAL_i = (nT)\ A + B\ \text{å}\ Y_i.$

If (2) is substituted into (1) for the $\text{å}SAL_i$ term, we have

(3) $TTS = [(nT)\ A + B(\text{å}Y_i)/nT](nT/nP)nP.$

To put (3) in terms of total teacher salary per pupil, we divide by nP and simplify further, obtaining

(4) $TTS/nP = (A + B\overline{Y})(nT/nP).$

In (4) $\overline{Y}$ is the average number of years of experience on the campus, which came from the total years experience summed for all teachers, $\text{å}Y_i$, divided by the number of teachers nT.

Note in (4) we are no longer dealing with individual teachers at the campus, but are instead dealing with the campus-wide concepts $\overline{Y}$ and teacher-pupil ratio (nT/nP), base salary (A), and annual salary step (B). It assumed that A and B are district policy parameters, while $\overline{Y}$ and the teacher-pupil ratio are unique to each campus within the district. It is also likely that A and B would vary by type of campus (elementary, middle, and high school).

If data are pooled across districts (for campuses of the same type) as we have done in this study, it becomes difficult to ascertain consistent relationships between total teacher salaries per pupil, average number of years of experience, and teacher-pupil ratios. Districts with different levels of resources are likely to

have different starting salaries (A) and/or different annual steps (B). Therefore, the simple relationship between salaries and teacher-pupil ratios expressed in (4) becomes obscured when data are pooled among different districts. If data from campuses of different types are also included, the relationship becomes even more obscured.

Equation (4) makes explicit that various combinations of beginning salary, step schedules, and teacher-pupil ratios could all result in the same observed average teacher salary per pupil.

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