DOCUMENT RESUME

ED 123 797 95 EA 008 358

AUTHOR Carroll, Stephen J.
TITLE School District Expenditure Behavior. The Rand Paper Series.
INSTITUTION Rand Corp., Santa Monica, Calif.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
REPORT NO Rand-P-5580
PUB DATE Jan 76
CONTRACT OEC-0-71-2533(099)
NOTE 29p.

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS *Budgeting; Elementary Secondary Education; Expenditure Per Student; *Instructional Staff; *Mathematical Models; Multiple Regression Analysis; Paraprofessional School Personnel; *Resource Allocations; School Districts; *School Systems; Statistical Analysis; Student Teacher Ratio; Tables (Data); Teachers

ABSTRACT

This study investigates how local school districts behave in allocating their budgets among teachers, other professional educators, support personnel, and nonpersonnel inputs. Demands for school inputs are estimated using U.S. Office of Education data on the expenditure and staffing patterns of large (enrollments in excess of 10,000 students) school districts in the 1969-70 school year. In general, results suggest that districts' allocative behavior at the margin is quite different from their average allocative behavior. In particular, relatively small proportions of budget increases (occasioned, perhaps, by reforms in school finance) would be allocated to employing additional teachers. (Author)

SCHOOL DISTRICT EXPENDITURE BEHAVIOR

Stephen J. Carroll

January 1976

P-5580

$1.50

The Rand Paper Series

Papers are issued by The Rand Corporation as a service to its professional staff. Their purpose is to facilitate the exchange of ideas among those who share the author's research interests; Papers are not reports prepared in fulfillment of Rand's contracts or grants. Views expressed in a Paper are the author's own, and are not necessarily shared by Rand or its research sponsors.

The Rand Corporation
Santa Monica, California 90406

ABSTRACT

The study investigates how local school districts behave in allocating their budgets among teachers, other professional educators, support personnel and non-personnel inputs. Demands for school inputs are estimated using U.S. Office of Education data on the expenditure and staffing patterns of large (enrollments in excess of 10,000 pupils) school districts in the 1969-1970 school year. In general, our results suggest that districts' allocative behavior at the margin is quite different from their average allocative behavior. In particular, relatively small proportions of budget increases (occasioned, perhaps, by reforms in school finance) would be allocated to employing additional teachers.

The research reported here was supported by the U.S. Office of Education under Contract OEC-0-71-2533(099). I am indebted to J. McCall, K. Ryder, Jr. and J. Stockfisch for their valuable suggestions and to B. Juba for his computational assistance.

INTRODUCTION

As a result of legal and political developments during the past five years, major reforms in school finance may soon be undertaken in many of the fifty states. Several states, notably California, Minnesota, and Florida, have already modified their systems substantially. The consequences in those states, and in others that are likely to follow suit, will probably include major reallocations of funds among school districts and may also result in substantial increases in aggregate, or average, support. The question of how such districts will respond to change is, therefore, of far more than academic interest. At present, however, very little information bearing on that question is available.

The purpose of this study is to investigate how local school districts behave in allocating their budgets among the main categories of school inputs: teachers, other professional educators, nonprofessional (support) personnel, and nonpersonnel resources. We develop a model of school district expenditure behavior, designed to take advantage of the available data. We describe the data and then discuss our empirical results (presented in tabular form in the Appendix). Finally, our conclusions and some of the limitations of the analysis are outlined.

A MODEL OF SCHOOL DISTRICT EXPENDITURE BEHAVIOR

The model represents the behavior of a school district that seeks to obtain the "best" combination of resources or inputs subject to an exogenously determined budget and exogenously determined salary levels and other input prices.[1] We focus on the districts' expenditure behavior

in the short run (the allocation of its budget for current operations) and neglect its decisions with respect to "fixed" school factors (e.g., capital items such as buildings). We also treat all funds as equivalent regardless of source and make no attempt to reflect linkages between funding sources and specific resource allocation decisions.[2]

Our model of school district expenditure behavior is based on the premise that school districts behave as if they had consistent preferences among alternative combinations of school inputs, and that these preferences can be described by utility functions of the form $U = U(x_1, \ldots, x_k)$, where x_i is the amount of the ith school input purchased or hired. The use of input quantities as arguments in the preference function is not in accordance with the usual procedure in factor-demand studies, which is to derive factor demands from demands for final outputs and technological relationships in production (production functions).[3] But dealing directly with trade-offs among input categories in the case of schooling is justified by two considerations: (a) there is no reason to assume the same kind of output maximizing behavior for school districts as underlies the derived demand notion applied to business firms [8]; and (b) as a practical matter, there is insufficient knowledge of production functions in education (and even insufficient evidence of their existence) to support empirical work based on an output-oriented specification of the

model.[4]

We leave open the question of whether hypothesized preferences among input categories derive from subjective perceptions of production functions by district decisionmakers, from traditional notions of what sets of inputs make up a "good" education, or from bureaucratic motives, such as staff enlargement or prestige. None of these is inconsistent with the basic formulation in terms of trade-offs among different input categories. We also leave open the question of the relative influence of district administrators, teachers and their professional organizations, school board members, community groups and, perhaps, other interested parties on the district's preferences. An agreement with the teachers' union which establishes maximum class size, for example, can be viewed as a district "preference" for a minimum number of teachers per pupil.

The explicit preference function we use is a modified version of the additive-logarithmic utility function used to derive the linear expenditure system of consumer economics.[5] We choose this particular function because of its empirical convenience; the estimating equations derived from the function are linear. The form of the function is:

$$U = \left(\frac{T_E}{E} - C_1\right)^{\alpha_1} \left(\frac{T_S}{S} - C_2\right)^{\alpha_2} \left(\frac{T_O}{A} - C_3\right)^{\alpha_3} \left(\frac{N}{A} - C_4\right)^{\alpha_4} \prod_{i=5}^{9} (x_i - C_i)^{\alpha_i}, \quad (1)$$

where the α_i and the C_i are parameters, and

T_E = number of elementary teachers,

T_S = number of secondary teachers,

T_O = number of all other professional staff serving instruction,

N = number of nonprofessional staff serving instruction,

E = number of elementary pupils,

S = number of secondary pupils,

A = E + S,

x_5= expenditures per pupil for administration,

x_6= nonpersonnel instructional expenditures per pupil,

x_7= expenditures per pupil for attendance and health services,

x_8= expenditures per pupil for pupil transportation, and

x_9= expenditures per pupil for plant operation and maintenance.

Thus, we are assuming that the district concerns itself with nine inputs--the respective teacher/pupil ratios in its elementary and secondary schools, the ratios of all other professionals and of nonprofessionals to total pupils, and the levels of expenditures per pupil in each of five categories.[6]

The parameter C_i can be interpreted as a "minimum required" level of the ith input per pupil. These minimum requirements reflect precommitments on the part of the district (e.g., the employment of tenured teachers, obtaining sufficient teachers to satisfy an agreement with the teachers' union regarding maximum class sizes), bureaucratic motives or concepts of prestige (e.g., the district's teacher/pupil ratio will be no smaller than the teacher/pupil ratios of "comparable" districts), or notions as to which inputs are required to provide a "quality" education (e.g., the National Educational Association's specification of the minimum acceptable teacher/pupil ratio). Regardless of their rationale, the assumption that they must be satisfied implies that decisionmakers seek to maximize the increment to utility provided by the consumption of resources beyond the minimum requirements.

The α_i can be interpreted as measures of the relative values the district places on the various inputs. Since the district is required to obtain at least C_i units of the ith input, a portion of its budget is precommitted. It is free to utilize the remainder of its budget to obtain amounts of the various inputs in excess of the minimum requirements. The parameter α_i indicates the share of the district's discretionary budget--that portion of its budget not committed to meeting the minimum requirements--that will be allocated to the acquisition of units of the ith input beyond the minimum required level.[7]

Maximizing Eq. 1, subject to the budget constraint[8]

$$b = P_T \frac{T_E + T_S + T_O}{A} + \frac{P_N N}{A} + \sum_{i=5}^{9} x_i , \qquad (2)$$

where

b = budget for current operations per pupil,

P_T = average salary of professional staff, and

P_N = average salary of nonprofessional staff,

and solving for the endogenous variables, we obtain the system used for empirical estimation. Thus,

$$x_i = \beta_{i0} + \beta_{i1} b + \beta_{i2} \frac{P_T E}{A} + \beta_{i3} P_T + \beta_{i4} P_N, \quad i = 1, \ldots, 9, \qquad (3)$$

where x_1 (x_2) is expenditures per pupil for elementary (secondary) teachers, x_3 (x_4) is expenditures per pupil for other professionals (nonprofessionals) and the β_{ij} ($i = 1, \ldots, 9$; $j = 0, \ldots, 4$) are functions of the α_i and C_i.[9]

DATA

The Elementary and Secondary General Information Survey (ELSEGIS) files contain data collected by the U.S. Office of Education in annual, two-part surveys of stratified random samples of public school districts. Part A of each survey obtains information on the district's schools, pupils, and staff for the current school year. Part B of each survey obtains information on the district's revenues and expenditures during the previous school year. In order to develop a consistent data base on staff and expenditures, we merged the expenditures data from the 1970 ELSEGIS file, the most recent available, and the pupil and staffing data from the 1969 ELSEGIS file, for the 671 districts whose enrollments exceeded 10,000 pupils in 1969.[10] We eliminated 58 districts that served only elementary or only secondary students on the grounds that the expenditure behavior of such districts was apt to differ from the behavior of districts that served pupils at all levels. We also eliminated the New York City school district since its size and budget were so different from the norm, even for large districts, as to make it a special case.

Ideally, the model should include measures of the characteristics of the population served by the district to allow for the possibility that school districts serving different "kinds" of students will have different preferences for inputs. However, the ELSEGIS files do not contain data on the characteristics of the community in which a district is located or of the students it serves. They do, however, identify the region (North Atlantic, Great Lakes and Plains, Southeast, West and Southwest) and metropolitan status

of the district. The latter variable indicates whether the district is located in the central city of a county in a Standard Metropolitan Statistical Area (SMSA), elsewhere in a SMSA, or outside a SMSA.[11]

RESULTS

On the assumption that the districts in a region having the same metropolitan status serve relatively homogeneous communities, we divided the large districts into 12 groups by metropolitan status and region and separately estimated the model for the districts in each group.[12] The results of these 108 regressions are presented in the Appendix.

Table 1 summarizes our principal conclusions regarding school district expenditure behavior. The entries in the table are the estimated values of the parameter α_i for each district type associated with each school input. This parameter indicates the portion of a district's discretionary budget that would be allocated to the ith school input.[13] Given the assumption that districts' budgets are sufficient to meet the minimum requirements for each input, these parameters are estimates of how school districts would allocate incremental funds among school inputs.

Table 1

ESTIMATED ALLOCATION OF DISCRETIONARY BUDGET AMONG INPUTS
(percent)

District Type	Elementary Teachers	Secondary Teachers	Other Professionals	Non-Professionals	Administration	Other Instructional	Attendance and Health Services	Pupil Transportation	Plant Operation and Maintenance
North Atlantic									
Central City	22.3	15.2	21.6	5.7	4.8	18.0	1.9	1.6	9.1
Metropolitan, Other	28.6	18.0	20.2	2.5	6.8	9.1	2.6	1.8	10.4
Nonmetropolitan	2.9	7.1	30.6	7.8	1.9	20.7	4.5	14.5	10.1
Great Lakes and Plains									
Central City	5.3	11.8	31.9	14.2	6.4	8.4	1.3	1.9	18.9
Metropolitan, Other	17.0	25.9	12.8	3.9	4.9	9.8	0.9	7.2	17.7
Nonmetropolitan	19.3	12.7	19.7	8.3	4.8	6.7	2.1	11.1	15.3
Southeast									
Central City	15.6	19.5	23.8	6.1	4.5	7.4	1.9	1.9	19.4
Metropolitan, Other	23.5	25.2	9.1	4.8	4.7	9.0	2.6	5.2	16.0
Nonmetropolitan	20.1	15.5	27.2	2.6	4.6	6.1	0.9	12.8	10.2
West and Southwest									
Central City	15.5	17.7	24.6	11.2	4.2	10.6	0.4	2.9	12.9
Metropolitan, Other	17.0	15.3	23.8	7.3	5.4	10.7	0.6	6.3	13.7
Nonmetropolitan	9.7	16.2	18.7	2.8	4.7	12.7	3.6	14.0	17.7

It is interesting to compare these estimates of district allocative behavior at the margin with their respective average behaviors. Table 2 displays for each type of district the distribution of budget for current operations per pupil among the inputs, calculated at the mean. There is far less variability among the different types of districts in terms of the portion of total budgets allocated to each input as compared to the portion of discretionary budgets. The reason for this difference is that the share of a district's total budget allocated to an input reflects both its expenditures to provide the minimum required level of that input and its discretionary expenditures for that input. If the minimum required level of expenditures for an input is large relative to discretionary expenditures for that input, and if the minimum requirements are roughly the same for different types of districts, then the proportion of total expenditures allocated to each input would be approximately the same for different types of districts even though the proportions of discretionary expenditures allocated to each input were much different.

Comparing the entries in Table 1 with those in Table 2, we see that although districts tend to spend roughly 33 percent of their total budget for elementary teachers, they would allocate a much smaller share--roughly 15 to 20 percent--of a budget increase to elementary teachers. Similarly, the share of an increase in a district's budget that would be allocated to

Table 2

AVERAGE ALLOCATION OF TOTAL BUDGET AMONG INPUTS
(percent)

District Type	Elementary Teachers	Secondary Teachers	Other Professionals	Non-Professionals	Administration	Other Instructional	Attendance and Health Services	Pupil Transportation	Plant Operation and Maintenance
North Atlantic									
Central City	32.4	26.5	10.6	3.7	3.5	6.0	2.1	2.4	12.7
Metropolitan, Other	30.8	28.6	9.7	3.4	3.6	6.1	2.0	2.9	12.0
Nonmetropolitan	32.1	26.2	9.6	4.3	3.0	5.6	1.7	6.0	11.6
Great Lakes and Plains									
Central City	32.1	26.2	12.3	6.0	2.8	4.2	1.2	1.9	13.2
Metropolitan, Other	31.8	30.1	9.4	3.2	4.3	4.3	0.8	3.3	12.8
Nonmetropolitan	33.8	30.2	9.4	2.9	2.8	3.8	0.8	3.1	13.3
Southeast									
Central City	36.8	28.4	9.5	3.1	2.9	5.2	0.7	1.8	11.6
Metropolitan, Other	36.4	28.4	9.5	2.8	2.7	5.1	0.6	4.1	10.4
Nonmetropolitan	36.2	26.6	10.9	3.0	2.9	5.0	0.7	4.9	9.8
West and Southwest									
Central City	33.3	29.0	11.1	4.8	3.2	4.1	1.2	1.4	11.9
Metropolitan, Other	33.8	28.3	10.1	4.8	3.3	4.3	1.0	4.3	12.2
Nonmetropolitan	32.3	28.0	11.2	4.1	3.2	4.9	0.9	3.2	12.2

secondary teachers--again, roughly 15 to 20 percent--would be much smaller than their share of the total budget--approximately 28 percent. On the other hand, other professionals account for about 10 percent of districts' total budgets, but something like 20 to 30 percent of an increase in a district's budget would go to increased expenditures for other professionals.

Summing the shares of total budgets allocated to elementary and secondary teachers and other professionals, we see that districts tend to spend 70 to 75 percent of their budgets for educational professionals. If we sum the estimated portions of discretionary budgets allocated to educational professionals as a group, we obtain combined estimates of about 50 to 60 percent.

Since the budget share allocated to educational professionals at the margin is substantially smaller than the average share of the budget allocated to professionals, expenditures for nonprofessionals and nonpersonnel inputs must occur at a marginal rate substantially larger than the average rate of expenditures for inputs in these categories. Comparing Tables 1 and 2, we see that each of the six remaining inputs generally receives a share of the discretionary budget greater than that of the total budget. The difference is smallest for attendance and health services and greatest for other instructional inputs.

We also estimated the derived demand equations corresponding to the first three equations of the system Eq. 3; for example,

$$\frac{T_E}{E} = \beta_{12} + \beta_{10}\frac{A}{P_T E} + \beta_{11}\frac{bA}{P_T E} + \beta_{13}\frac{A}{E} + \beta_{14}\frac{P_N A}{P_T E},$$

and similarly for the teacher/pupil ratio in secondary schools and the ratio of "other" teachers to total students. The values of R^2 and the F-statistic

obtained for each estimation were lower than those obtained from the estimation of the corresponding expenditure equation. However, the parameter estimates were not greatly affected. In particular, the estimates of β_{i1}, β_{i3}, and β_{i4} were virtually identical in the two sets of estimates for i = 1, 2, 3, for all 12 region by metropolitan-status samples. The estimates of β_{i0} and β_{i2} were somewhat less stable across the two approaches, but the differences were never large.

LIMITATIONS OF THE ANALYSIS

The policy issues addressed in this study hinge on district responses, in terms of their expenditures for various school inputs, to changes in their budgets. An appropriate approach would clearly include a longitudinal analysis in which changes in district budgets were related to changes in their expenditure patterns. Unfortunately, the only national data base on school district expenditures and staffing patterns, the ELSEGIS files, does not lend itself to this approach. Changes in a district's expenditure patterns could be related to changes in its budget only if the district were included in the sample for three consecutive years. The ELSEGIS design, a random sample of districts stratified by enrollment size, yields too few such cases to support empirical analysis.

The definition of district type used in this analysis leaves much to be desired. We use region and metropolitan status to distinguish among districts because these are the only variables in the ELSEGIS files related to the community each district serves. The results of the empirical work demonstrate that different types of districts exhibit markedly different

expenditure behavior at the margin despite the similarity in overall expenditure patterns. We presume that more meaningful (that is, more directly related to a community's educational needs and priorities) descriptors of district type would enhance the quality of the estimates considerably.

Finally, we have used average teachers' salary. This may not be a particularly accurate estimate of the price of a teacher to the district. A teacher's salary depends upon his or her degree level and experience. The price of an inexperienced teacher with a Bachelor's degree can be one-half to two-thirds the price of a teacher who has had years of experience and possesses a Master's degree. How much it costs a district to hire a teacher depends upon the kind of teacher it hires. However, we lack the data needed to assess the districts' priorities in this regard.

FOOTNOTES

[1] Federal and state aid, which account for roughly half the average district's revenue receipts, are determined by funding formulas based on factors not under local control (e.g., number of disadvantaged students). [7,12] The numerous studies of the determinants of local revenues consistently find that the tax base (assessed property value) per pupil and other variables beyond a district's control explain better than 80 percent of the variation among districts. [3,6,7] Further, most large districts have reached state imposed limits on local property tax rates and cannot increase local revenues, given the tax base, without specific approval from the voters. And, since the late 1960s, proposed tax increases have not fared well at the polls. [12] Studies of local revenues have also shown that teachers' salaries are not a significant predictor of locally raised revenues. [1,5] Neither theory nor previous research suggests that specific expenditures decisions enter the determination of teachers' salaries. [e.g., 13] In sum, this analysis focuses on one part of what can be viewed as a block recursive system. [14]

[2] Districts tend to use funds for their own priorities and interests despite attached categorical purposes and restrictions. [11] Most state aid is general purpose and local revenues, half the average district's budget, are totally unconstrained, providing adequate opportunity for substitution.

[3] For example, [5] estimates the demand for teachers in the context of a traditional model of the derived demand for inputs.

[4] The lack of adequate measures of educational outcomes may affect educational decisionmakers as well as economists. School district officials may use inputs as proxies for educational outcomes or quality even though they would not dispute the existence of an educational production function.

[5] See [4] or [10] for detailed discussions of the linear expenditure system.

[6] We define all variables in per-pupil terms to minimize the impact of expenditure patterns in the large districts on the results.

[7] Assuming $\Sigma\alpha_i=1$, an arbitrary normalization.

FOOTNOTES (Continued)

[8] We assume that no borrowing is allowed to support current operations and that the district does not accumulate cash balances.

[9] Since E+S=A, the term in $P_T S/A$ is algebraically eliminated.

[10] Few smaller districts were included in both the 1969 and 1970 surveys.

[11] The "metropolitan, other" districts tend to be suburban, although a few are rural. The non-SMSA districts include rural areas, small towns, and cities that lie outside SMSAs. In school systems that include both the central city and surrounding areas, a 50-percent rule is applied. Dade County, Florida, for example, is a single district classified as "metropolitan, other" because less than 50 percent of its pupils are in the central city (Miami).

[12] The nine expenditure equations in the system contain a total of 45 parameters to be estimated. However, each of these parameters is a function of the 18 structural parameters of the assumed district preference function (eq. 1). Clearly the β_{ij} are not independent. Park [10] outlines a statistical procedure for the estimation of expenditure systems, such as the one examined here, that yield consistent, maximum likelihood estimators for β_{ij}. However, that procedure requires more time and resources than were available for this analysis. Moreover, we wished to test the model with the data to discover whether or not an unconstrained estimation of the expenditure system would yield parameter estimates that approximately satisfied the implicit relationships among β_{ij}. Accordingly, we estimated each of the nine expenditure equations of the system (eq. 3) independently.

[13] The coefficient of b in the ith equation, β_{i1}, is the estimate of α_i.

REFERENCES

1. Alexander, A., *Teachers, Salaries, and School District Expenditures*, R-1588-FF, The Rand Corporation, Santa Monica, CA, October 1974.

2. Barro, S., *Theoretical Models of School District Expenditure Determination and the Impact of Grants-in-Aid*, R-867-FF, The Rand Corporation, Santa Monica, CA, February 1972.

3. ----, *The Impact of Intergovernmental Aid on Public School Spending*, Ph.D. dissertation, Stanford University, Stanford, CA, May 1974.

4. Brown, A. and A. Deaton, "Models of Consumer Behavior: A Survey," *The Economics Journal*, V. 82, No. 328, December 1972, pp. 1145-1236.

5. Brown, B., "Achievement, Cost, and the Demand for Public Education," *Western Economics Journal*, V. 10, No. 2, June 1972, pp. 198-219.

6. Hickrod, G., "Local Demand for Education: A Critique and Economic Research Circa 1959-1969," *Review of Educational Research*, V. 41, February 1971, pp. 35-49.

7. Johns, R. and K. Alexander, *Alternative Programs for Financing Education*, The National Educational Finance Project, V. 5, Gainsville, Florida, 1971.

8. Levin, H., "A New Model of School Effectiveness," *Do Teachers Make a Difference?*, U.S. Department of Health, Education, and Welfare, Office of Education, Washington, D.C., 1970.

9. McMahon, W., "An Economic Analysis of Major Determinants of Expenditures on Public Education," *Review of Economics and Statistics*, V. 52, No. 3, August 1970, pp. 242-252.

10. Park, R., "Systems of Demand Equations: An Empirical Comparison of Alternative Functional Forms," *Econometrica*, V. 37, No. 4, October 1969, pp. 611-628.

11. Porter, D., *The Politics of Budgeting Federal Aid*, Sage Publications, New York, 1973.

12. Reischauer, R. and R. Hartman, *Reforming School Finance*, The Brookings Institution, Washington, D.C., 1973.

13. Schmenner, R., "The Determination of Municipal Employee Wages," *Review of Economics and Statistics*, V. 55, No. 1, February 1973, pp. 83-90.

14. Theil, H., *Principles of Econometrics*, John Wiley and Sons, New York, 1971.

Table A1

REGRESSION RESULTS
(Dependent Variable: Expenditures per Pupil for Elementary Teachers)

Item	Sample[a]											
	11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variable	247.68	252.41	237.16	223.73	223.66	223.25	184.53	177.53	175.06	203.62	214.46	196.49
Regression Coefficients												
b	.223 (6.80)	.286 (10.32)	.029 (.33)	.053 (1.24)	.170 (5.78)	.193 (3.42)	.156 (5.63)	.235 (9.34)	.201 (7.17)	.155 (5.93)	.170 (7.80)	.097 (1.51)
$P_T E/A$	.050 (12.32)	.041 (12.33)	.060 (8.85)	.039 (7.56)	.029 (5.09)	.061 (11.05)	.039 (13.37)	.036 (12.49)	.035 (13.61)	.033 (8.64)	.035 (13.39)	.036 (8.37)
P_T	-.024 (-5.42)	-.025 (-9.09)	-.017 (-2.13)	-.009 (-1.97)	-.013 (-3.47)	-.032 (-5.35)	-.006 (-1.80)	-.011 (-3.14)	-.005 (-1.83)	-.006 (-1.75)	-.007 (-2.66)	-.005 (-1.05)
P_N	-.001 (-1.05)	-.001 (-1.01)	-.009 (-2.02)	-.000 (-.44)	.003 (.24)	-.001 (-1.04)	-.002 (-1.10)	-.002 (-1.54)	-.001 (-1.38)	-.000 (-.46)	-.002 (-3.07)	-.005 (-1.45)
Constant	16.83	43.14	73.25	48.58	68.76	75.10	-24.50	-14.24	-39.37	-11.84	-13.55	19.36
R^2	.88	.87	.91	.69	.63	.91	.92	.95	.87	.92	.91	.92
F	80.26	113.63	42.32	24.04	21.97	45.61	120.45	209.97	114.13	155.58	215.47	36.25
Standard Error	21.03	19.13	21.25	21.91	18.56	11.77	10.06	9.33	10.57	13.56	17.34	16.98
N	49	71	22	48	57	23	46	53	74	57	94	18

NOTE: [a]The first digit denotes the region (1 = North Atlantic, 2 = Great Lakes and Plains, 3 = Southeast, and 4 = West and Southwest), and the second denotes metropolitan status (1 = central city; 2 = metropolitan, other; and 3 = nonmetropolitan).

Table A2

REGRESSION RESULTS

(Dependent Variable: Average Expenditures per Pupil for Secondary Teachers)

Item	Sample 11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variables	203.11	234.28	193.48	182.91	211.54	199.97	142.34	138.27	128.97	177.18	179.27	170.31
Regression Coefficients												
b	.152 (4.75)	.180 (5.93)	.071 (1.28)	.118 (3.01)	.259 (15.31)	.127 (1.74)	.195 (6.57)	.252 (8.26)	.155 (7.60)	.177 (6.53)	.153 (7.67)	.162 (3.63)
$P_T S/A$	.043 (11.09)	.049 (13.23)	.038 (8.72)	.038 (8.10)	.043 (13.01)	.048 (6.82)	.042 (13.35)	.040 (11.47)	.035 (18.92)	.044 (11.16)	.042 (17.69)	.041 (13.62)
P_T	-.013 (-3.75)	-.021 (-6.02)	-.001 (-.23)	-.006 (-1.57)	-.014 (-7.35)	-.004 (-.78)	-.007 (-2.34)	-.013 (-4.50)	-.004 (-2.57)	-.012 (-4.94)	-.009 (-4.58)	-.009 (-3.31)
P_N	-.001 (-1.50)	.000 (.33)	.007 (2.53)	-.000 (-1.46)	-.001 (-.79)	-.000 (-.28)	-.003 (-2.17)	-.003 (-1.64)	-.000 (-.57)	-.000 (-.45)	-.000 (-.59)	-.005 (-2.45)
Constant	53.00	82.11	-25.33	5.68	-15.65	-45.96	-25.95	3.39	-20.24	-9.16	-13.06	14.28
R^2	.79	.85	.87	.79	.96	.88	.90	.94	.94	.93	.92	.97
F	42.13	91.41	29.73	39.68	333.54	32.73	89.07	187.62	292.61	163.00	261.18	79.94
Standard Error	20.48	20.94	13.78	19.91	10.69	15.22	10.76	11.34	7.66	14.03	15.88	11.81
N	49	71	22	48	57	23	46	53	74	57	94	18

Table A3

REGRESSION RESULTS

(Dependent Variable: Average Expenditures per Pupil for Other Professionals)

Item	Sample											
	11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variable	81.41	79.29	70.51	85.44	65.88	62.20	47.63	46.26	52.59	67.63	64.15	68.00
Regression Coefficients												
b	.216 (6.73)	.202 (8.00)	.306 (4.73)	.319 (5.47)	.128 (6.27)	.197 (3.59)	.238 (7.95)	.091 (3.51)	.272 (7.87)	.246 (8.51)	.238 (12.68)	.187 (3.16)
$P_T E/A$	-.001 (-.18)	-.002 (-.53)	-.012 (-2.30)	-.004 (-.59)	.002 (.48)	.007 (1.28)	-.003 (-.84)	-.003 (-1.07)	-.007 (-.217)	.006 (1.38)	.004 (1.69)	-.004 (-.88)
P_T	-.005 (-1.24)	-.001 (-.42)	-.007 (-1.18)	-.008 (-1.29)	-.002 (-.71)	-.011 (-1.89)	-.009 (-2.44)	.003 (.93)	-.010 (-2.91)	-.013 (-3.44)	-.012 (-5.04)	-.005 (-1.00)
P_N	.000 (.33)	-.003 (-2.18)	-.004 (-2.00)	-.002 (-4.11)	.001 (.76)	.001 (.77)	.004 (2.46)	.005 (3.51)	.000 (.18)	-.000 (-.91)	.000 (.41)	.004 (1.47)
Constant	-28.41	-54.93	.57	-18.89	-16.90	-.13	6.37	-21.42	27.86	13.92	11.32	-1.28
R^2	.62	.75	.65	.46	.61	.53	.71	.81	.71	.69	.80	.67
F	17.98	48.81	7.98	9.31	20.20	5.15	25.51	50.21	42.88	29.56	90.86	6.83
Standard Error	20.65	17.50	16.04	29.78	12.86	11.48	10.87	9.59	13.01	15.01	14.93	15.62
N	49	71	22	48	57	23	46	53	74	57	94	18

Table A4

REGRESSION RESULTS
(Dependent Variable: Average Expenditures per Pupil for Nonprofessional Staff)

Item	Sample 11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variables	28.54	27.94	31.74	42.11	22.35	19.01	15.35	13.50	14.65	29.44	30.41	25.14
Regression Coefficients												
b	.057 (3.26)	.025 (1.95)	.078 (2.76)	.142 (4.15)	.039 (3.62)	.083 (2.54)	.061 (5.41)	.048 (7.59)	.026 (2.58)	.112 (7.28)	.073 (6.47)	.028 (1.74)
$P_T E/A$	.002 (1.05)	.005 (3.32)	.005 (2.21)	-.006 (-1.59)	.000 (.15)	-.002 (-.69)	-.002 (-2.05)	.000 (.45)	-.000 (-.34)	.004 (1.70)	.001 (.44)	.000 (.45)
P_T	-.003 (-1.50)	-.002 (-1.82)	-.005 (-1.71)	-.000 (-.14)	.001 (.54)	-.001 (-.24)	-.000 (-.31)	-.001 (-1.47)	-.000 (-.35)	-.006 (-3.22)	-.002 (-1.63)	-.000 (-.32)
P_N	.004 (7.36)	.005 (8.62)	.010 (6.79)	.004 (17.72)	.001 (2.87)	.000 (.72)	.003 (5.29)	.005 (13.45)	.004 (12.74)	.001 (2.75)	.002 (6.19)	.005 (6.24)
Constant	-11.24	-18.02	-53.14	-49.49	-18.70	-16.94	-8.39	-12.35	-4.47	-.68	-8.41	-8.90
R^2	.73	.64	.84	.96	.56	.46	.74	.95	.86	.70	.78	.89
F	29.96	29.99	22.59	250.42	16.57	3.76	29.53	243.54	103.64	30.85	77.09	26.74
Standard Error	11.17	8.73	6.99	17.39	6.78	6.81	4.08	2.35	3.82	7.99	9.03	4.20
N	49	71	22	48	57	23	46	53	74	57	94	18

Table A5

REGRESSION RESULTS

(Dependent Variable: Average Expenditures per Pupil for Administration)

Item	Sample											
	11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variables	26.79	29.38	21.88	19.54	30.55	18.41	14.70	13.34	14.20	19.58	21.17	19.42
Regression Coefficients												
b	.048 (3.57)	.068 (5.15)	.019 (.74)	.064 (7.51)	.048 (6.04)	.048 (1.63)	.045 (2.43)	.047 (3.95)	.046 (3.92)	.042 (3.72)	.054 (8.22)	.047 (4.10)
$P_T E/A \times 10$	.000 (.00)	.002 (-.12)	-.003 (-.13)	.028 (2.78)	.074 (2.37)	-.015 (-.52)	-.000 (-.01)	-.005 (-.40)	.002 (.16)	-.008 (-.48)	.007 (.87)	-.000 (-.07)
$P_T \times 10$	.002 (.13)	-.020 (-1.52)	.009 (.39)	-.030 (-3.34)	-.098 (-4.82)	.010 (.32)	-.034 (-1.41)	-.018 (-1.05)	-.002 (-.17)	-.008 (-.57)	-.014 (-1.65)	-.006 (-.72)
$P_N \times 10$	.003 (.94)	-.009 (-1.44)	-.006 (-.48)	-.004 (-5.51)	-.017 (-2.55)	.003 (.49)	.009 (.87)	.014 (.65)	-.001 (-.33)	.001 (.65)	-.005 (-2.12)	.000 (.01)
Constant	-13.90	.28	3.37	-9.20	28.56	-16.14	17.00	5.82	-6.85	5.59	-.71	-2.75
R^2	.45	.44	.20	.64	.46	.39	.17	.52	.38	.42	.67	.75
F	9.07	12.75	1.09	19.52	10.97	2.83	2.11	12.93	10.68	9.26	44.87	9.96
Standard Error	8.61	9.13	6.29	4.33	10.23	6.16	6.69	4.43	4.38	5.88	5.24	3.00
N	49	71	22	48	57	23	46	53	74	57	94	18

Table A6

REGRESSION RESULTS

(Dependent Variable: Average Expenditures per Pupil for Other Instructional Inputs)

Item	Sample 11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variables	46.09	49.93	41.05	29.63	30.55	24.88	26.19	24.83	24.05	25.06	27.34	30.02
Regression Coefficients												
b	.180	.091	.207	.084	.098	.067	.074	.090	.061	.106	.107	.127
	(5.62)	(4.34)	(3.97)	(3.97)	(6.04)	(1.75)	(2.68)	(4.08)	(3.09)	(7.23)	(11.23)	(4.76)
P_TE/A	-.005	-.002	-.008	.000	.007	-.007	.006	.007	.003	.003	.000	-.000
	(-1.38)	(-.93)	(-1.86)	(.08)	(2.37)	(-1.98)	(2.09)	(2.60)	(1.78)	(1.32)	(.08)	(.13)
P_T	-.002	.004	-.005	-.006	-.010	.001	-.008	-.008	-.005	-.005	-.004	-.004
	(-.54)	(1.93)	(-1.10)	(-2.73)	(-4.82)	(.33)	(-2.35)	(-2.59)	(-2.53)	(-2.86)	(-3.77)	(-1.94)
P_N	-.0[illegible]3	-.003	-.005	-.001	-.002	-.001	-.001	-.003	-.000	-.000	-.001	-.000
	(-3.3[illegible])	(-3.02)	(-1.88)	(-3.50)	(-2.55)	(-1.25)	(-.96)	(-2.07)	(-.82)	(-.90)	(-2.11)	(-.13)
Constant	-21.0[illegible]	-43.40	7.04	35.34	28.56	14.21	31.21	18.90	19.18	-.73	8.82	-7.89
R^2	.4[illegible]	.65	.59	.29	.46	.46	.22	.36	.14	.64	.71	.72
F	10.0[illegible]	31.53	6.10	4.49	10.97	3.87	[illegible].85	6.68	2.80	22.58	55.65	8.44
Standard Error	20.5[illegible]	14.54	12.93	10.78	10.23	8.03	10.08	8.19	7.41	7.58	7.56	7.01
N	49	71	22	48	57	23	46	53	74	57	94	18

Table A7

REGRESSION RESULTS

(Dependent Variable: Average Expenditures per Pupil for Attendance and Health Services

Item	Sample											
	11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variables	16.34	16.00	12.53	8.29	5.56	5.38	3.55	3.10	3.39	7.55	6.16	5.47
Regression Coefficients												
b	.019 (2.21)	.026 (3.63)	.045 (2.35)	.013 (1.32)	.009 (1.85)	.021 (1.19)	.019 (2.74)	.026 (4.76)	.009 (1.29)	.004 (.62)	.006 (1.92)	.036 (6.36)
P_TE/A	.002 (2.14)	.002 (2.09)	-.001 (-.56)	.002 (1.69)	.001 (.84)	-.000 (-.17)	.000 (.22)	-.000 (-.51)	.000 (.37)	-.000 (-.43)	.000 (.29)	.000 (.95)
P_T	-.001 (-.49)	-.001 (-.85)	.001 (.30)	-.002 (-1.48)	-.000 (-.64)	-.001 (-.36)	-.001 (-.55)	-.000 (-.03)	-.001 (-1.49)	.000 (.15)	.000 (.64)	-.001 (-3.55)
P_N	-.000 (-1.40)	.000 (1.48)	.001 (.64)	-.000 (-1.34)	.001 (3.76)	.000 (.10)	.000 (.48)	-.001 (-3.81)	-.000 (-.37)	.000 (.34)	.000 (.34)	-.001 (-2.94)
Constant	-4.48	-11.53	-23.63	3.54	-4.52	-.02	-3.38	-4.97	6.08	5.73	-1.25	-.66
R^2	.31	.52	.52	.09	.36	.11	.24	.59	.05	.04	.32	.77
F	4.95	17.73	4.61	1.12	7.30	.56	3.28	17.00	.90	.48	10.32	10.60
Standard Error	5.48	4.90	4.75	4.95	3.24	3.[illegible]	2.58	1.99	2.62	3.63	2.55	1.49
N	49	71	22	48	57	23	46	53	74	57	94	18

Table A8

REGRESSION RESULTS

(Dependent Variable: Average Expenditures per Pupil for Pupil Transportation)

Item	Sample 11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variables	18.29	32.06	44.15	13.43	23.42	20.26	8.96	19.86	23.69	8.49	14.30	19.21
Regression Coefficients												
b	.016	.018	.145	.019	.072	.111	.019	.052	.128	.029	.063	.140
	(.98)	(.77)	(2.09)	(1.09)	(3.74)	(2.52)	(.72)	(2.59)	(4.77)	(3.20)	(6.88)	(3.25)
$P_T E/A$	-.002	.001	-.002	-.003	.006	-.008	.001	.001	.009	.000	.002	.004
	(-.84)	(.22)	(-.41)	(-1.26)	(1.50)	(-1.84)	(.26)	(.53)	(3.52)	(.05)	(1.66)	(1.31)
P_T	.002	.002	-.007	.001	-.008	.001	-.002	-.007	-.012	-.001	-.005	-.009
	(.78)	(.87)	(-1.10)	(.59)	(-3.45)	(.15)	(-.53)	(-2.55)	(-4.35)	(-.91)	(-4.43)	(-2.45)
P_N	.000	-.001	.000	-.000	-.000	.001	-.003	-.001	-.002	.000	-.000	-.001
	(.99)	(-.85)	(.11)	(-1.06)	(-.39)	(1.10)	(-2.15)	(1.26)	(-2.73)	(1.04)	(-.29)	(-.53)
Constant	-2.96	-5.52	18.38	6.23	29.42	-19.59	18.68	48.69	17.15	.05	16.35	-4.74
R^2	.14	.17	.26	.09	.27	.50	.13	.25	.27	.33	.42	.46
F	1.77	3.33	1.52	1.02	4.76	4.33	1.54	3.97	6.49	6.39	16.19	2.80
Standard Error	10.54	16.14	17.25	8.65	12.09	9.23	9.44	7.46	10.10	4.70	7.29	11.37
N	49	71	22	48	57	23	46	53	74	57	94	18

Table A9

REGRESSION RESULTS

(Dependent Variable: Average Expenditures per Pupil for Plant Operation and Maintenance)

Item	Sample 11	12	13	21	22	23	31	32	33	41	42	43
Mean of Dependent Variables	97.10	98.12	85.50	92.11	90.31	88.09	58.09	50.78	47.49	73.08	77.18	74.22
Regression Coefficients b	.091 (3.84)	.104 (5.23)	.100 (3.19)	.189 (8.17)	.177 (8.78)	.153 (2.92)	.194 (9.08)	.160 (6.78)	.102 (4.02)	.129 (7.50)	.137 (11.92)	.177 (3.93)
$P_T E/A$	-.003 (-.96)	.004 (1.63)	-.004 (-1.53)	.007 (2.57)	-.002 (-.58)	.000 (.04)	.001 (.33)	.000 (.03)	-.005 (-2.08)	-.000 (-.09)	.000 (.16)	.004 (1.28)
P_T	.003 (.88)	-.003 (-1.38)	.003 (1.07)	-.005 (-2.17)	.004 (1.39)	-.002 (-.42)	-.004 (-1.58)	-.000 (-.12)	.003 (.97)	-.000 (-.07)	-.001 (-.91)	-.006 (-1.75)
P_N	.001 (1.4[illegible])	.003 (2.95)	.000 (.27)	-.001 (-5.89)	.000 (.39)	-.000 (-.06)	.001 (1.15)	-.000 (-.15)	.000 (.43)	.000 (.12)	.000 (1.11)	.003 (1.32)
Constant	12.22	7.88	-.51	-21.80	-57.73	9.47	-11.04	23.83	.67	-2.88	.48	-7.42
R^2	.53	.63	.69	.73	.82	.56	.77	.84	.53	.82	.87	.76
F	12.3[illegible]	27.67	9.26	29.38	59.17	5.61	35.42	64.10	19.31	62.53	155.23	10.54
Standard Error	15.19	13.78	7.76	11.80	12.75	10.94	7.75	8.75	9.51	8.89	9.12	11.90
N	49	71	22	48	57	23	46	53	74	57	94	18