The influence of demographic and social variables indicate that perhaps it is time once again for Illinois to consider a cost-of-education index in the school funding formula.

Prediction Variables for District Operating Expenditure Per Pupil in the State of Illinois

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A topic of long-standing concern and controversy to school finance has been the issue of expenditure equity (Swanson & King, 1991; Wood, 1990; Guthrie, Garms, Pierce, 1988; Arnold, Hickrod, Hubbard, 1985). Beginning with the 1954 United States Supreme Court decision in *Brown v. Board of Education*, and continuing through the influx of federal programs of the 1960s and school finance reform of the last three decades, a major portion of 20th century school finance research and policy development has been focused on equity concerns and the influence of reform on equity. In the absence of full state funding, state aid cannot by itself create complete expenditure equality. Operating expenditure per pupil supplemented in varying degrees by local wealth and revenue can create "disparities in per pupil revenue between more-and less-affluent jurisdictions" (Verstegen & Salmon, 1989, p. 205). Although demographic and social variables have been noted as powerful expenditure predictors, specific local characteristics of variables within these categories which account for the remaining variation in local expenditure need further specification. The purpose of this study was to determine specific demographic and social predictor variables for district operating expenditure per pupil in Illinois. Seven expenditure functions were designed to predict operating expenditure per pupil by geographic area and district type in Illinois to determine significant predictors by geographic region and district type.

The state, as the primary governmental level responsible for education in the United States, has the momentous task of providing a uniform and equitable education for students within its boundaries. Current fiscal restraints however, have created additional pressure and "nearly every state legislature exhibits a badly balkanized political process. This often results in an inability to reach long-term solutions to certain key fiscal issues" (Wood. 1990, p. 59–60). Additional pressure is therefore placed on local revenues to provide resources for education. Local variation in both tax rate and tax base (assessed valuation) has created wide disparities in the expenditure per pupil, exaggerating the problems of equity in the schools.

Numerous expenditure determination studies have been conducted in an attempt to predict per pupil expenditure variation. In a doctoral dissertation, Reimer (1971) outlined significant contributions to expenditure research from 1959–1967. Brazer (cited in Reimer, 1971) accounted for 40% of the variation in per pupil expenditure with median family income, average daily attendance and the amount of state aid received as the best predictors. Property valuation, an index of quality, percentage of secondary students and school district size accounted for 85% of the variation in local expenditure in a study conducted by Hirsh (cited in Reimer, 1971). Additional significant prediction variables for per pupil expenditures cited by Reimer included property valuation, personal income, percent of the labor force unemployed, socioeconomic factors, pupil–teacher ratio, and expenditures for instructional staff.

Jones (1985) further defined expenditure determinants, noting that variations were most often accounted for through local predictors. Governmental, economic, social, demographic and political administrative variables were found to account for significant variation.

"The single most significant item within a local school budget are the salaries paid to professional educators" (Webb, McCarthy, Thomas, 1988, p. 306). Personnel expenditures constitute 82%–85% of a typical local budget, and can therefore account for wide expenditure disparities. Other local program characteristics which affect not only the type of education provided but the diversity in costs as well included class size, transportation needs and costs, maintenance and operations costs, supplies, materials, and equipment (Webb, etal., 1988).

In regard to geographic area or community type, DeYoung (1987) emphasized the predominance of urban/suburban influence on policy decision, curricular needs and research activities. The mass movement to suburbia, the distinct municipal overburden problems of the urban central city and the unique concerns of the rural community create special concerns related to school financing systems and equity.

This study addresses equity in the State of Illinois by determining prediction models for operating expenditure per pupil by geographic area and district type. It was hypothesized that variations would exist and that teacher/administrator salaries would be significant expenditure determinants in all models. Further, it was hypothesized that school size, pupil teacher ratio, pupil administrator ratio, percent attendance and percent low-income would constitute a set of variables which would significantly predict operating expenditure per pupil, in some combination, by district area and type in Illinois.

Method

Subjects: Unit and high school districts who submitted data to the State of Illinois on the Better Schools Accountability data form for the 1985–86 academic year were utilized in this study. These districts provided a data base which consisted of 690 total observations; 164 high school districts and 526 unit districts. All 690 school districts reported information for variables analyzed in the study.

Procedure: Seven stepwise multiple regression analyses at $\propto$=.05 were completed. The independent variables tested in these analyses were district average teacher salary (DAVTSAL), district average administrator salary (DAVASAL), percent low-income (PSLOIN), percent attendance rate (PSATTR), district pupil teacher ratio (DPTR), district pupil administrator ratio (DPADMR), and school enrollment (SENR). The dependent

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variable for each analysis was district operating expenditure per pupil (DOEPP).

School districts were categorized as rural, suburban, or urban. The designation rural for community type was assigned to school districts in Illinois inside or outside of a Standard Metropolitan Statistical Area (SMSA) with 50% or more of its residents classified as "rural" by the Federal Census. Suburban designation was assigned to districts inside a SMSA with more than 50% of its residents classified "suburban" by the Federal Census which did not serve a central city in a SMSA. School Districts classified as urban were those that serve a central city (cities) inside a SMSA and those districts outside of a SMSA with more than 50% of its residents classified as "urban" by the Federal Census.

School districts were also categorized by the three types used in Illinois. High school districts (grades 9–12) and unit districts (K–12) were used in this study. Elementary districts (K–8) were excluded from the study.

Results

To test the research hypotheses, seven stepwise multiple regression analyses were conducted. Only those which accounted for more than sixty percent of the variance are reported here. The stepwise multiple regression procedures for the State of Illinois, which included high school and unit school districts for all three geographic areas, sixty-eight percent of the variance in district operating expenditure per pupil (DOEPP) was accounted for by six variables, R^2 = .67698, F (6, 683) = 238.57, p = .000. The significant variables were

Table 1
Stepwise Multiple Regression Results High School and Unit Districts in Rural, Suburban, Urban Areas State of Illinois

Dependent Variable—DOEPP

Multiple R:	.82279
R Square:	.67698
Adjusted R Square:	.67414

Analysis of Variance	df	Sum of Squares	Mean Square	F	Obs. Sig.
Regression	6	475976593.87	79329432.31	238.57*	0.00
Residual	683	227109572.59	332517.68		

	B	Beta	t	Obs.Sig.
CONSTANT	4307.49000		5.778*	.0000
DAVTSAL	.12907	.74179	13.630*	.0000
DPADMR	–5.04545	–.33277	–13.211*	.0000
DPTR	–97.7534	–.39779	–12.767*	.0000
SENR	.1484	.11694	2.947*	.0033
PSATTR	22.2400	–.07370	–2.924*	.0036
DAVASAL	.0159	.10049	2.370*	.0181

*p∝.05

VARIABLES NOT IN EQUATION: PSLOIN

DAVTSAL, b = .1291, t = 13.63; DPADMR, b = –5.045. t = –13.21; DPTR, b = –97.753, t = –12.77; SENR, b = .1484, t = 2.95; PSATTR, b = –22.240, t =–2.92; and DAVASAL, b = .0159, t = 2.37.

For the stepwise multiple regression procedures for high school districts in suburban areas, seventy-two percent of the variance in district operating expenditure per pupil (DOEPP) was accounted for by four variables, R^2 = .7199, F (4, 97) = 62.36, p =.000. The significant variables were DAVTSAL, b = .146, t =12.57; DPTR, b = –166.32, t = –6.09; DPADMR, b = –3 39, t = –5.33; and PSATTR, b = –72.39, t = –2.57.

For the stepwise multiple regression procedures for unit districts in urban areas, eighty-nine percent of the variation in district operating expenditure per pupil (DOEPP) was accounted for by six variables, R^2 = .888, F (6, 154) = 202.53, p = .000. The significant variables were DAVTSAL, b = .116, t = 13.66; DPADMR, b = –2.61, t = –6.11; PSLOIN, b = 5.89, t = 3.82; DPTR, b = –41.23, t = –5.19; SENR, b = .097, t = 2.88; and PSATTR, b = –15.63, t = –2.46.

Stepwise multiple regression procedures which accounted for less than sixty percent of the variance in district operating procedures are not fully reported here. Included are high school districts in rural areas, unit districts in rural areas, unit districts in suburban areas, and high school districts in urban areas.

The descriptive data for the eight variables studied in the analyses determined that high school districts have higher average operating expenditures per pupil (DOEPP, H.S./Suburban $\bar{X}$ = 4844, H.S./Rural $\bar{X}$ = 4422, H.S./Urban $\bar{X}$ = 3852) than the state average (DOEPP = 3433). Unit district operating expenditure per pupil was below the state average (DOEPP, Unit/Urban $\bar{X}$ = 3378, Unit/Suburban $\bar{X}$ = 3016, Unit/Rural $\bar{X}$ = 2906).

Discussion

The results of this study support the hypothesis that variations would exist among expenditure functions to predict operating expenditure per pupil by geographic area and district type in the State of Illinois. Variable sets created to predict district operating expenditure per pupil contained distinctive combinations of the variables entered.

In support of Reimer (1971) and Webb's (1988) research, average teacher salary was a significant predictor variable for operating expenditure per pupil in all models. Related to this finding, district pupil teacher ratio was also a significant predictor variable. While some of the variables were excluded from individual models as insignificant, none of the variables were excluded from all of the models. This finding supports the hy-

Table 2
Stepwise Multiple Regression Results High School Suburban Areas State of Illinois

Dependent Variable—DOEPP

Multiple R:	.84852
R Square:	.71999
Adjusted R Square:	.70845

Analysis of Variance	df	Sum of Squares	Mean Square	F	Obs. Sig.
Regression	4	65021001.92	16255250.48	62.36*	0.00
Residual	97	25286801.42	260688.67		

	B	Beta	t	Obs.Sig.
CONSTANT	10438.81		3.979*	.0001
DAVTSAL	.14640	.6897	12.571*	.0000
DPTR	−166.324	−.3282	−6.097	.0000
DPADMR	−3.395	−.2902	−5.333*	.0000
PSATTR	−72.390	−.1414	−2.572*	.0116

*p∝.05

VARIABLES NOT IN EQUATION: DAVASAL, SENR, PSLOIN

Table 3
Stepwise Multiple Regression Results Unit Districts in Urban Areas State of Illinois

Dependent Variable—DOEPP

Multiple R:	.94208
R Square:	.88752
Adjusted R Square:	.88314

Analysis of Variance	df	Sum of Squares	Mean Square	F	Obs. Sig.
Regression	6	70733823.99	11788970.66	202.525*	0.00
Residual	154	8964318.09	58209.86		

	B	Beta	t	Obs.Sig.
CONSTANT	2879.089		4.234*	.0000
DAVTSAL	.11567	.6933	13.655*	.0000
DPADMR	−2.6086	−.1692	−6.109*	.0000
PSLOIN	5.8984	.1695	3.817*	.0002
DPTR	−41.2298	−.1663	−5.189*	.0000
SENR	.0972	.1109	2.875*	.0046
PSATTR	−15.6301	−.1130	−2.462*	.0149

*p∝.05

VARIABLES NOT IN EQUATION: DAVASAL

pothesis that the original variable set would constitute a set of variables which would significantly predict operating expenditure per pupil, in some combination, by district area and type. Further investigation into additional demographic and social variables which would significantly predict operating expenditure per pupil in Illinois and increase the amount of variance accounted for would be an appropriate outgrowth of this study.

The numerous studies that have determined the significant impact of wealth variables (assessed property valuation and personal income) as expenditure determinants would suggest that the addition of wealth and income variables would increase the prediction power of these equations. Further refinement of these analyses which included wealth and income data in the variable set would be a second appropriate outgrowth of this study. If the use of a prediction model is to be a practical tool, however, a systemic data collecting device for income and wealth data at the district level would be required. Inclusion of this information on the "School Report Card" in future collections in Illinois is recommended.

Further, the results of this study support DeYoung 's (1987) premise that variation existed in economic need by geographic area. The addition of a cost-of-education index for the State of Illinois which would factor in the variation in expenses across the state would result in a clearer understanding of the heterogeneity in operating expenditure in Illinois school districts.

Continued development of the expenditure functions for predicting operating expenditure per pupil in Illinois school districts would provide local school personnel with a needed tool for more accurate and precise long range financial planning. Given the bleak outlook forecasted for the financial future for Illinois public schools in the coming decades, methods which would assist local school administrators in dealing with the financial dilemmas ahead could come none too soon.

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