

# THE EQUALIZATION OBJECTIVE IN STATE SUPPORT PROGRAMS: AN ANALYSIS OF MEASURES NEED AND ABILITY<sup>1</sup>

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THAT equalization is a major objective of state grants-in-aid to local school districts has been widely accepted; that present state grant-in-aid programs achieve this objective is open to question. The results of a recent study of state support systems should make educators feel somewhat uncomfortable with present state aid programs if achievement of the equalization objective indeed is desired.<sup>2</sup>

The equalization objective, as embodied in existing state support programs, has at least two facets—equalization of educational opportunity and equalization of local financial effort in support of the public schools. These two facets were clearly identified by Strayer and Haig in 1923<sup>3</sup> and have

provided the frame of reference for much of the present day practice in equalization. Strayer and Haig indicated that the achievement of equalization would require a uniform local school tax rate levied by each school district in the state in support of a satisfactory minimum educational program, with any deficiencies made up by state subventions.<sup>4</sup>

If equalization of educational opportunity and equalization of tax levies in support of education are to be achieved, it is necessary to quantify in some objective fashion both the characteristics of a satisfactory minimum educational program and local tax effort. That is, the characteristics of a satisfactory educational program and local tax effort must be expressed in operational terms, if state grants-in-aid are to achieve the equalization objective. In the parlance of educational finance, the terms "need" and "ability" are quite generally applied to the measures used in describing the educational responsibility and fiscal capacity of a school district. Achievement of the equalization objective is heavily dependent upon the precision with which these measures are able to distinguish operationally among various levels of educational programs (or at least between acceptable and unacceptable minimum educational pro-

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<sup>2</sup> Reported in LeRoy J. Peterson, Richard A. Rossmiller, Stewart D. North, and Howard E. Wakefield. *Economic Impact of State Support Models on Educational Finance*, U.S. Office of Education Cooperative Research Project No. 1495 (Madison, Wisconsin: School of Education, The University of Wisconsin, 1963).

<sup>3</sup> George D. Strayer and Robert M. Haig. *The Financing of Education in the State of New York*, A Report of the Educational Finance Inquiry Commission (New York: The Macmillan Company, 1923), pp. 173-75.

<sup>4</sup> *Ibid.*, pp. 174-75.

grams) and among various levels of fiscal capacity.

The broad scope of educational need was clearly seen by Mort when he defined it as "the composite of all those elements in the community that would affect the cost of the public educational offering demanded by a state program for making available to all children a set minimum educational opportunity."<sup>5</sup> Various measures of educational need have been suggested. These range from such gross measures as geographic area and total population to such refined measures as weighted pupil units and weighted classroom units coupled with minimum expenditure levels for such units. Although researchers have recognized that educational needs vary from one school district to another, e.g., metropolitan core cities and rural villages, present state support programs typically apply the same measures of educational need to all districts in computing the allocation of state grants-in-aid. Implicit in these programs is the assumption that a specified sum of money made available to local school districts on the basis of pupil or classroom units will guarantee equality of educational opportunity.

The equalization objective also requires equity among local school districts in the financial support of education. This, in turn, requires quantification of the fiscal capacity of a local school district—the resources it has and presumably can use to raise revenue. Most studies of fiscal capacity have been directed toward the measurement of fiscal capacity at the state level using either flow of resources, e.g., income, out of which state and local taxes can be paid

<sup>5</sup> Paul Mort. *The Measurement of Educational Need* (New York: Bureau of Publications, Teachers College, Columbia University, 1924), p. 1.

or the comparative yield of various tax systems.<sup>6</sup> Research on the fiscal capacity of local school districts frequently has been frustrated by the lack of data for any measure of fiscal capacity other than valuation of property. For this reason, and because few local school districts are able to levy taxes on any base other than that of real property, state support programs rely upon the assessed or equalized valuation of property in the school district, or an index designed to approximate the value of property, to measure the fiscal capacity of local school districts. Implicit in this measure of fiscal capacity is the assumption that the levying of a uniform property tax rate for local school purposes will guarantee equalization of financial support, i.e., that all who own property equal in true value are alike in their ability to pay taxes.

The need and ability facets of the equalization objective usually have been dichotomized and there has been a tendency to discuss measures of need in isolation from measures of ability. The utility of this dichotomy may be questioned, however, since the two facets of the equalization objective are closely related. For example, measures of fiscal capacity are sometimes expressed on a per-pupil or per-teacher basis, a procedure which obviously attempts, either wittingly or unwittingly, to relate fiscal capacity and educational need.

### *Study Procedure*

Since the study herein reported was concerned with examining the interrelationships which exist among variables relating to educational program and

<sup>6</sup> See, for example, The Advisory Commission on Intergovernmental Relations. *Measures of State and Local Fiscal Capacity and Tax Effort* (Washington, D.C.: Government Printing Office, 1962).

financial effort, an attempt was made to identify every obtainable item of data having an apparent relationship to the financing of education. In all, 161 variables were identified and partitioned into two groups. Seventy-six were classified as "ability variables," i.e., variables related to ability to support education; 85 were classified as "need variables," i.e., variables related to demand for educational services. In partitioning the variables a distinction was drawn between data having to do with a school district's potential to support public services and data reflecting the extent of a district's educational responsibility, either explicitly or implicitly.

Data were gathered for each variable in 104 Wisconsin school districts offering K-12 educational programs during the 1959-60 school year. The 76 ability variables included various measures, expressed on a per-capita basis, of accumulated capital, income and sales; number of workers, type of employment and educational level of labor force; municipal receipts and expenditures; sources of school revenue; and such miscellaneous items as postal receipts, motor vehicle registrations and telephones. The 85 need variables included measures of the pupil population such as enrollment and academic ability; measures of staffing such as pupil-teacher ratio, average class size, and professional preparation and experience of the teaching staff; measures related to curriculum such as percentage of enrollment and class size in various secondary school subjects and availability of educational programs for mentally and/or physically handicapped pupils; measures related to services such as transportation, school lunch, health and recreation; measures of total population and pupil mobility; measures related to outcomes such as

dropouts and percentage of high school graduates enrolled in colleges, technical schools, etc.; and expenditures for current operation, debt service, libraries, transportation, and the like.

Initially, the two groups of variables were studied separately. Intercorrelations and multiple correlations were computed and used as a basis for eliminating certain variables from further consideration. In determining the variables which were to be retained, preference was given to variables for which data were available from official reports, to variables which could be collected on a school district basis with relative ease, and to variables which permitted a minimum of misinterpretation or manipulation on the part of reporting officials. Factor analysis was then employed to ascertain inter-relationships among the remaining variables in each group.<sup>7</sup> Finally, after eliminating 50 ability variables and 41 need variables on the basis of insights gained through inter-correlations, multiple correlations and factor analysis of the two groups, the remaining 70 variables were combined and again subjected to factor analysis.

### *Results of Factor Analysis*

It was hoped that factor analysis would yield a relatively simple configuration of the variables. Such was not the case. Application of factor analysis to 48 ability variables resulted in the extraction of 32 factors which accounted for 79 per cent of the total variance of the 48 variables. One factor accounted for 13 per cent of the total

<sup>7</sup> For a discussion of the theoretical basis of the factor analysis program which was employed see Chester W. Harris, "Some Rao-Guttman Relationships," *Psychometrics*, 27: 3 (September, 1962), pp. 247-63. The IMAGE program used in this study employs a normal varimax trailer to accomplish rotation of the factor matrix.

variance; one accounted for 5.5 per cent; three factors each accounted for 4.5 per cent; three factors each accounted for 3-4 per cent; and the remaining 24 factors each accounted for less than three per cent of the total variance.

When 62 need variables were subjected to factor analysis, 43 factors accounting for 78.8 per cent of the total variance were extracted. One factor accounted for 7.8 per cent of the total variance; one accounted for 5.7 per cent one accounted for 4.9 per cent; one accounted for 4.6 per cent; one accounted for 3.7 per cent; and the remaining 38 factors each accounted for less than three per cent of the total variance.

Application of factor analysis to the combination of 70 need and ability variables resulted in the extraction of 51 factors accounting for 83 per cent of the total variance. One factor accounted for 11.8 per cent of the total variance; one accounted for 6.5 per cent; one accounted for 4.7 per cent; one accounted for 3.6 per cent; and the remaining 47 factors each accounted for less than two per cent of the total variance.

The clustering of variables produced by factor analysis did not support the educational responsibility-fiscal capacity dichotomy. The multiplicity of factors extracted by factor analysis emphasizes the complexity of the inter-relationships among these variables. However, a number of generalizations seem warranted by the results of factor analysis of data drawn from the 104 Wisconsin school districts included in the sample.

1. No single measure of fiscal capacity currently in use is adequate to describe fully the ability of a community to support public services,

including education. Ten factors describing various aspects of fiscal capacity showed:

- a. Equalized valuation of all property was only slightly correlated with personal income tax paid and was unrelated to retail sales. The various components of total equalized valuation—residential, manufacturing, mercantile and agricultural property—varied widely in their correlation with equalized valuation of all property.
  - b. Equalized valuation of residential property was much more closely correlated with personal income than was any other type of property. However, it was not related to retail sales.
  - c. Corporate income tax paid was unrelated to any measure of wealth other than equalized valuation of manufacturing property.
  - d. Equalized valuation of agricultural property was singled out in two factors as being unrelated to other measures of fiscal capacity.
  - e. Equalized valuation of mercantile property was but slightly correlated with personal and corporate income tax paid and only moderately correlated with retail sales.
2. The educational responsibility of a community cannot be assessed in clear-cut fashion by employing such simple measures as size of population, size of professional staff, or average daily membership of pupils. Fifty-two factors were isolated which described the educational responsibilities of school districts. The factors, although for the most

part quite specific, may be classified as follows:

- a. Pupil/teacher/administrator ratios were described by five factors.
- b. The character of the student body was described by eight factors associated with such items as type of higher education pursued by graduates, drop-out rate and pupil mobility. Academic ability of the student body was singled out in two factors, one of which accounted for nearly six per cent of the total variance of the 62 need variables.
- c. Number of students was described by four factors related to average daily membership, non-public school enrollment, and non-resident average daily membership.
- d. Special services such as transportation and school lunches were described by six factors.
- e. The character of the teaching staff, including experience and salary, was described by five factors.
- f. Subject areas of the high school curriculum were described by 14 factors. These included such specific aspects as percentage of students enrolled in mathematics, English, social studies, and physical education. The size of classes in these subjects was described by one factor which accounted for nearly eight per cent of the total variance of the 62 need variables.
- g. Programs of special education were described by seven factors. Three factors indicated a positive relationship between these

programs and the size of the school district.

3. The educational responsibilities of a community must be financed through a program of support related to, but not limited by, the fiscal capacity of the district. Seventeen factors relating educational responsibility to fiscal capacity grouped as follows:
  - a. No relationship was found between various specific aspects of the educational program and measures of wealth and/or community characteristics in 10 factors. One factor described class size but showed no relationship with school district wealth.
  - b. Aspects of urbanity, suburbanity, and rurality were described by six factors which related these characteristics to population growth rate, pupil transportation needs and school lunch programs.
  - c. One factor, which in itself illustrates the complex nature of the "educational climate," presented a rather comprehensive profile of the relationships between school district wealth and a district's educational program. This factor had statistically significant correlation with 42 variables and accounted for 11.8 per cent of the total variance of the combination of 70 ability and need variables. The factor described fiscal capacity of the school district by reference to personal income tax paid and equalized valuation of residential property, both of which were highly correlated with the factor. The lack of high correlations between this factor and municipal receipts and disbursements was

striking. The college preparatory subject areas of the secondary school curriculum (fine arts, foreign languages and mathematics) were correlated positively with the factor, while vocational subjects were correlated negatively. Equalized valuation of agricultural property was found to have a negative correlation with the factor. Municipal tax rates correlated negatively with the factor; school tax rates correlated positively. School district revenue from local sources related positively to the factor; school district revenue from federal and state sources related negatively. The factor was also associated with an academically talented student body, fewer high school dropouts, lower teacher-pupil ratios, a well-prepared teaching staff receiving relatively high salaries, and a high level of educational attainment on the part of the adult population.

Personal income tax paid is the most adequate of the measures of fiscal capacity currently available from public records. The two factors which provided the most comprehensive profile of school district wealth had their highest correlation with personal income tax paid. One of these factors accounted for 13 per cent of the total variance of the 48 ability variables; the other accounted for 11.8 per cent of the total variance of the combination of 70 ability and need variables. Effective buying income and equalized valuation of residential property were also found to have high correlation with these

two factors. Neither factor showed significant correlation with retail sales, a very important tax base in many states, and their correlation with equalized valuation of all property—by far the most common measure of fiscal capacity of school districts—was only slight.

5. The Wisconsin state support program is achieving some equalization of school support. Percentage of revenue from state sources was found to be inversely related to equalized valuation. Two factors provided clear evidence that the equalization function of the Wisconsin state support program was operating, but that poorer districts were still at a relative financial disadvantage.
6. Local school tax rates are influenced by enrollment in non-public schools. Enrollment in non-public elementary and secondary schools was negatively correlated with school tax rate and with receipts per pupil from state sources. However, enrollment in non-public schools had no significant correlation with expenditure per pupil for current operation of the public schools.
7. The high school dropout rate is influenced by the nature of the professional staff. Dropouts in grades 9-12 correlated positively with percentage of teachers having less than four years of professional preparation and correlated negatively with mean teacher salary and pupil mobility. No significant correlation was found between dropout and academic ability of the student body, average size of high school classes or percentage of the student body enrolled in various high school subjects.

8. Community wealth and local school support are not related to size of population. No significant correlation was found between size of population and any factor describing fiscal capacity of a school district or financial support of the schools. However, population size was related to municipal revenue derived from general property taxes and municipal revenue from fines and forfeitures in two factors.

9. Municipal support is essentially unrelated to measures of wealth. Ten factors describing municipal receipts and disbursements had no significant correlation with equalized valuation, personal or corporate income taxes paid, or retail sales.

10. Municipal support and local school support tend to be unrelated or inversely related to each other. Two factors clearly showed an inverse relationship, six factors indicated no relationship, and six factors showed either slight positive relationships or relationships which were obscure. One factor showed an inverse relationship between municipal property tax receipts and school property tax rates, suggesting that school districts in which a high municipal tax rate is levied will encounter difficulty in securing an increased local tax effort in support of the public schools.

11. Many elements of education and educational finance are distinctive. They were not related to other variables or factors in a consistent manner. These included such items as qualifications of teachers and pupil-teacher ratios. It is worth noting that receipts per pupil from state sources did not correlate to any appreciable extent with vari-

ables normally assumed to be related to the quality of the educational program.

### Conclusions

It is evident from this study that the assumptions implicit in the measures of need and ability employed in most present-day state support programs will not bear close scrutiny. A state support plan which guarantees to local school districts a specified sum of money allocated on the basis of pupil or classroom units does not, *per se*, insure equality of educational opportunity. Whether equality of educational opportunity is achieved depends upon the nature of the educational program which is provided, not on the amount of money expended. The cost of a given educational program will vary among school districts. Consequently, if equality of educational opportunity is to be achieved, the formula for distribution of state grants-in-aid must reflect both varying educational needs as these are translated into educational programs and the varying cost of educational programs in the several school districts of the state.

It is also evident that a uniform local property tax levied in support of local schools does not guarantee equity in the treatment of individual taxpayers, particularly if one accepts the commonly held view that all taxes are paid from income. Clearly, the relationship between income and property varies with the types of property involved. Some types of property, e.g., owner-occupied dwellings, generate no income as such but tend to reflect the income level of the owner; other types of property, e.g., mercantile and manufacturing property, generate income directly; still other types of property, e.g., undeveloped

city lots, generate income indirectly if they appreciate in value, but this income is realized only upon sale of the property. Inequity in the treatment of individual taxpayers becomes even more pronounced if local taxes levied in support of other public services are considered. Yet, fiscal decisions relative to the financing of public education are often reached in isolation from fiscal decisions relative to the financing of other public services.

Few would deny that pursuit of the equalization objective has had a salutary affect on American public schools during the past four decades, or that the measures of need and ability presently employed in state support programs are superior to earlier measures. It appears, however, that further progress toward the equalization objective is dependent upon defining educational need in terms of actual educational programs and viewing fiscal capacity in the context of the total demand for public services.