

AN INDEX OF TAXPAYING ABILITY FOR OKLAHOMA COUNTIES:  
A County Index of Taxpaying Ability Composed of Selected Economic Measures  
That May Be Used In Lieu of Assessed Property Valuations As A  
Basis For The Distribution of State Equalization Aid  
To The Public School Districts of Oklahoma

By

Waymon Lavern Westfall  
Bachelor of Science  
Oklahoma State University  
Stillwater, Oklahoma

1946

Master of Science  
Oklahoma State University  
Stillwater, Oklahoma

1950


Submitted to the Faculty of the Graduate School  
of the Oklahoma State University in Partial  
Fulfillment of the Requirements for the  
Degree of Doctor of Education  
May, 1959

NOV 18 1959

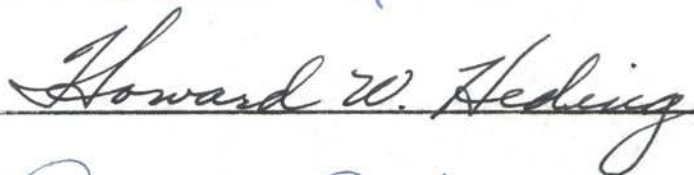
AN INDEX OF TAXPAYING ABILITY FOR OKLAHOMA COUNTIES:

A County Index of Taxpaying Ability Composed of Selected Economic Measures  
That May Be Used In Lieu of Assessed Property Valuations As A Basis For  
The Distribution of State Equalization Aid To The Public School Districts  
of Oklahoma

Thesis Approved:

  
\_\_\_\_\_  
Thesis Adviser

  
\_\_\_\_\_

  
\_\_\_\_\_

  
\_\_\_\_\_

  
\_\_\_\_\_  
Dean of the Graduate School

430873

DEDICATION

This volume is dedicated to my wife,  
Betty, my daughters, Linda Sue,  
Judith Laverne, Carol Lynn, and my  
son Larry Wayne.

W. L. W.

## ACKNOWLEDGMENT

The author is extremely grateful to Dr. Helmer E. Sorenson, Chairman of the Thesis Committee, whose constructive guidance made this study possible. The author is indebted to each of the Thesis Committee Members; Dr. Howard Heding, Dr. Ware Marsden, and Dr. Joseph Klos for their valuable guidance and assistance in writing the Thesis.

Indebtedness is acknowledged to Dr. Howard Heding and the Computing Center at Oklahoma State University for their assistance in solving the statistical computations involved in the study. The advice and assistance of Dr. Richard Jungers of Oklahoma State University in the final preparation of the Thesis is sincerely appreciated.

The author would also like to thank the Members of the Board of Education of Temple Public Schools for their granting the author a leave of absence from his position as Superintendent of Schools, in order that the study might be pursued to its successful completion.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Statement of the Problem . . . . .	3
Purposes of the Study . . . . .	3
The Need for the Study . . . . .	4
Assumptions Underlying the Study . . . . .	5
Scope of the Study . . . . .	6
Procedure . . . . .	7
Source of Data . . . . .	7
Definition of Terms . . . . .	7
Organization . . . . .	9
II. BACKGROUND FOR THE STUDY . . . . .	11
Historical Review of the Support of Public Education . . .	11
The Equalization Plan of State Support . . . . .	13
Estimating Taxpaying Ability . . . . .	17
Summary . . . . .	19
III. REVIEW OF ECONOMIC INDICES OF TAXPAYING ABILITY. . . . .	21
Historical Review of the Use of Economic Indices of Taxpaying Ability . . . . .	21
Summary of the Application of Economic Indices of Taxpaying Ability in Various States . . . . .	24
Criteria for Developing Indices of Taxpaying Ability . . .	34
Summary . . . . .	38
IV. DEVELOPMENT OF THE INDEX OF TAXPAYING ABILITY. . . . .	40
Categories of Possible Measures for Inclusion in Oklahoma's Economic Index of Taxpaying Ability . . . . .	42
Analyses of Economic Measures to Be Included in Oklahoma's Index of Taxpaying Ability . . . . .	47
Development of the Weights of the Economic Measures to Be Included in Oklahoma's Economic Index of Taxpaying Ability . . . . .	57
Coefficients of Part Determination . . . . .	66
Summary . . . . .	71
V. APPLICATION OF THE INDEX OF TAXPAYING ABILITY TO SCHOOL UNITS. . . . .	74
Summary . . . . .	81

TABLE OF CONTENTS (continued)

Chapter	Page
VI. SUMMARY AND RECOMMENDATIONS. . . . .	82
Summary. . . . .	82
Recommendations. . . . .	86
SELECTED BIBLIOGRAPHY . . . . .	87
APPENDIX. . . . .	90

## LIST OF TABLES

Table	Page
I. Measures and Weights Used in Alabama's Economic Index of Taxpaying Ability . . . . .	26
II. Measures and Weights Used in Florida's Economic Index of Taxpaying Ability . . . . .	28
III. Measures and Weights Used in West Virginia's Index of Taxpaying Ability . . . . .	29
IV. Measures and Weights Used in Texas' Economic Index of Taxpaying Ability . . . . .	30
V. Measures and Weights Used in Arkansas' Economic Index of Taxpaying Ability . . . . .	31
VI. Measures and Weights Used in Georgia's Economic Index of Taxpaying Ability . . . . .	32
VII. Measures and Weights Used in Mississippi's Economic Index of Taxpaying Ability . . . . .	33
VIII. List of Measures Which Have Been Included in Indices of Taxpaying Ability . . . . .	45
IX. Five Hypothetical Counties With Indices of Taxpaying Ability	58
X. An Index of the Taxpaying Ability of Oklahoma Counties. . .	75
XI. Local Contribution Required of Temple School District Based on the Application of an Economic Index of Taxpaying Ability . . . . .	80

## Chapter I

### INTRODUCTION

Democracy requires a program of public education with the scope and depth necessary to provide rich, stimulating educational experiences for children, youth, and adults everywhere throughout each state and the nation. Public education, therefore, is a concern of all the people to the extent that within no state shall there be denied the educational opportunities considered necessary to the fullest development of individuals and the total good of a democratic society.

The realization of the objective of adequate educational opportunities depends upon:

1. The establishment of local and state school organizations and structures which are adequate to provide educational programs for American children, youth, and adults.

2. Conformance to principles governing the operation of schools which have evolved from the experience of developing American school systems, and which have come to be accepted as valid guides to their further development.

3. The provision of enough funds from public sources to make possible the effective operation of an appropriate program of education.<sup>1</sup>

The Constitution of the United States is silent on the question of education, but by implication the Tenth Amendment placed education among the duties of government assigned or reserved to the states. In its constitution and by appropriate legislation, the State of Oklahoma has assumed this responsibility and has organized a system of public education.

The adequate financing of public education in Oklahoma by equitable methods is a problem which is becoming more serious and complex as the years go by. Variations in assessment of property, variations in financial

---

<sup>1</sup>Committee on Tax Education and School Finance, GUIDES--to the Development of State School Finance Programs, National Education Association Bulletin, (Washington D. C., 1949), p. 4.



ability, variations in the concept of the school program, and variations in the willingness to pay for education in local school units are all items that have tended to complicate the problem.

According to a study of education in Oklahoma for the year 1947 by Pugmire<sup>2</sup>, the ratio of low to high in assessed valuation per pupil was 1 to 3,146. Pugmire's study showed further that the ratio of the lowest tax levy to the highest was 1 to 5. No significant changes have been made in Oklahoma's educational system recently which would indicate that much improvement has been made in this situation.

Oklahoma's first schools were operated almost entirely from local sources of revenue. The trend has been toward a gradual increase in use of state sources of revenue to help operate the local school units. According to Pugmire<sup>3</sup>, between the school years 1939-40 and 1947-48, the amount of state support to public schools increased 97 per cent while local support increased 49 per cent; yet in 1947-48, 53 per cent of all public school support was still derived from local sources of revenue.

Pugmire makes the following observation:

The evidence is clear that provisions for financial support of schools in Oklahoma reflect the operation of both constructive and negative policy. The state has increased the amount of its support and, at the same time, has permitted the deterioration of the base of local support to a point which has become critical. It is evident that the needs of the schools and the actual financial ability of the people have not always been the basis for policies and decisions relative to financial support of schools.<sup>4</sup>

Between the school years 1939-40 and 1947-48, expenditures for schools increased 82 per cent but the financial ability as reflected in

---

<sup>2</sup>Ross Pugmire, Oklahoma's Children and Their Schools, Oklahoma Education Association Publication, (Oklahoma City, 1950), P. 13.

<sup>3</sup>Ibid., p. 12.

<sup>4</sup>Ibid., p. 3.

the income of the people increased 167 per cent.<sup>5</sup> An 82 per cent increase in the amount spent for schools during this period was an actual decrease in effort. The increase in amount of money spent for schools does not indicate either the actual ability of the state or the full needs of the schools which rising costs and the necessity of expanded programs and services have created.

The shift from school financing dependent almost entirely upon contributions from local sources of revenue to a partnership plan between the state and local unit whereby the state contributes a substantial portion of the funds, has solved some of the problems of education but has created others. One problem of extreme importance that has been created by the partnership plan is the problem of developing a technique for apportioning state equalization aid to the local administrative unit whereby it will be distributed in a relatively objective and equitable manner.

#### Statement of the Problem

This study is designed to develop an index of taxpaying ability which could be used as a basis for the distribution of state equalization aid in a relatively objective and equitable manner. Answers to the following questions are being sought:

1. What criteria should be used for developing an index of taxpaying ability?
2. What measures of economic wealth should be selected for inclusion in the index?
3. How much weight should be given to each measure selected for inclusion in the index?
4. How might the index be used to determine the distribution of state equalization aid?

#### Purposes of the Study

The purposes of this study are: (1) to develop an index of taxpaying ability for each county in Oklahoma; and (2) to describe how the index could

---

<sup>5</sup>Ibid.

be used as a basis for the distribution of state equalization aid.

### The Need for the Study

There has been much dissatisfaction voiced with the present method of distributing state equalization aid to local school units in Oklahoma. The criticism has been made that the present method is not fair or equitable, and that it is subject to local manipulation.

Martin reported some pertinent observations in a recent study which he prepared.<sup>6</sup> Martin asserts that more equitable local support is needed for a better guaranteed program in Oklahoma. He indicates that this support could be obtained by the equalization and upgrading of assessments and the use of economic indices to determine the taxpaying ability of local school units. Martin reported that surveys showed property assessment throughout the state ranged from one per cent to seventy-five per cent of fair cash value. He further states that attempts to improve assessment practices from the state level have always met with failure, and that improvement will come only when the people decide to attack this problem from the local level.

Hagen<sup>7</sup> states that one of three basic problems in financing Oklahoma's schools is the problem of equalizing the cost of education between the state and local school units.

Pugmire states, "The restrictions on the use of the property tax combined with the low level of assessed values for over a decade have

---

<sup>6</sup>Jesse W. Martin, "The Development of State Support of the Public Schools of Oklahoma and Recommendations for a Better State Guaranteed Program." (unpub. Ed. D. dissertation, University of Tulsa, 1955).

<sup>7</sup>Hal E. Hagen, "Three Basic Problems in Financing Oklahoma's Schools", The Oklahoma Teacher, April, 1956, p. 19.

made it impossible for the people to use the actual resources in school districts at will to improve their schools."<sup>8</sup>

A study made by the Oklahoma Tax Commission in 1948 showed that the ratio of assessed value to actual value as determined by actual sales of property, varied as much as 22 per cent among counties in Oklahoma.<sup>9</sup> A more recent study made by the Oklahoma Real Property Association, Inc. in 1956 showed a variation of approximately 20 per cent, and a decrease of 30 per cent in assessed value to actual value when compared with the 1948 study.<sup>10</sup>

An index of taxpaying ability is one method of measurement of potential taxpaying ability that can be objective in the absence of accurate property appraisals. The use of indices of taxpaying ability has been promoted in recent years, because of the reluctance of local administrative units to give up the authority of assessing property.

#### Assumptions Underlying this Study

It was assumed that the equalization or partnership plan of financing public education between the state and local school unit has become established as a basic principle of financial support. The essential features of equalization aid, or what has recently been described as the "partnership plan" of state finance, are discussed in most modern texts on the subject of school finance. There are also several brief treatments of the subject such as the one prepared by a Committee on Tax Education and School Finance of the National Education Association.<sup>11</sup>

---

<sup>8</sup>Pugmire, p. 3.

<sup>9</sup>Oklahoma Tax Commission, A Certified Study Made to the State Department of Education, (Oklahoma City, 1948).

<sup>10</sup>Oklahoma Real Property Association, Inc., Summary of Real Estate Ratio Study, (Oklahoma City, 1956).

<sup>11</sup>Committee on Tax Education and School Finance, GUIDES--to the Development of State School Finance Programs.

The major objective of the equalization plan is the financial support of programs in local school units from a combination of state sources and local sources of revenue, in such a way that the state contribution is relatively greatest in those school units which are least able to support school programs from local sources of revenue. The local revenue is derived almost entirely through levying an ad valorem tax on assessed property valuations within the local school unit. The equalization plan was originally introduced in order that those school units with the least ability to support education from a tax on assessed property valuations, at a uniform rate of local tax effort, would locally contribute less support than those school units most able to pay. In Oklahoma, approximately eighty per cent of the state aid distributed to local school units is distributed under the equalization plan.

#### Scope of the Study

This study is primarily concerned with the development of an index of taxpaying ability which might be used as a relatively objective and equitable basis for distributing state equalization funds. The index of taxpaying ability developed in the study will be proposed for use in lieu of assessed property valuations as a basis for distributing state equalization aid to county units. The application of the economic index of taxpaying ability to county units is described and further application of the index to local school units within a county is discussed.

This study does not attempt to justify or change the present tax base. Nor does it attempt to make any change or revision in the present method of determining the minimum program for local school units. Except for the substitution of an economic index of taxpaying ability for assessed valuation in the formula used for distribution of state

equalization aid, this study accepts the present framework of Oklahoma school law and regulations.

### Procedure

The solution of the problem was undertaken in the following manner:

1. A study was made of literature pertaining to indices of taxpaying ability.
2. Previous studies of indices of taxpaying ability were analyzed.
3. From a study and analysis of previous indices, criteria were adopted, economic measures selected, and weighting of measures determined.
4. An economic index of taxpaying ability was developed for each county unit in the state.
5. The application of the index of taxpaying ability was described.
6. A summary and recommendations were prepared.

### Sources of Data

Data for this study were obtained from pertinent literature on public school finance; reports of development and application of indices of taxpaying ability and information from the Oklahoma Tax Commission, the United States Census Bureau, Sales Management Magazine, the Oklahoma Real Property Association, Inc., and the Business Research Bureau of the University of Oklahoma.

### Definition of Terms

The term index or economic index of taxpaying ability as used in the study refers to an index for determining a local school unit's ability to raise funds through ad valorem taxes on property. The index of taxpaying ability developed in this study is a composite index of selected economic measures of wealth weighted to correspond to the actual value of property.

County Unit when used in the study refers to the county fiscal unit of government jurisdiction, which is the basic local tax collecting and

disbursing agency.

Local School Unit as used in the study refers to the basic local unit of school administration in Oklahoma, the school district.

State Tax refers to a tax levied by the state and collected by the state or county unit of government.

Local Tax refers to a tax authorized by the state and approved by local school units. This tax is levied and collected by the county fiscal agency.

Local Revenues refers to revenues collected on taxes levied for the local school unit and collected by the county fiscal agency.

State Revenues refers to revenues collected from taxes which are levied by the state and collected either by the state or county fiscal agency.

State Aid or State Support refers to revenues contributed by the state government to the local school unit to help in financing the cost of education in the local school unit.

State Equalization Aid when used in the study refers to that type of state aid granted the local school unit to help in financing a minimum program of educational opportunity for the local school unit.

Partnership Plan refers to a plan of school finance whereby the state and local school unit share in the educational costs according to some predetermined method.

Equalization Plan is a type of partnership plan whereby the state guarantees the local unit that it will contribute enough funds from state tax sources to the local unit to provide a minimum program of educational opportunity in the local school unit.

Minimum Program (commonly referred to as foundation program), as used in the study refers to a program of educational need as measured

by the number of pupils, number of teachers, or a combination of the two along with other factors as being the minimum of educational opportunity to be maintained in the local school unit by a partnership plan of school financing.

Minimum Program Income refers to the revenues derived from state and local tax sources which the local school unit is charged toward financing the minimum program of educational need.

### Organization

The report of this study is organized into six chapters. Chapter I includes the introduction, statement of the problem, purposes of the study, need for the study, assumptions, scope of the study, procedures, sources of data, and definitions of terms.

Chapter II provides a background for the study. This chapter includes a historical review of the financial support of public education in the United States. The trend toward more state support of public education is reviewed and some of the methods used as a basis for distributing state equalization funds are enumerated.

Chapter III contains a review of economic indices of taxpaying ability. The chapter includes a historical review of the use of economic indices of taxpaying ability and a brief summary of the application of economic indices of taxpaying ability in various states. The guiding standards used in developing other indices of taxpaying ability were enumerated and criteria for this study are adopted.

Chapter IV involves the development of an index of taxpaying ability composed of selected economic measures of wealth and weighted to correspond to the actual value of property. The criteria adopted for this study are listed. Some of the measures of wealth listed for possible inclusion



by authorities developing indices of taxpaying ability are enumerated, and, using these as a basis the possible measures for this study are categorized and listed. An analysis is made of the possible measures to be included in the index of taxpaying ability and through applying the criteria adopted for the study, individual measures are selected for inclusion in the index. A method of developing weights for measures in the index is applied and measures with low weights are further eliminated. The measures remaining, after elimination of those with low weights, are developed into a composite index with weights as determined by the formula selected for developing weights.

Chapter V discusses the application of the index of taxpaying ability. An index is developed for each county in Oklahoma and a method of applying the index is described.

Chapter VI contains the summary and recommendations.

## Chapter II

### BACKGROUND FOR THE STUDY

This chapter will include a brief history of the financial support of public education in the United States. The equalization plan of state support will be explained and some methods of distributing state equalization funds will be discussed.

#### Historical Review of the Support of Public Education

Public education has always been associated with, and more or less dependent upon, the solution of problems of adequate school support. Among the early methods of supporting schools in New England was a per capita tax on parents who sent their children to school. To this source of income, the proceeds of land endowments, state appropriations, fines and penalties, organized lotteries, license taxes on business, licenses on liquor and amusements, and taxes on banks were later added.

The first Federal land grants made to Ohio in 1802 marked the beginning of a means of supporting education which promised for a time to raise sufficient revenue to maintain all the needed schools. Proceeds from this source and from many grants made by the Federal government were used to build up permanent endowment funds for education.

Failure of such endowments to produce sufficient revenue to support the schools led to the acceptance of the idea that state-wide taxation was needed to make the necessary funds available. Such educational leaders as Horace Mann in Massachusetts, Henry Barnard in Connecticut, Thaddeus Stevens in Pennsylvania, Caleb Mills in Indiana, and others

advocated the principle that the wealth of a state should be taxed to educate the children of the state.

Compulsory tax support of schools was not spontaneous, nor was it accomplished in the same manner in the various states. Cubberley has pointed out that this battle may have progressed generally along the following lines:

1. Permission granted to communities so desiring to organize a school taxing district, and to tax for school support the property of those consenting and residing therein.
2. Taxation of all property in the taxing district permitted.
3. State aid to such districts at first from the income from permanent endowments funds, and later from the proceeds of a small state appropriation or a state or county tax.
4. Compulsory local taxation to supplement the state or county grant.<sup>1</sup>

Examples of early permissive legislation are: the laws of 1816 in Maryland giving the voters the right to decide whether schools should be supported by general taxation or by subscription; the Maryland optional county law of 1826; the New Jersey law of 1820 permitting a county tax for the education of poor children; the Missouri law of 1824 permitting a district tax on the written demand of two-thirds of the voters; and the Illinois law of 1827 providing that only one-half of the cost of schools might be raised by taxation. Ohio permitted taxation for schools as early as 1821, but it was not until 1853 that rate bills were abolished and a state tax was substituted. In 1824, Indiana authorized communities to establish schools and to tax certain property or to raise money by rate bills, but it was not until the new state constitution was adopted in 1851 that a state tax for schools was levied on all property.

---

<sup>1</sup>Ellwood P. Cubberley, Public Education in the United States (rev. ed., Boston: Houghton Mifflin Company, 1934), p. 180.

The distribution of state aid gave the states more authority to enforce the compulsory local taxation provision by withholding such aid until a community raised its share. In 1797, Vermont required town support of schools on penalty of forfeiting state aid. Massachusetts made local taxation compulsory in 1827. New York in 1812, Delaware in 1829, and New Jersey in 1836 provided for an expansion of state-aid provisions.<sup>2</sup>

A number of states recognized that in the distribution of state aid there should be some provision for special aid to the weaker districts. The Massachusetts law of 1874 provided for the distribution of available state funds to rural districts only, as these were generally poorer than the city districts. By 1881, New Jersey had taken similar action in setting aside a reserve fund to be distributed at the discretion of the State Board of Education. When Cubberley studied state support of education in 1905,<sup>3</sup> he found equalization laws in eight states, chiefly in the eastern United States. A more recent study made by the Council of State Governments in 1949<sup>4</sup> showed that forty-three states were distributing state aid funds on an equalization basis.

#### The Equalization Plan of State Support

The equalization plan or "partnership plan," as it is more commonly called, is based upon one of the primary principles of public school finance; namely, that of equality. This principle holds that there should be equality of educational opportunity and also equity in the sharing of.

---

<sup>2</sup>Ibid., p. 188.

<sup>3</sup>Ibid.

<sup>4</sup>Council of State Governments, The Forty-Eight State School Systems, (Chicago, 1949), p. 227.

the burden of cost to support educational opportunity. According to this philosophy, wealth should be taxed wherever it is found to educate children wherever they may live. The policy of distributing state funds to local school units for financing public education on the basis of equalization has been readily adopted by the various states in the United States.

The equalization plan of state support has some important distinguishing characteristics. The plan involves a partnership between the state and local school unit of government whereby the two units share in supporting a minimum or foundation program that is guaranteed to every child in the state. The state finances its portion of the program from state tax revenues, while the local school unit usually provides its share primarily from ad valorem taxes levied for and within the local unit. The plan of financial support is frequently called the minimum program plan or foundation program plan, since the purpose is to provide for each local unit a uniform amount of funds per unit of educational need from combined state collected and locally collected sources of revenue. The major objective is the financial support of school programs in local school units, from a combination of state tax sources and local tax sources of revenue, in such a way that the state's contribution of funds is relatively greatest in those districts which are least able to raise money from a uniform levy on property. The districts with the least potential ad valorem taxpaying ability contribute proportionately less than those districts with greater potential ad valorem taxpaying ability.

In determining the state's contribution under the equalization plan, three steps are usually followed. First, the educational need for each school unit of the state is calculated on a uniform basis up to the level

provided in the minimum program. The educational need is then translated into cost of the program. Second, the revenue which can be raised by the required minimum ad valorem tax levy for support of the minimum program is determined. Third, the difference between the cost of the minimum program in each local school administrative unit and the revenue obtained by the required minimum ad valorem property tax levy is provided by the state from the state equalization or minimum program fund.

No program of state support for schools can be satisfactory until sound bases and procedures have been established for determining educational needs and for translating these needs into costs. The first step in developing satisfactory measures of educational need for use in a state is to determine and define the services and facilities accepted as an adequate minimum or foundation program for the schools. Determining educational needs of a local school unit involves determining the number of pupils to be taught in the public schools from kindergarten through junior college, the scope of the program to be provided, the number and qualifications of teachers and other instructional personnel required, the auxiliary services to be provided, the instructional and other supplies and materials that are needed, and the plant facilities that are necessary for an accepted foundation program. When these services and facilities have been defined and agreed upon, it becomes possible to develop objective measures which can be used to determine the educational needs in each local school system. These needs can then be translated into educational costs.

As has been pointed out earlier, the first two steps in determining the state's contribution under the equalization plan involve determining the cost of the minimum program of educational need by some objective measure for each local school unit. The final step involves subtracting

the amount of revenue derived by the minimum required ad valorem tax levy of the local school unit from its minimum program cost of education. The remainder of the cost is distributed in the form of state equalization aid to the local school unit.

If, for example, a school unit has 1,000 pupils and the agreed upon minimum program can be provided at a cost of \$200 per pupil, then the total cost of the jointly financed program would be \$200,000. If the required local contribution is \$40,000, then the state's portion of the cost would be \$200,000 less \$40,000, or \$160,000.

The plan of granting state equalization aid to local school units to help finance a minimum program of education has met with difficulties because of inequities in the assessment of property from county to county. In order to determine the amount of equalization aid to be given a local school unit, it is necessary to compute its required local contribution. The required local contribution in most cases is based primarily upon the assessment of property. In such cases, a required minimum uniform mill levy is multiplied by the assessed value of property to determine the required local funds to be contributed toward financing the partnership plan of education.

In those states where the ad valorem property tax is the chief source of locally collected revenue to the local school district, there is an inducement for taxpayers in the local school unit to look with favor on the reduction of assessed property valuations because, in so doing, the local contribution is decreased and hence the local school unit gets more state equalization aid. It was discovered in applications of this plan, in the early part of the century, that competitive underassessment of property was blocking the equalization goal which such a plan of apportionment attempted to achieve.

The development of measures of taxpaying ability, or financial capacity, not depending upon inequitable assessment values, was the purpose of the original study by Cornell<sup>5</sup> in 1936 which produced economic indices of taxpaying ability. Cornell's objective was purely that of implementing the successful allocation of state equalization aid on an equitable basis. Cornell did not suggest his economic index of taxpaying ability as a solution to the problem of improving assessment.

The purpose of this study is to develop an economic index of taxpaying ability to be used for the distribution of state equalization funds in a relatively objective and equitable manner. Since assessment in Oklahoma is made on a county unit basis and since statistics for an index will be available only on a county basis, the index developed in this study will be for the county unit. Thus, the index may be used as a relatively objective and equitable measure of the amount of state equalization aid to be allotted to each county unit.

#### Estimating Taxpaying Ability

There are four techniques or agencies in common use for estimating the taxpaying ability of local units as a basis for distributing state equalization funds. These are listed in a recent monograph prepared by Meyer and Johns for the National Education Association Committee on Tax Education and School Finance. They are:

1. Local assessments. This method is highly unsatisfactory because it varies considerably from county to county with respect to true valuation. Also, it is subject to local manipulation.
2. State supervised assessments. This is some improvement over local assessments in that the opinions of impartial

---

<sup>5</sup>Francis G. Cornell, A Measure of Taxpaying Ability of Local School Administrative Units. (New York, 1936), p. 114.



officials are brought to bear. However, local officials still share in the valuation of property.

3. State tax commission. Such bodies appraise the true value of property in each local unit.
4. Index of taxpaying ability. In this method an objective technic is sought that will predict relative ability on the basis of the economic factors of wealth contained in the local administrative units.<sup>6</sup>

In a study made by the Committee on Tax Education and School Finance of the National Education Association in 1949, the following statements were made:

It is necessary for any state supporting a partnership foundation program to arrive at as accurate and equitable an estimate of the tax-paying ability of each local administrative unit as possible.

1. Most states are accepting the results of local assessments, with little or no supervision. This practice results in conflicting pressures upon local assessors with respect to their assessments. Such pressures, if continued without state supervision, cannot work fairly over any length of time. The use of a uniform tax rate when assessment ratios vary is so obviously inequitable that it can no longer be regarded as defensible.

2. Other states set certain standards and give some supervision to local assessors. This plan usually has more chance of success than the first one, but has not been altogether successful because of the limited nature of the supervision provided.

3. Still other states (e.g., Washington) require their state tax commissions to arrive at a ratio of assessed to true value of property in each taxpaying jurisdiction in the state. The department of education, or other state agency, is then required to use these ratios to compute equalized valuations in determining aid for all local-school administrative units. The local district then finds it necessary to levy whatever rate on the assessed valuation that will produce taxes equal to the proceeds calculated on the equalized valuation. When the tax commission is well staffed and competent this plan is highly promising.

4. Some states (e.g., Alabama and Florida) are now using indexes of economic ability based upon such statistics as retail sales, motor vehicle registrations, value added by manufacture and farm production, and other items. These indexes are reported as successful in these states.<sup>7</sup>

According to the Committee on Tax Education and School Finance,<sup>8</sup> it is generally agreed that either property assessment by a state tax

---

<sup>6</sup>Herbert A. Meyer and R. L. Johns, A Method of Calculating An Economic Index of The Taxpaying Ability of Local School Units, NEA Committee on Tax Education and School Finance Bulletin No. 34 (Washington, 1952), p. 2.

<sup>7</sup>Committee on Tax Education and School Finance, GUIDES--to the Development of State School Finance Programs, National Education Association Bulletin (Washington, 1949), p. 17.

<sup>8</sup>Ibid.

commission or an economic index will be the best methods to successfully determine local taxpaying ability. The Committee also states that often it is not practicable to set up a state tax commission with the authority and staff necessary to appraise property on a statewide basis.

In Oklahoma, surveys and studies have shown wide variation in assessments. The Oklahoma Legislature has been very reluctant to establish a state tax commission with the authority and staff to assess all of the property in the state. In some states where the legislature has been unable or unwilling to establish a state tax commission to supervise the assessment of property, the use of an economic index of taxpaying ability has been used successfully.

#### Summary

The first schools were supported by a per capita tax on parents who sent their children to school. Later, a partnership plan of supporting schools between the state and local unit came into acceptance. In the partnership plan of school finance, a number of states recognized that in the distribution of state aid there should be some provision for special aid to the poorer school units. The equalization plan of state support came into existence as a result of the philosophy held by these states.

The major objective of the equalization plan is the financial support of school programs in local school units, from a combination of state collected and locally collected sources of tax revenue, in such a way that the state's contribution of funds is relatively greatest in those districts or units which are least able to raise funds from a uniform levy on property. Forty-three states at the present time distribute state aid funds on the basis of equalization.

Inequity has resulted in the distribution of state equalization funds because of inequities in the assessment of property from county to county. In some states the legislature has preferred to establish an objective technique in the form of an economic index of taxpaying ability instead of a state tax commission.

Since inequity has resulted in the distribution of state equalization aid in Oklahoma due to wide variation in assessment of property, there is need for a relatively objective and equitable technique for distributing state equalization aid. Economic indices of taxpaying ability have met with approval in other states as an objective and relatively equitable technique for distributing state equalization aid. This study will develop an economic index of taxpaying ability for Oklahoma.

## Chapter III

### REVIEW OF ECONOMIC INDICES OF TAXPAYING ABILITY

The purpose of this chapter is to review economic indices of tax-paying ability developed and used in other states and the criteria used in the development of such economic indices. Criteria selected for this study will be reported.

#### Historical Review of The Use of Economic Indices of Taxpaying Ability

Original indices or statistics reflecting taxpaying ability were developed for the federal government as a basis for distributing federal aid to the states. Interest in federal aid began with the depression in the early 1930's and culminated in a series of studies, reports, and proposed legislation. The federal aid problem is similar to the state aid problem. In a federal aid program, the federal to state relationship would be similar to that of the state to local unit relationship in a state aid program. The federal aid program could be termed a "partnership plan" between the state and federal government in the financing of education.

Mort<sup>1</sup> applied the same principles to the federal aid program that had been previously applied to the state aid program. Cornell, participating in the Mort studies, developed an economic index which was reported in 1936.<sup>2</sup> It was one of the original studies proposing the use of economic

---

<sup>1</sup>Paul R. Mort et al., Research Problems in School Finance, Report of The National Survey of School Finance of The American Council on Education, (Washington, 1933).

<sup>2</sup>Mort, Federal Support For Public Education, Bureau of Publications, Teachers College, (Columbia University, 1936), 334 p.

indices in educational finance. In the Mort research,<sup>3</sup> Newcomer estimated a theoretical yield of a model tax plan. Using Newcomer's theoretical yield of a model tax plan as a guide, Cornell developed a formula consisting of readily available statistics such as number of income tax returns, automobile registrations, retail sales, and population in the forty-eight states. This research is only of historical significance, since the Bureau of Foreign and Domestic Commerce is now using different measures to estimate the taxpaying capacity of states as a basis for granting federal aid for other purposes.

The development of measures of relative ability of states suggested the feasibility of a similar technique for determining the relative taxpaying ability of local districts within a state. In 1936, Cornell<sup>4</sup> published a study offering two techniques of measuring taxpaying ability of the counties of New York State. Cornell chose New York State because the full value of property, published by the state equalization board, was considered reasonably satisfactory. Hence, there existed a criterion with which an index as an indicator of relative ability of counties in New York State could be compared. The number of individual income tax returns; measures of population; retail sales; motor vehicle registrations; the value of farming mining, and manufacturing production; and postal receipts were combined by formula in different ways. Several of the ways were found to have a lower average variation from full value of property than the average variation of assessed valuation from full value. The average amount of variation of assessed valuation from full valuation was measured by the "coefficient of dispersion." It may be

---

<sup>3</sup>Ibid., p. 117-178.

<sup>4</sup>Cornell, p. 114.

considered as the average per cent of error.

Neither the New York State study nor any of the studies which followed, has indicated that economic indices of taxpaying ability would completely eliminate discrepancies from a theoretical full value or other criteria of taxpaying capacity. The chief conclusions of the New York State studies according to a report by the Committee on Tax Education and School Finance of the National Education Association made in 1953 are:

1. That a combination of formulas provides an average inequity which is no greater than the inequity in the use of assessed valuation--at least in states where there has been evidence that assessed valuation is highly inequitable, and this pertains to most of the states in the union.
2. That by measuring local capacity as a basis for computing the local contribution, with official government statistics, it takes away from local units the incentive of manipulation or underassessment of property.<sup>5</sup>

Indices of relative ability do not eliminate inequities in the measurement of relative ability. The technic must be viewed as an expediency which may have advantages of objectivity, equity, and stability over the use of assessed valuation. There is no substitute for good property tax assessment to permit an adequate yield of revenue on property.

The study of economic indices of taxpaying ability for distribution of federal aid and the New York State study were theoretical, even though they dealt with a real and practical problem. In neither case were they actually used in legislation to apportion school funds. The first economic index of taxpaying ability written into a state law was developed by Johns<sup>6</sup> in 1939 for the state of Alabama. It was Dr. R. L. Johns who after much effort finally worked

---

<sup>5</sup>Committee on Tax Education and School Finance, The Index of Local Economic Ability in State School Finance Programs.

<sup>6</sup>R. L. Johns, An Index of The Financial Ability of Local School Systems to Support Public Education, Alabama State Department of Education (Montgomery, 1938).

out the technical details for legislation which now exist in Alabama. He has been more frequently involved than any other person in work in those states which have adopted or have considered the use of the Cornell-type index. The index for Alabama is not a complete adoption of the idea originally suggested by Cornell. An index of ability based on a series of factors was computed, but it was averaged with relative assessed valuation. In effect, the actual measure now in use in Alabama is a compromise between an index made up of economic measures independent of assessed valuation on the one hand and assessed valuation on the other.

Alabama was the only state to use an economic index of taxpaying ability until after World War II. Florida adopted an ability index in 1947 and West Virginia adopted one in 1948. However, West Virginia abandoned the economic index of taxpaying ability in 1953. An ability index was incorporated into the Texas state equalization aid plan in 1949; and in 1951, Arkansas and Georgia adopted ability indices in the state apportionment plan. Mississippi is the state most recently (1953) reporting the adoption of an economic index of taxpaying ability. The author of this study received copies of the economic indices of taxpaying ability from all of the states which are now using or have at some time used this plan in apportioning state equalization funds. Copies of letters from state authorities concerning the index of taxpaying ability are contained in the appendix to this study.

#### Summary of The Application of Economic Indices of Taxpaying Ability in Various States

This portion of the study will list the measures selected for inclusion in the indices of ability of individual states. The weights assigned the measures will be shown and the manner of applying the index

for distributing state equalization funds will be explained. Such an analysis should help in determining the composition of the index and a method of applying it.

Ability indices are based on state totals of the various measures selected. For example, the influence that income has on the index is the relationship of the income earned within the county to the total income earned in the state. This relationship can be shown as a proportion or per cent. The difference between proportion and per cent is merely a difference in the placement of the decimal point. For instance, if the income of the people for a certain year in a certain county divided by the total income of all counties in the state is 0.044, the index of the county expressed as a proportion is 0.044. The other form of expressing it would be 4.4, meaning that 4.4 per cent of the total income in the state is allocable to the county.

The weight of a measure is the amount by which the measure is to be multiplied before adding it into the composite index. For instance, assuming a county with 4.4 per cent of the income of the state and a weight for this measure of .2; the contribution of this measure toward the composite index would be .88. The measures in indices of taxpaying ability are usually expressed as per cents of the state total for each county. The weights are expressed either as a fractional or decimal part of 1. Thus, when the per cents of each measure are multiplied by their individual weights and the results added, the index for each county will be expressed in that county's per cent of the state total.

The ability index in Alabama was developed by Cornell and Johns<sup>7</sup>

---

<sup>7</sup>Francis G. Cornell and Roe L. Johns, "Alabama's New Index of Local Ability To Pay for Education," School Executive, June, 1941, p. 22.



using "trial and error" methods. The amount of local contribution is determined by multiplying a county's average index (ability index averaged with the index of assessed valuation) by one-half of one per cent of the total assessed valuation of the state. One of the complaints made of Alabama's index of taxpaying ability is that it gives too much significance to assessed valuation in the weighting of the factors included in the index. Various studies in process in Alabama are contemplating the elimination of assessed valuation from the index.<sup>8</sup> The measures and weights included in Alabama's economic index of taxpaying ability are indicated in Table I.

Table I

## Measures and Weights Used in Alabama's Economic Index of Taxpaying Ability

Measures	Weights	
	Actual	Per Cent
Total Assessed Valuation - - - - -	17	50.0
Assessed Valuation of Public Utilities - - - - -	3	8.8
State Income Tax - - - - -	1	2.9
Sales Tax Returns - - - - -	6	17.6
Auto License Fees - - - - -	5	14.7
Value of Farm Products - - - - -	1	2.9
Value Added By Manufacture - - - - -	1	2.9

The seven measures used in computing Alabama's economic index of taxpaying ability are reported in Table I. Total assessed valuation has an actual weight of 17, which is 50 per cent of the total weights assigned the various measures in the index. Assessed valuation of public utilities has a weight of 3, which is 8.8 per cent of the composite weight; state income tax has a weight of 1 or 2.9 per cent; sales tax returns has a weight of 6 or 17.6 per cent; auto license fees has a weight of 5 or 14.7 per cent; value of farm products has a weight of 1 or 2.9 per cent; and value added by manufacture has a weight of 1 or 2.9 per cent.

<sup>8</sup> Committee on Tax Education and School Finance, The Index of Local Economic Ability in State School Finance Programs, p. 44.

In the Florida formula, the amount of local contribution in each county is the index for that county multiplied by 95 per cent of the yield of a 6-mill levy on the state total taxable valuation. Lee<sup>9</sup>, a member of the staff of the State Department of Education in Florida, was instrumental in getting Florida's original index revised to its present form. The original index of taxpaying ability included assessed valuation other than public utilities and effective buying income as determined by Sales Management Magazine. These two measures were omitted and gainfully employed workers was added to form the measures in the present index. In addition, the weights were changed from whole numbers to decimals. Lee recognized that the inclusion of the assessed valuation factor in the index could be justified only during a period of transition from an assessed valuation index of taxpaying ability to a completely independent economic index of taxpaying ability. A National Education Committee<sup>10</sup> studying economic indices of taxpaying ability made mention of the fact that many of the county officials realized that the inclusion of assessment as part of Florida's economic index of taxpaying ability made it unattractive to raise property assessments. This was the main reason why Florida dropped assessed valuation other than public utilities from its index of taxpaying ability. Table II indicates the measures and weights included in the economic index of taxpaying ability for Florida.

---

<sup>9</sup>Robert E. Lee, "A Technique For The Development of An Index of Relative Taxpaying Ability of Local Administrative Units" (unpub. Ed. D. dissertation, University of Florida, 1950), 79 p.

<sup>10</sup>Committee on Tax Education and School Finance, The Index of Local Economic Ability In State School Finance Programs, p. 50.

Table II

## Measures and Weights Used In Florida's Economic Index of Taxpaying Ability

Measures	Weights	
	Actual	Per Cent
Assessed Valuation of Railroad and Telephone - - - -	.0461	4.61
Retail Sales - - - - -	.3654	36.54
Motor Vehicle Registrations - - - - -	.2857	28.57
Value of Farm Products - - - - -	.0586	5.86
Gainfully Employed Workers (less farm and govt.) - -	.2442	24.42

As reported in Table II, Florida's index of taxpaying ability has five measures with retail sales having the greatest weight. Retail sales has a weight contributing approximately 36 per cent of the index, with motor vehicle registrations and gainfully employed workers contributing approximately 28 per cent and 24 per cent, respectively. Assessed valuation of public utilities and value of farm products contributes approximately 5 per cent and 6 per cent, respectively, to the total index.

In 1948, West Virginia adopted an economic index of taxpaying ability consisting of ten measures. In 1953, the legislature adopted a new plan for the allocation of state equalization aid. The new plan bases the local ability measure upon a survey and appraisal of property values to be made by a state tax commission. A report of the measures and weights used in West Virginia's index of taxpaying ability follows in Table III.

Table III

## Measures and Weights Used In West Virginia's Index of Taxpaying Ability

Measures	Weights	
	Actual	Per Cent
Property Taxes For Current School Expense On Other Than Public Utility Property - - - - -	8	33.3
Property Taxes For Current School Expense On Public Utilities - - - - -	8	33.3
Retail Sales- - - - -	1	4.2
Number of Passenger Car Licenses- - - - -	1	4.2
Effective Buying Income - - - - -	1	4.2
Population- - - - -	1	4.2
Number of U. S. Income Tax Returns Filed- - - - -	1	4.2
Income of Residents - - - - -	1	4.2
Sales Tax Receipts- - - - -	1	4.2
Postal Receipts- - - - -	1	4.2

As illustrated in Table III two-thirds of the weight of the index was dependent on property taxes. Property taxes for current school expense on other than public utility property had an actual weight of 8 or 33.3 per cent of the total index and property taxes for current school expense on public utilities had a weight of 8 or 33.3 per cent. Retail sales, number of passenger car licenses, effective buying income, population, number of U. S. income tax returns filed, income of residents, sales tax receipts and postal receipts each had an actual weight of 1 or 4.2 per cent of the total index.

The Texas economic index of taxpaying ability adopted in 1949 emphasizes the income aspect. According to the Texas law, a county's contribution for the year 1955 was derived by multiplying that county's ability index by \$64,205,000. (The total amount to be contributed by all local units.) The total amount to be contributed by the local units is subject to revision each year. Since Texas schools are not on a county unit basis, the county contribution is prorated to districts within the county in proportion to the assessed valuation of each district.

The Texas index is unique in that it provides for an adjustment when there is a sharp increase or decrease in an individual county's index from year to year. The economic index of taxpaying ability in Texas is recomputed for each year using the latest statistics available. The measures and weights used in Texas' economic index of taxpaying ability are as indicated in Table IV.

Table IV

## Measures and Weights Used In Texas' Economic Index of Taxpaying Ability

Measures	
Assessed Valuation - - - - -	20            20.0
Scholastic Population- - - - -	8             8.0
Income Based On:	
Value Added By Manufacture	
Value of Minerals Produced	
Value of Agricultural Products	
Payrolls for Retail Establishments	
Payrolls for Wholesale Establishments	
Payrolls for Service Establishments- - - - -	72            72.0

The Texas index is based on three measures which consist of assessed valuation of property, school population, and certain aspects of county income. Assessed valuation has a weight of 20, which is also 20 per cent of the total index. Scholastic population has a weight of 8 or 8 per cent of the total index. In arriving at income, various components are combined and these receive collectively a weighting of 72 points or 72 per cent of the total index. The income components combined are value added by manufacture, value of minerals produced, value of agricultural products, payrolls for retail establishments, payrolls for wholesale establishments, and payrolls for service establishments.

In Arkansas, a county's contribution to the equalization plan is determined by applying the index. The county contribution is prorated to districts within the county in proportion to their

assessed valuations. The existing law provides a total local contribution on the basis of an 18-mill levy on the state total assessed valuation.

The 1957 legislature in Arkansas added assessed public utilities as one of the measures to be included in the index, and provided by law that the measures of state income tax receipts and value of farm products be omitted from the index. The law enacted by the legislature also provided that the complex six-decimal weightings be eliminated from the index and weights in fraction form be substituted.

Table V

Measures and Weights Used In Arkansas<sup>1</sup> Economic Index of Taxpaying Ability

Measures	Weights	
	Actual	Per Cent
Sales Tax Returns- - - - -	2/7	28.57
Auto License Fees- - - - -	2/7	28.57
Number of Gainfully Employed Workers Excluding Farm and Government Workers - - - - -	2/7	28.57
Assessed Public Utilities- - - - -	1/7	14.29

According to Table V, the present economic index of taxpaying ability in Arkansas has four measures. Three of these four measures (sales tax returns, auto license fees, and number of gainfully employed workers) have equal weightings of two-sevenths or 28.57 per cent of the total index. The fourth measure (assessed public utilities) contributes the remaining one-seventh or 14.29 per cent of the total index.

In Georgia, the local contribution is determined by multiplying each county's index by the yield of a 7-mill tax levy on the total state assessed valuation as indicated in the school tax digest. Independent city districts within counties are allocated a fraction of the ability index based on prorating assessed valuation within the county after first weighting each such independent school district's property valuation by one and one-third.

The Georgia index of taxpaying ability includes assessed valuation of property (property tax digest) and is, therefore, a compromise index. In 1954, the State Board of Education of Georgia decided to start eliminating the property digest measure from the economic index. This is being done over a period of five years reducing the weights given the property digest from 6 to 5 to 4, etc. In this way, this measure will be completely eliminated by 1960. Georgia is also doing some research on retail sales with the idea of substituting the sales tax receipts for retail sales. At the time the original index was instituted, Georgia did not have a sales tax.

Table VI

## Measures and Weights Used In Georgia's Economic Index of Taxpaying Ability

Measures	Weights	
	Actual	Per Cent
Property tax digest less homestead exemption - - - -	6	31.5
Public utilities tax digest- - - - -	2	10.5
State income taxes paid- - - - -	1	5.3
Average 5 years effective buying income- - - - -	6	31.5
Average 5 years retail sales - - - - -	2	10.5
Motor vehicle taxes- - - - -	2	10.5

Table VI presents the six measures comprising Georgia's economic index of taxpaying ability. Property tax digest less homestead exemption and average 5 years effective buying income each have a weighting of 6 or 31.5 per cent of the total index. Public utilities tax digest, average 5 years retail sales, and motor vehicle taxes each have a weighting of 2 or 10.5 per cent of the index. State income taxes paid has a weight of 1 or the remaining 5.3 per cent of the total index.

In Mississippi, the total local contribution required toward a minimum program is calculated each biennium. The local contribution was set at an arbitrary figure of \$20,000,000 for the 1953-55 biennium with provisions that it be recalculated each biennium on a ratio of the

required local contribution to the state appropriation. Each county's portion of the total local contribution is determined by application of its index.

Mississippi's economic index of taxpaying ability is similar to the Arkansas index in that it does not include any assessed valuation of property in its index, other than public utilities which are assessed on the state level. Mississippi's index has been criticized because of its six-decimal weightings of the various measures in the index.

Table VII

## Measures and Weights Used In Mississippi's Economic Index of Taxpaying Ability

Measures	Weights	
	Actual	Per Cent
Assessed Valuation of Public Utilities - - - - -	.242152	24.2152
Retail Sales Tax - - - - -	.282970	28.2970
Motor Vehicle License Receipts - - - - -	.044144	4.4144
Value of Farm Products - - - - -	.065110	6.5110
Personal Income Taxes - - - - -	.222936	22.2936

Table VII presents the six measures in Mississippi's economic index of taxpaying ability. The weights of the measures contribute toward the total index approximate per cents as follows: Assessed valuation of public utilities, 24; retail sales tax, 28; motor vehicle license receipts, 4; value of farm products, 7; personal income taxes, 14; and gainfully employed non-farm, non-government workers contributes approximately 22 per cent.

In the preceding discussion of economic indices of taxpaying ability, this report has enumerated the measures used in the indices, shown the assigned weights of each measure, and described the application of the index to the local unit in the computation of state equalization aid. In the development of the index of taxpaying ability for this study similar steps are necessary in the procedure for developing the index. First,



criteria must be adopted for developing the index of taxpaying ability; and then on the basis of these criteria, the measures to be used in the index must be selected; a weighting technic determined; and an index developed for each county unit in Oklahoma.

#### Criteria for Developing Indices of Taxpaying Ability

This portion of the study will enumerate the guiding standards or criteria adopted by authorities who have developed indices of taxpaying ability. After a review of some of the criteria adopted by authorities, the criteria adopted for this study will be enumerated and justified.

Cornell, in the original study on ability indices, adopted the following criteria for measures from the Report of the National Survey of School Finance:

1. All measures used should be objective.
2. Measures should be based to the greatest degree possible upon dependable data systematically obtained by governmental agencies at regular intervals and by tried and established methods.
3. Measures should be as equitable as they can be made without the introduction of undue complexity.
4. The plan should be such as to have a common sense appeal both in the measures applied and in the scheme of distribution.<sup>11</sup>

In the second report of the series published by the National Survey of School Finance,<sup>12</sup> two bases for the distribution of federal aid to the states were discussed--educational need, and income produced. Mort, as Associate Director of this survey, formulated criteria for the development of indices of taxpaying ability for either of these bases of distributing aid. These standards were:

1. All measures used must be objective.

---

<sup>11</sup>Francis G. Cornell, "Grant-in-Aid Apportionment Formulas", Journal of The American Statistical Association, March, 1947, p. 92.

<sup>12</sup>Mort, Research Problems In School Finance, p. 133.

This is to avoid friction between the states and the central agency arising from ambiguity of measures; to avoid local manipulations of data to increase the amount of aid received; and to avoid the tendency to bureaucratic control that tends to arise from any plan which is not sufficiently objective to avoid the need on the part of the central agency for exercising judgment.

2. Measures used should be based to the greatest degree possible upon dependable data systematically obtained by federal agencies at determined periods and by tried and established methods.

This is to avoid the setting up of cumbersome additional machinery; to avoid local manipulation of data; to free the federal government from delay due to inefficient record systems in the state; and to insure uniformity in the collection of information.

3. Measures used must be as equitable as they can be made without the introduction of complexity.

4. Federal aid must be non-fluctuating in nature.

The federal aid should be sufficiently stable to enable careful planning by states. It should be possible for any state to predict the amount of aid it shall receive sufficiently far ahead to make state legislative action possible. For example, this requires that the amount of aid which a given state gets shall be determined by data arising from that state alone. It should not depend upon the developments in all of the other states.

5. The plan must be such as to have a common-sense appeal both in the measures applied and in the scheme of distribution.

Experience has shown that measures obtained by refined methods are not necessarily lacking in their appeal as common-sense measures.

6. The plan must not in any way interfere with the rights of the states to shape their own educational destinies.<sup>13</sup>

The problem of determining the taxpaying ability of states is not the same problem as determining the taxpaying ability of localities within a state; however, the techniques used in developing an index and the standards governing the measures to be used are quite similar.

Cornell, in a later study adopted the following criteria from the National Survey of School Finance in developing measures of the taxpaying ability of the counties of New York:

1. All measures should be objective.

This is to avoid friction between the local units and the state arising from ambiguity of measures; to avoid manipulation of data to increase the amount of aid received; and to avoid the tendency to bureaucratic control that tends to arise from any plan which is not sufficiently objective to avoid the need on the part of the central agency for exercising judgment.

---

<sup>13</sup>Ibid., p. 133.

2. Measures used should be based to the greatest degree possible upon dependable data systematically obtained by governmental agencies at regular intervals and by tried and established methods.

This is to avoid the setting up of cumbersome additional machinery; to avoid local manipulation of data; to free the state from delay due to inefficient record systems in the localities; and to insure uniformity in the collection of information.

3. Measures used should be as equitable as they can be made without the introduction of undue complexity.

4. State aid should be non-fluctuating in nature.

The state aid should be sufficiently stable to enable careful planning by localities. It should be possible for any local unit to predict the amount of aid it shall receive far enough ahead to make possible proper budgeting of local expenditures. For example, this requires that the amount of aid which a given locality gets shall be determined by data arising from that locality alone. It should not depend upon the developments in all the other localities of the state.

5. The plan should be such as to have a common-sense appeal both in the measures applied and in the scheme of distribution.

Experience has shown that measures obtained by refined methods are not necessarily lacking in their appeal as common-sense measures.

6. Statistical suitability. Mathematical techniques must be resorted to in combining measures and only through numerical treatment of data is it possible to judge the adequacy of techniques in terms of the other requirements.<sup>14</sup>

Johns, as Special Finance Consultant for the South Carolina Survey of 1948, proposed criteria for the development of an index of the relative taxpaying ability of the counties of South Carolina. Some of these were used by Mort and Cornell, others were added by Johns. These standards were:

1. An index of the relative taxpaying ability of the several counties of South Carolina to support schools must not be an index of theoretical taxpaying ability but a relative wealth in order to be equitable because local taxes for schools are largely derived from property.

2. A sufficient number of economic measures of wealth should be included in the index to include all the principal elements of the wealth of the state on which taxpaying ability is based.

3. All economic measures included in the index should be independent from the influence of local assessing bodies.

5. Each economic measure should measure some different aspect of the wealth of the state insofar as possible.

6. Statistically, each economic measure should have a fairly high positive correlation with the true wealth of the respective counties of the state but the economic measures should have as low intercorrelation with each other as possible.

---

<sup>14</sup>Cornell, A Measure of Taxpaying Ability of Local School Administrative Units, p. 17.

7. The mathematical formula employed for the development of the index of taxpaying ability should measure the relative taxpaying ability of small counties as accurately as large counties.<sup>15</sup>

Lee, in his study of a technique for the development of an index of relative taxpaying ability of local units, summarized the standards used by some of the authorities and decided upon using the criteria as adapted from criteria used by Johns.

The guiding standards adopted by Lee were:

1. The index and all economic factors should be objective; therefore all data pertaining to these factors should be obtainable from reliable published sources.

2. All economic factors and the index should be independent from the influence of local assessing bodies.

3. Each economic factor should measure some different aspect of the wealth of the state, and a sufficient number should be included in order to represent all the principal elements of the wealth of the state.

4. The index should be based on some validating measure that directly corresponds to the actual value of property.

5. The mathematical formula employed for the development of the index of taxpaying ability should be as sensitive to the small local units as it is to the large local units in predicting relative ability.

6. The index of taxpaying ability should be as equitable as possible without undue complexity in order that the formula be administratively feasible.<sup>16</sup>

The guiding standards used in this present study are adapted from criteria used by Cornell, Johns, and Lee. Although there are differences in wording, the criteria used by these three authorities are, in effect, the same. Since there appeared to be general agreement by authorities, this present study has not attempted to justify the guiding standards used in this study. These criteria or guiding standards will be reported in the ensuing chapter.

---

<sup>15</sup>Public Schools of South Carolina, A Report of The South Carolina Educational Survey Committee, p. 322.

<sup>16</sup>Lee, p. 14.

### Summary

A historical review and a summary of the development of indices of taxpaying ability in other states was made by the author to be used as a guide in the development of an economic index of taxpaying ability for Oklahoma.

The first economic index of taxpaying ability applied in a state for distributing state equalization aid was in Alabama in 1939. Florida adopted an economic index in its state aid plan in 1947. West Virginia adopted an economic index of taxpaying ability for distributing state equalization aid to county school units in 1949, but abandoned the index in 1953. Texas adopted an index in 1949, followed by Arkansas and Georgia in 1951. Mississippi is a state recently adopting an index of taxpaying ability. Mississippi adopted an economic index of taxpaying ability in its state aid apportionment formula in 1953.

Seven states have applied an economic index of taxpaying ability as a basis for distributing state equalization funds to local school units. Six states are at present using the index of ability in their state equalization formulas. The number of measures included by the states that applied the index varied from a maximum of ten to a minimum of two. Weights of measures in the indices of taxpaying ability varied from a maximum of 72 per cent of the total index to a minimum of 2.9 per cent of the total index.

In the application of the index, most of the states required each local unit to raise through local property taxes an amount equal to the local unit's index of ability multiplied by the amount to be raised by

all local units. In some instances the total local unit contribution was determined by multiplying the total assessed valuation of the state by a uniform mill levy. Some states simply set an arbitrary amount to be required of the total local units toward the minimum program and determined each local unit's pro rata share by multiplying that unit's economic index by the total amount required.

Criteria adopted by authorities in the development of other indices of taxpaying ability were reviewed and criteria for this study were adopted. The criteria adopted in this study correspond to those of authorities. There appears to be general agreement by authorities in regard to criteria to be adopted in developing indices of taxpaying ability.

## Chapter IV

### DEVELOPMENT OF THE INDEX OF TAXPAYING ABILITY

The purpose of this chapter is to describe the development of an index which could be used as a relatively objective and equitable measure of the relative ability of each county in Oklahoma to raise revenues by means of an ad valorem tax on property within that county. Standards for the development of the index will be set forth; the selection of factors or measures will be discussed; a formula for weighting the economic measures contained in the composite index will be determined; and an index will be developed for each county fiscal unit in the state.

The techniques used in this study could be applied in developing an economic index of taxpaying ability for any state. However, it is probable that an index developed for another state using the techniques employed in this study would be different, because of the different economic measures and available statistics of other states.

In order to develop an index of taxpaying ability for Oklahoma, criteria were adopted to serve as guides in selecting measures for the index, and a mathematical method was devised to determine the weight of each economic measure in the composite index of taxpaying ability. The guiding standards for this study were adopted from those used by Lee, Johns, and Cornell (reviewed in Chapter III).

The criteria adopted for this study are as follows:

1. The index and all economic measures should be objective; therefore, all data pertaining to these measures should be obtainable from reliable published sources.

2. All economic measures and the index should be independent of the influence of local assessing bodies.

3. Each economic measure should measure some different aspect of the wealth of the state, and a sufficient number of measures should be included in order to represent all the principal elements of the wealth of the state. However, no measure should be included in the index that is not present to some degree in every local unit in the state.

4. The measures in the index should be weighted according to a criterion. The criterion to be used should directly correspond to the actual value of property.

5. There should be no overlapping of measures to the extent that double weightings would be given one aspect of wealth of the state.

6. The mathematical formula employed for the development of the index of taxpaying ability should be as sensitive to the small local units as it is to the large local units in predicting relative ability.

7. The index of taxpaying ability should be as equitable as possible without undue complexity in order that the formula be administratively feasible. The fewer measures included in the index, the better will this requirement be met as long as enough measures are included to make the index valid.

Another consideration to be given the development of an economic index of taxpaying ability, is that some decisions must be made that are, to a certain extent, subjective in nature. A Committee of the National Education Association<sup>1</sup> recognized that in the selection of criteria, measures or weights, common sense and good judgment should prevail.

---

<sup>1</sup>Committee on Tax Education and School Finance, The Index of Local Economic Ability in State School Finance Programs.



Categories of Possible Measures for Inclusion in Oklahoma's Economic  
Index of Taxpaying Ability

A brief review of what has been done in measure analysis will serve as a guide in the selection of possible economic measures that might be included in the index of taxpaying ability to be developed in this study. This portion of the study will review the categories and possible measures listed in each category by some of the authorities who have developed indices of taxpaying ability. On the basis of this review, categories will be selected. Measures which might be included in each category will be identified.

Cornell divided into three categories the possible measures that might be used in a formula to predict taxpaying ability in New York. These measures were:

1. Direct Measures of the Value of Real Property.
  - a. Value of farm real estate.
  - b. Rental of homes.
  - c. Value of owned homes.
  - d. Value of construction business.
2. Measures of Population.
  - a. Total population.
  - b. Population density.
  - c. Urbanization.
  - d. Proportion of agricultural population.
  - e. Rate of population increase.
  - f. Birth rate.
  - g. Proportion of population of various ages.
3. Measures of Income and Purchasing Power, Resultants and Concomitants.
  - a. Net taxable income.
  - b. Value of manufacturing, mining, and farm products.
  - c. Retail sales.
  - d. Number of gainfully employed workers.
  - e. Residence telephones.
  - f. Savings deposits.
  - g. Postal receipts.
  - h. Motor vehicle registrations.
  - i. Aggregate taxes on property.<sup>2</sup>

---

<sup>2</sup>Cornell, A Measure of Taxpaying Ability, p. 19.

Cornell used only six of the measures which he had listed as possible measures in developing indices of taxpaying ability for the counties of New York. These measures were: total population, retail sales, motor vehicle registrations, production, income tax returns, and postal receipts.<sup>3</sup>

Mort classified possible measures of the taxpaying ability of the states under the following aspects of wealth:

1. General
  - a. Income tax returns.
  - b. Population.
  - c. Bank resources.
  - d. Time deposits.
  - e. Postal receipts.
  - f. Motor vehicle registrations.
2. Manufacturing and Industry.
  - a. Factory wages.
  - b. Value of manufactured products.
  - c. Value added by manufacture.
  - d. Factory wage earners.
  - e. Horsepower in manufacture.
  - f. Production of electric power.
  - g. Employment; all industries.
3. Business Activity.
  - a. Commercial failures; total liabilities.
  - b. Stock transfers.
  - c. Bank suspension deposits.
  - d. Gasoline consumption.
  - e. Retail trade--net sales.
  - f. Wholesale trade--net sales.
  - g. Value of construction business.
4. Agriculture.
  - a. Farm cash income.
  - b. Farm gross income.
  - c. Value of farm real estate.
5. Natural Resources.
  - a. Petroleum production.
  - b. Value of mineral products.<sup>4</sup>

The measures selected by Mort in developing his index of the relative taxpaying ability of the states were: urban population, value

---

<sup>3</sup>Ibid. p. 48.

<sup>4</sup>Mort, Federal Support for Public Education, p. 180.

added by manufacture, farm cash income weighted inversely as the percentage of farm population of total population, postal receipts, retail trade--net sales, motor vehicle registrations, value of new incomes reported for federal income tax returns, value of net incomes reported for federal income tax returns, total population, and the yield of a theoretical tax on one-half of one per cent of the par value (in the case of no par stock, of the issue price) on authorized capital stock of corporations.<sup>5</sup>

Johns used twelve different measures in various indices of the tax-paying ability, which he helped develop. However, in no case did he use all twelve of the measures in a given index. The measures that he has used are as follows: assessed valuation, retail sales, auto registrations, farm income, public utilities, state income tax, effective buying power, employed workers, value added by manufacture, railroad and telephone property, population, and income.<sup>6</sup> The selection of measures for the various indices was of necessity geared to the nature of the state's economy where the index was to be used and was governed by the availability of data.

A special report by the Committee on Tax Education and School Finance of the National Education Association in 1953,<sup>7</sup> classified measures of taxpaying ability into three broad categories. This classification listed direct measures of value of property, measures of population, and measures of income and purchasing power. Measures that are presently being used in indices in the states of Alabama, Florida, Georgia, Mississippi, Arkansas, and Texas have been classified using these

---

<sup>5</sup>Ibid., p. 192.

<sup>6</sup>Lee, p. 30.

<sup>7</sup>Committee on Tax Education and School Finance, The Index of Local Economic Ability in State School Finance Programs.

categories (see Table VIII).

Table VIII

## List of Measures Which Have Been Included in Indices of Taxpaying Ability

<u>Measures of Economic Ability</u> <u>Included in Indices</u>	<u>Source of Data</u>	<u>States</u> <u>Where Used</u>
<u>Direct measures of value of real</u>		
<u>Property:</u>		
Assessed valuation - - - - -	State tax agencies	Alabama Arkansas Florida Georgia Mississippi Texas
Property taxes - - - - -	State revenue de- partment	West Virginia
<u>Measures of Population:</u>		
Total - - - - -	U. S. Census Bureau	West Virginia
Scholastic - - - - -	State Dept. of Educ.	Texas
<u>Measures of income and purchas-</u> <u>ing power:</u>		
State income tax - - - - -	State revenue de- partment	Alabama Georgia Mississippi
Number of federal income tax returns - - - - -	U. S. Internal Revenue Service	West Virginia
Total income payments- - - - -	State Chamber of Commerce	West Virginia
Effective buying income- - - - -	Sales Management (magazine)	Georgia West Virginia
Payrolls for retail estab- lishments- - - - -	U. S. Census Bureau	Texas
Payrolls for wholesale estab- lishments- - - - -	U. S. Census Bureau	Texas
Payrolls for service estab- lishments- - - - -	U. S. Census Bureau	Texas
Sales tax receipts - - - - -	State revenue de- partment	Alabama Arkansas West Virginia
Retail sales - - - - -	Sales Management (magazine) and U. S. Census Bureau	Florida Georgia Mississippi West Virginia

Table VIII cont.

Table VIII (continued)

## List of Measures Which Have Been Included in Indices of Taxpaying Ability

Measures of Economic Ability Included in Indices	Source of Data	States Where Used
Passenger auto registration - - -	Vehicle registration	Alabama Arkansas Florida Georgia Mississippi West Virginia
Number of gainfully employed - - -	U. S. Census Bureau	Arkansas Florida Mississippi
Value added by manufacture - - - -	U. S. Census Bureau	Alabama Texas
Value of farm products - - - - -	U. S. Census Bureau	Alabama Florida Mississippi Texas
Value of minerals produced - - - -	U. S. Census Bureau	Texas

A study of the data in Table VIII shows that six states use some form of assessed valuation in their index of taxpaying ability and one state uses property taxes. Two states include measures of population and all of the states include one or more measures of income and purchasing power.

The author classified possible measures that might be used in a formula to predict taxpaying ability in Oklahoma into three categories similar to those listed by Cornell<sup>8</sup> for New York State. The three categories chosen are generally accepted by authorities as being sufficient to cover all possible measures of taxpaying ability.

The categories of measures and the possible measures for each category in Oklahoma are as follows:

1. Direct Measures of the Value of Real Property.

---

<sup>8</sup>Cornell, A Measure of Taxpaying Ability, p. 19.

- a. Assessed valuation of railroads and public service corporations.
- b. Assessed valuation, other than railroads and public utilities.
- c. Property taxes.
- 2. Measures of Population.
  - a. Total population.
  - b. Scholastic population.
  - c. Population density.
  - d. Proportion of agricultural population.
  - e. Proportion of population of various ages.
- 3. Measures of Income and Purchasing Power, Resultants and Concomitants.
  - a. State income tax.
  - b. Number of federal income tax returns.
  - c. Federal income tax receipts.
  - d. Net taxable income (income to individuals)
  - e. Effective buying income.
  - f. Retail sales.
  - g. Retail sales and use tax receipts.
  - h. Number of auto license registrations.
  - i. Auto license receipts.
  - j. Number of gainfully employed workers.
  - k. Value of farm products.
  - l. Value added by manufacture.
  - m. Value of minerals produced.
  - n. Postal receipts.
  - o. Savings deposits.
  - p. Payrolls for retail, wholesale and service establishments.
  - q. Residence telephones.

There are, no doubt, other possible measures that might be included in an economic index of taxpaying ability for Oklahoma. The author has chosen all the possible measures used by authorities developing indices for other states that contribute some form of wealth toward the economy of Oklahoma. Some measures listed as possible measures in other states were eliminated from this listing of possible measures because they were repetitious of other measures or were not significant measures of wealth and thus did not justify their inclusion as a possible measure in the index.

#### Analyses of Economic Measures To Be Included in Oklahoma's Index of Taxpaying Ability

It is the purpose of this portion of the study to make an analysis of the possible economic measures listed for inclusion in Oklahoma's index

of taxpaying ability and to select those measures that conform to the guiding standards adopted for developing the index. In the discussion to follow, each of the possible measures for inclusion in the index of taxpaying ability for Oklahoma will be analyzed and measures will be selected for inclusion in the proposed index.

Direct measures of the value of real property. In an analysis of direct measures of the value of real property, it is found that assessed valuation and property taxes are the only direct measures of the value of real property used in other economic indices of taxpaying ability. There are three possible measures listed for Oklahoma in this category. They include assessed valuation of public utilities, assessed valuation of property other than public utilities, and property taxes.

The economic indices of taxpaying ability are devised to correct the abuses caused by unequal property assessment, yet assessed valuation is a factor in the economic indices of taxpaying ability of all seven of the states which have been discussed in this study. The use of assessed valuation as a measure in an economic index of taxpaying ability for determining the local contribution to the minimum program of education is defended by the argument that it eases the period of transition from assessed valuation to an economic index method of determining taxpaying ability. The inclusion of assessed valuation as a measure in the index is simply a "compromise" measure in changing from assessed valuation to an economic index method of determining the taxpaying ability of the local school unit. In other words, the change is not a complete change, but one in which elements of the old and new index of ability are both included.

When assessed valuation is included in the measures in the index and weighted as heavily as in Alabama, (50 per cent of the index) the purpose

of the index is being defeated. There is still a tendency for local assessment officials to be reluctant to increase the assessment values since such increases will be reflected in a higher economic index figure of taxpaying ability for the local unit and a consequent loss of state equalization aid to that local unit. If the index were not weighted so heavily with the measure of assessed valuation, assessment officials would not be so reluctant to raise assessments.

Not all measures of assessed valuation are undesirable as measures of taxpaying ability. Cornell was chairman of a committee of the National Education Association that made the following observation:

When a state agency does the assessing of a property group, such as public utilities, and the assessments are therefore uniform for the state and considered fairly reliable, it is advantageous for ease of administration to include such assessed valuations as a factor in the ability index.<sup>9</sup>

The Alabama, Georgia, Florida, Mississippi, West Virginia and Arkansas plans include separate items for this type of property assessed on a statewide basis. The Arkansas plan added assessed valuation of public utilities as one of the measures in its index only recently.

The Committee on Tax Education and School Finance of which Cornell was chairman further observes:

States which now include assessed valuation as a sort of "compromise" or transition plan, should consider retaining the valuation of utilities when contemplating the elimination of assessed valuation of other property, so as to get on a strict index basis. Utility valuation--primarily railroad, power, telephone, and telegraph property--is not otherwise easily reflected in other economic measures.<sup>10</sup>

The valuation of all railroad and public service property in Oklahoma is determined annually by the State Board of Equalization. Since the

---

<sup>9</sup>Committee on Tax Education and School Finance, The Index of Local Economic Ability, p. 27.

<sup>10</sup>Ibid., p. 27.



members of this Board have other duties to perform, it meets only a few times each year to function as a State Board, and is handicapped in securing sufficient information relating to the proper assessment of railroad and public service corporation property. As a result, the Legislature has transferred to the Oklahoma Tax Commission the necessary detail work in these matters. Every railroad and public service corporation is required by statute to make a rendition of its property to the Oklahoma Tax Commission and the Commission is directed to make all necessary investigations, hold hearings and make recommendations to the Board of Equalization as to the amount of assessment of each company. To perform its duties in connection with the assessment of property for ad valorem taxation, the Oklahoma Tax Commission has an ad valorem tax division. This division conducts such investigations and performs the detail work necessary for the proper assessment of all railroad and public service corporation property. From this information the Tax Commission makes its reports and recommendations to the State Board of Equalization.

The Biennial Report of the Oklahoma Tax Commission reports the assessed valuation of all railroads and public service corporations in Oklahoma by counties. For the purposes of this study, the assessed valuation of railroads and public service corporations will be used as one of the measures in the economic index of taxpaying ability developed for Oklahoma. It meets the requirements of the guiding standards set up for this study in that it is objective, is independent of local assessing bodies, and measures an aspect of wealth of the state.

The use of assessed property taxes as a measure in an economic index of taxpaying ability is objectionable because its use can prevent the state from receiving the full benefits of an ability index, since the assessment of property is subject to local manipulation. There is

an additional objection to the use of the ad valorem property tax as a measure in that it penalizes those districts spending at a rate greater than the state average rate of millage and rewards those districts which spend at a rate less than that of the average.

Property taxes will not be included as a measure in the economic index of taxpaying ability for Oklahoma, since it is subject to local manipulation, and thus is not consistent with the criteria for this study.

Measures of population. Of the possible measures of population listed for Oklahoma, total population and scholastic population would appear to be the most reliable measures that might be included in an index. Although the original studies of ability indices indicated that total population might be used as a reliable measure of economic ability, no state other than West Virginia (which has abandoned the use of an index) ever attempted to use this factor as a measure in its index of economic taxpaying ability. The main argument against the use of a population measure as a measure in an index is that it could be a measure of need just as well as it could be a measure of ability.

The original studies of economic indices of taxpaying ability reported little value in scholastic population as a measure. Recent experience in Texas, which state is considering eliminating scholastic population from the index, is another indication that this measure is not satisfactory.

Thus, no measures of population will be used in the economic index of taxpaying ability to be developed in this study.

Measures of income and purchasing power. There are more statistics available indicating income and purchasing power than may be found in any other area of measures encompassed by this study. Revenue departments of the states and the U. S. Department of Commerce (e.g., the Census

Bureau and Office of Business Economics) publish data in this area.

Business data which indicate income and purchasing power are regularly reported by Sales Management, the Blue Book of Southern Progress, State Business Research Bureaus, and State Chambers of Commerce.

State income taxes paid, the number of federal income tax returns, effective buying income, and payrolls are employed as measures of the income phase of a state's economy included in the economic indices of taxpaying ability in other states. A single measure of income is used in four states. One state utilized the number of federal income tax returns, total income of residents, and effective buying income as measures in its index. Another state uses the payrolls of retail, wholesale and service businesses; and the value added by manufacturing, agriculture, and mining.

No data for the counties in Oklahoma are available for number of persons filing federal returns or for federal income taxes collected.

In Oklahoma, three measures of direct income are available from reliable sources. These data consist of statistics on income to individuals as computed by the Business Research Bureau of Oklahoma University, effective buying income as estimated by the magazine Sales Management, and state income tax receipts from individuals and corporations as reported by the Oklahoma Tax Commission.

Income to individual data are compiled by the Business Research Bureau of Oklahoma University located at Norman, Oklahoma. These data are determined by adding wages and salaries of proprietors of farm and business operators; other labor income such as employers contributions to private pension, health and welfare funds, directors fees, military leavy pay, etc.; proprietors income consisting of net business earnings of owners of unincorporated enterprises including producers cooperatives;

property income consisting of rental income, dividends and personal interest income; and transfer payments consisting of receipts of persons from government and business for which no services are currently being rendered. From the amounts obtained by adding these sources of income in each county, personal contributions to social insurance were subtracted in order to obtain the estimated income to individuals shown by these data.<sup>11</sup>

Effective buying income is estimated by Sales Management magazine based upon national data on disposable income, census data on median income, federal tax collections, income payments by state, relationships of retail sales and income, and other items.

Of the three measures of income; income to individuals, effective buying income and state income tax receipts, only one measure should be included in the index, since all three measures involve practically the same components in determining the direct income phase of the state's economy. To include more than one of these measures would place undue emphasis on this phase of the state's economy and cause, in effect, a double weighting of this phase of the economy in the final computation of the economic index of taxpaying ability.

In the development of the economic index of taxpaying ability for Oklahoma, effective buying income was deleted. Effective buying income is an estimate. Income to individuals is a statistical report of factual information. Therefore, income to individuals should be more valid than effective buying income as a measure. State income tax receipts might not be a good measure to include in the index, because they vary greatly from the statistics shown by federal income tax returns for this state and thus, are probably unreliable.

---

<sup>11</sup>Business Research Bureau, "Income to Individuals." (bulletin of the University of Oklahoma, 1955).

Retail sales, as reported by the U. S. Census Bureau, estimated by Sales Management magazine, or shown by sales tax receipts of states, measures a component of income arising from the activity of retail centers. Florida dropped effective buying income (estimated by Sales Management magazine) from its index and added direct sales tax data in place of estimated retail sales during the last session of its state legislature. It is expected that this change will increase the accuracy of its index by using direct data rather than estimates.

For the economic index of taxpaying ability for Oklahoma developed in this study, the latest statistics on actual retail and use tax receipts were selected as one of the measures in the index. Actual retail and use sales tax receipts should be more reliable than estimated retail sales, since actual retail and use tax sales receipts would be direct data rather than estimates. Use sales tax receipts, which tax is levied on out of state retail purchases by Oklahoma residents, was added in with retail sales to give a more reliable figure on retail activity.

Passenger auto registrations is a measure used in all states except Texas. The measure includes a component of taxpaying ability missed by other measures. Registration fees collected, rather than number of auto passenger registrations, should be the better measure in Oklahoma since the fees are levied on a graduated basis according to the estimated value of the automobile and would thus give a better indication of this measure. Auto license receipts was one of the measures selected for the economic index of taxpaying ability of county fiscal units in Oklahoma. The data for this measure may be obtained from biennial reports of the Oklahoma Tax Commission.<sup>12</sup>

---

<sup>12</sup>Oklahoma Tax Commission, Oklahoma Sales Tax and Use Tax, A Statistical Report (Oklahoma City, 1957).

The number of gainfully employed workers exclusive of farm and government workers was included in the original Arkansas and Mississippi indices. The State Legislature of Florida added this measure to its index in 1957. In these states, school authorities indicate the number employed seems to be a good measure of ability, especially in those areas of these states where new construction and new business activity are developing. The number of gainfully employed workers was selected as a measure in the economic index of ability developed for Oklahoma. The data for this measure may be obtained from the Oklahoma Labor Market, a publication of the Oklahoma State Employment Service.<sup>13</sup>

Value added by agriculture, manufacturing and mining was also listed as possible measures to be included in an economic index of taxpaying ability for Oklahoma. Texas combines the three measures--value of farm products, value added by manufacture, and value of mineral products--with payrolls to measure all economic activity. Alabama uses both value of farm products and value added by manufacture in its index. West Virginia (at one time) used value added by manufacture; and Arkansas and Florida originally used value of farm products in their indices of taxpaying ability. However, Arkansas dropped value of farm products from its index in 1957.

Since value added by agriculture, manufacturing and mining are all similar, in that they are measures of production in the state's economy, the inclusion of only one of these factors in an index is questionable; the combining of all three seems to be most desirable. The acceptability of the use of only one depends on the other factors in the index. In

---

<sup>13</sup>Oklahoma Employment Security Commission, Oklahoma Labor Market, Research and Planning Division Publication (Oklahoma City, 1957).

Oklahoma, statistics are not available by county on value of manufacturing and mineral production. In answer to a request by the author to the U. S. Department of Commerce, Bureau of the Census, for complete county data on value of manufacturing and mineral production, information was given to the effect that the law under which the Bureau of the Census operates and the interpretations of that law by the General Counsel of the Commerce Department and by the Attorney General prohibits it from publishing or providing to other than sworn Census Bureau employees any information which might reveal the operations of an individual company or establishment.<sup>14</sup> For this reason, information for all of the counties of Oklahoma on value added by manufacturing and mineral production was unobtainable and therefore cannot be included as a measure in the index.

The value of farm products was obtained and included in an experimental index, but because of its low weighting (less than one per cent of the index) was found to be of little influence or value to the computed index and partly for that reason was abandoned as a measure to be included in the final index. Another reason for disqualifying value of farm products as a measure in the index was that no other measure could be found to combine with it to offset this one phase of economic activity.

Of the other possible measures that might be included in the index listed previously in this study, none met the requirements of the guiding standards adopted for the selection of measures well enough to justify their inclusion in the final index.

The measures selected for inclusion in the economic index of tax-paying ability of county fiscal units in Oklahoma were assessed valuation

---

<sup>14</sup>Letter in Appendix, From Edwin D. Goldfield, Chief Statistical Reports Division, Bureau of the Census (Washington, D. C., July 29, 1957).

of public utilities, retail sales and tax receipts, individual income, auto license receipts, and gainfully employed workers. These measures satisfy the criteria adopted for this study. The sources of data for these five measures were accepted as reliable, and establish the respective measures as both objective and free from local influence. Each economic factor selected measures some different aspect of the wealth of the state, and each measure has a positive correlation with the actual value of property.

#### Development of The Weights of The Economic Measures To Be Included In Oklahoma's Economic Index of Taxpaying Ability

The original intent of the index idea was to make it possible to develop measures of relative taxpaying ability to use in place of assessed valuation. No state other than Arkansas has used an ability index completely in this sense. In most cases where an index is used, it is combined in some way with assessed valuation and is, therefore, not used instead of assessed valuation; or in some other respects, property valuation is computed at least in part separate from the index as a means of arriving at the local contribution.

Since the objective is to get a measure of relative taxpaying ability of county units, all measures are expressed as indices. Ability indices are based on state totals of the various measures selected. As an example the influence that income has on the index is the relationship of the income earned within the county to the total income earned in the state. This relationship can be shown as a proportion or per cent. The difference between proportion and per cent is merely a difference in the placement of the decimal point. For instance, if the income of



the people for a given year in a given county divided by the total income of all counties in the state is 0.044, the index of the county expressed as a proportion is 0.044. The other form of expressing it would be 4.4, meaning that 4.4 per cent of the total income in the state is allocable to the county.

Assuming a state policy in which it has been decided to use (a) retail sales, (b) income, and (c) motor vehicle registrations in developing an index to be used in place of assessed valuation, a table such as Table IX might be prepared for five hypothetical counties in a hypothetical state. For each county, each figure is expressed as a per cent of the state total. The relative values shown in column 2 are to be replaced by the index in column 6.

Table IX

## Five Hypothetical Counties With Indices of Taxpaying Ability

County	Various measures as per cents of state totals				
	Assessed valuation	Retail sales (X <sub>1</sub> )	Income (X <sub>2</sub> )	Motor vehicle registrations (X <sub>3</sub> )	An Ability Index (X <sub>p</sub> )
1	2	3	4	5	6
A- - - -	2.25	2.05	2.84	2.23	2.37
B- - - -	0.59	0.34	0.74	0.89	0.66
C- - - -	1.07	0.74	0.82	0.91	0.82
D- - - -	0.33	1.05	0.54	0.62	0.74
E- - - -	18.21	19.22	20.26	18.04	19.17
Other Counties -	77.55	76.60	74.80	77.31	76.24
State Total- - -	100.00%	100.00%	100.00%	100.00%	100.00%

Several techniques of combining and weighting a given set of factors may be used in developing an economic index of taxpaying ability. The simplest possible arrangement in combining the component measures--retail sales, income, and motor vehicle registrations, would be to determine

their simple average. In computing the simple average of these factors, each factor would be weighted equally, since this would consist of adding the three and dividing by three. The result would be the ability index as shown in column six of the table.

The per cent of the state assessed valuation expressed as an index number (for county A, 2.24) might be compared with the calculated index number (for county A, 2.37). Presumably, there is reason to doubt the validity of the index numbers based on proportion of state assessed valuation as an accurate measure of ability, or the state would not resort to a different index in place of them.

The index number as reported in column six may be viewed as a composite of the several measures of ability. In other words, the calculated ability index number has components in it which reflect value of retail sales, total income, and motor vehicle registrations in a given county. As a matter of fact, the three components may easily be identified since the index for each county, (see Table IX) is simply each of the three individual measures reduced to index number form, multiplied by  $1/3$  and summed. A formula may be written as follows:

$$(1) X_p = .333X_1 + .333X_2 + .333X_3.$$

In this formula  $X_p$  is the index of ability;  $X_1$  is the first measure, retail sales expressed in index number form;  $X_2$  is the second measure, income expressed in index number form; and  $X_3$  is the third measure, motor vehicle registrations expressed in index number form.

Where there are more than three measures to be included in determining the index and substituting 'A' for the weight of each measure, the formula could be written as follows:

$$(2) X_p = A_1X_1 + A_2X_2 + A_3X_3 + A_nX_n.$$

In this formula  $A_1$  would be the weight of  $X_1$ ,  $A_2$  would be the weight of  $X_2$ , and  $A_3$  would be the weight of  $X_3$ . The formula could be written to include any number of measures ( $A_n$ ) and weights ( $X_n$ ).

The criteria adopted as a guide for developing an index of taxpaying ability were:

1. The index and all economic measures should be objective; therefore, all data pertaining to these measures should be obtainable from reliable published sources.

2. All economic measures and the index should be independent of the influence of local assessing bodies.

3. Each economic measure should measure some different aspect of the wealth of the state, and a sufficient number should be included in order to represent all the principal elements of the wealth of the state. However, no measure should be included in the index that is not present in every local unit in the state.

4. The measures in the index should be weighted according to a criterion. The criterion to be used should directly correspond to the actual value of property.

5. There should be no overlapping of measures to the extent that double weightings would be given one aspect of wealth of the state.

6. The mathematical formula employed for the development of the index of taxpaying ability should be as sensitive to the small local units as it is to the large local units in predicting relative ability.

7. The index of taxpaying ability should be as equitable as possible without undue complexity in order that the formula be administratively feasible. The fewer measures included in the index, the better will this requirement be met as long as enough measures are included to make the index valid.

The type of formula that will meet the standards given above is a mathematical function that will combine the selected economic measures with weights that assess their relative influence on a valid criterion. This function can be expressed in formula (2), and might properly be called a weighted average.

A study of Table IX reveals a simple method of combining three measures to form an ability index. It was the simple plan of equal weighting for each of the three measures used. Through some form of statistical manipulation it might be decided that a better index of relative ability would result if the retail sales index number was to count three times as much as the index number of motor vehicle registrations and the income index number to count twice as much as the motor vehicle registrations index number. This result may be achieved by a "weighted" average of the three measures written in index form. Such an index can be obtained for county A (with a weighting of three for retail sales, two for income, and one for motor vehicles) by multiplying the figures for that county in columns three, four, and five, respectively, by these weights and dividing the result by the sum of the weights. The result of this manipulation would result in the following formula for the index:

$$(3) X_p = .500_1 \neq .333_2 \neq .167_3.$$

Most states would be expected to adopt formulas for the combining of measures in an index much as has been done in formula (2). It is the prevailing method for combining measures and the one which has been recommended by those who have seriously studied the subject,

including Cornell<sup>15</sup>, Johns<sup>16</sup>, Lee<sup>17</sup>, and Meyer.<sup>18</sup>

There have been a number of proposals for developing mathematical methods of determining weights which would yield the best results. They are all modifications of regression methods which are presented in most elementary statistics texts. In the development of any predictive formula, it is necessary to select one observed measure of what is to be predicted as the validating measure. In this study, the validating measure is referred to as the criterion. The weights of the other measures used in a composite index are determined by their influence and relationship with this validating measure. According to Mort<sup>19</sup>, the best single measure of local ability is the true value of taxable property. Cornell<sup>20</sup> used the true value of real property as determined by the State Tax Commission as the criterion for his index of the taxpaying ability of the counties of New York State. For South Carolina, Alabama, and Florida, assessed valuation was taken as the best available criterion; for Tennessee, the best available criterion was an estimate of true value of real property based on the ratio of assessed value to selected actual sales.

---

<sup>15</sup>Cornell, A Measure of Taxpaying Ability.

<sup>16</sup>Roe L. Johns and Herbert A. Meyer, "Distributing State Funds: How To Estimate Taxpaying Ability of Local School Units," Nation's Schools,

<sup>17</sup>Lee.

<sup>18</sup>Herbert A. Meyer, "A Study of Certain Phases of Local Tax Effort In Relation to Taxpaying Ability In Florida." (unpub. Master's thesis, University of Florida, 1950).

<sup>19</sup>Paul R. Mort, State Support for Public Education, Report of the National Survey of School Finance (Washington, D. C.: The American Council On Education, 1933).

<sup>20</sup>Cornell, A Measure of Taxpaying Ability.

In developing an index of taxpaying ability for Oklahoma, the true value of real property based on the ratio of assessed value to selected actual sales,<sup>21</sup> combined with the assessed valuation of public utilities, and assessed valuation of personal property adjusted to the true value of personal property was used as the criterion for weighting the factors in the index. In any state, the ultimate selection of a criterion on which to develop an economic index of taxpaying ability depends on the available data. Since the primary source of local revenues is property valuation, and since the primary purpose of this study is to develop an objective and equitable index of taxpaying ability based on the value of property; some type of estimate of the real value of property, even though imperfect, would represent the best criterion of taxpaying ability.

It is not the purpose of this study to outline in detail the various mathematical procedures that might be used in determining the weights of the measures to be included in the economic index of taxpaying ability for Oklahoma. However, it was necessary to make a study of the various procedures used by others developing indices of taxpaying ability, in order to determine what method would best fit the guiding standards adopted for this study.

The criteria adopted for this study are, in effect, the same as those adopted by Lee<sup>22</sup> in his study of a technique for the development of an index of relative taxpaying ability of local administrative units. In his study, Lee attempted to analyze all of the various mathematical procedures that had been used, or that might be available that would

---

<sup>21</sup>Oklahoma Real Property Association, Inc., Summary of Real Estate Ratio Study, (Oklahoma City, 1957).

<sup>22</sup>Lee, p. 33.

best fit the guiding standards for the development of the index. Lee studied the use of logarithms, simple weighted averages, broken distributions of measures with separate formulas for each, a method involving relative residuals, grouped homogeneous equations, beta coefficients, and coefficients of part determination in order to determine the method that best fit the guiding standards that he had adopted for developing an economic index of taxpaying ability.

Lee<sup>23</sup> proved by the application of formulas to three states that the coefficients of part determination method showed less average per cent deviation from the criterion than any other method studied. The mathematical formula for developing the weights of the various measures in the index is as sensitive to the small local units as it is to the large local units in predicting relative ability and produces an index that is as equitable as possible without introducing undue complexity and making the index administratively unfeasible. The coefficients of determination method is simple enough that anyone who can compute regression coefficients, standard deviations, and multiple correlation coefficients can apply it to the problem of determining taxpaying ability. This mathematical technic will also enable independent workers to arrive at the same results. Since the coefficients of part determination method meets the requirements adopted in the criteria for this study, this statistical technic is employed for determining the weights of the measures in the study.

Another method more recent than the method developed by Lee, is a plan for determining weights developed by Meyer in collaboration with Johns.<sup>24</sup> This is a modified "regression method" which has all weights

---

<sup>23</sup>Ibid., p. 66.

<sup>24</sup>Herbert A. Meyer and Roe L. Johns, pp. 49-50.

positive and "minimizes" sums of squares of relative residuals. It is a model for forming a "linear combination" similar to formula (2). The method was not applied to any state by its authors, but was tested by Walter Malmberg<sup>25</sup> at the University of Florida by its application to data obtained from the states of Mississippi, Tennessee, South Carolina, West Virginia, Arkansas and Florida. It is possible that this method might have produced a closer fit with a criterion than the method that was used in this study. The method was not used because it violates one of the essential criteria for this study, namely, that the index be as equitable as possible without undue complexity in order that it might be administratively feasible.

Malmberg in his study made mention of the fact that the amount of computation involved in his problem would have been prohibitive without the aid of IBM machines.<sup>26</sup> He made much use of the 602-A Calculating Punch, the 405 Alphabetical Accounting Machine, and the 519 Reproducing Punch. His major field of study was mathematics and he could be considered an expert with the use of statistical techniques. According to the authors of the mathematical technic for weighting under discussion, the method should be used only by statisticians who are experts.<sup>27</sup> The method also has weaknesses in that the results computed by Malmberg gave negative weights for the state of Tennessee and did not produce the best fit with the criterion as compared with other methods

---

<sup>25</sup>Walter Frank Malmberg, *Multivariate Analysis Applied to A Problem In Taxation*, (unpub. Master's Thesis, University of Florida, 1951).

<sup>26</sup>*Ibid.*, p. 14.

<sup>27</sup>Committee on Tax Education and School Finance, "A Method For Calculating An Economic Index of The Taxpaying Ability of Local School Units", Roe L. Johns and Herbert A. Meyer, ed. (Washington, D. C., 1952), p. 6.



in the case of South Carolina.<sup>28</sup> This method has never been used by any state in the actual application of an economic index of taxpaying ability to its school finance program. The complexity resulting in its use would clearly be unacceptable, a complexity that might overwhelm not only supporting professional organizations, but laymen and legislators as well.

#### Coefficients of Part Determination

The coefficient of part correlation was developed in 1926 by Ezekiel and Smith and is reported in a publication by Smith.<sup>29</sup> The coefficient of part correlation is a statistical device for measuring the separate effect of individual variables on the dependent variable. The measure applied to the variables in a linear multiple regression equation determined by least square methods. This coefficient measures:

.....the amount of correlation between each independent variable and the variation remaining in the dependent variable after the estimated effects of the other independent variables have been eliminated.<sup>30</sup>

The symbol expressing this correlation is  $Ol^r_{2345}$ . If the multiple regression equation with five independent variables is expressed by:

$$(4) X_p = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + k, \text{ then } Ol^r_{2345}$$

equals the correlation between  $X_1$  and  $(X_p - b_2X_2 - b_3X_3 - b_4X_4 - b_5X_5)$ .

The coefficient of part determination is defined simply as the square of the coefficients of part correlation. The computation is facilitated by the formula.<sup>31</sup>

---

<sup>28</sup>Malmberg, p. 36.

<sup>29</sup>B. B. Smith, "Correlation Theory and Method Applied to Agricultural Research," U. S. Department of Agriculture Publication, (Washington, D. C., 1926), pp. 57-60.

<sup>30</sup>Mordecai Ezekiel, Methods of Correlation Analysis, (2nd ed., New York, 1930), pp. 181-183.

<sup>31</sup>Ibid., pp. 379-80.

$$(5) \quad OI^2_{2345} = \frac{b_1^2 \sigma_1^2}{b_2^2 \sigma_1^2 + \sigma_0^2 (1 - R_0^2 \cdot 12345)},$$

where R represents the multiple correlation coefficient and  $\sigma_1$  represents the standard deviation of the  $X_1$  distribution. The b's in this formula stand for the regression coefficients. O is the dependent variable or criterion and 1, 2, 3, 4, and 5 represent the independent variables or measures.

The coefficients of part determination measure:

.....they may be explained as measuring the proportion of variance remaining in the dependent variable after the net effects of the other variables are taken account of, which can be explained by adding the additional factor.<sup>32</sup>

As an illustration, if  $OI^2_{2345}$  were .316, it would mean that  $X_3$  would account for 31.6 per cent of the variance in  $X_p$  (index of ability) when the other variables are taken account of.

In the basic formula for predicting relative ability,

$$(6) \quad X_p = A_1 X_1 + A_2 X_2 + A_3 X_3 + A_4 X_4 + A_5 X_5,$$

if both sides of the equation are summed, then

$$(7) \quad X_p = A_1 \Sigma X_1 + A_2 \Sigma X_2 + A_3 \Sigma X_3 + A_4 \Sigma X_4 + A_5 \Sigma X_5.$$

Since  $X_p$  means the sum of the percentages of the state's property values for all counties, its value must be 100 per cent or 1. In like manner, the values  $\Sigma X_1$ ,  $\Sigma X_2$ ,  $\Sigma X_3$ ,  $\Sigma X_4$ , and  $\Sigma X_5$  are also unity. Therefore, equation (4) becomes:  $A_1 + A_2 + A_3 + A_4 + A_5 = 1$ .

Since it is apparent that the weights should sum to unity, every combination of weights by any technique should be adjusted in order to meet this requirement. If this adjustment is not made, it is necessary to divide the index of each county by the total in order to determine

---

<sup>32</sup>Ibid.

its relative ability in per cents. The former procedure is decidedly preferred. Then the respective weights,  $A_1$  can be defined in terms of coefficients of part determination. For example:

$$A_4 = \frac{04r^2_{1235}}{01r^2_{2345} + 02r^2_{1345} + 03r^2_{1245} + 04r^2_{1235} + 05r^2_{1234}}$$

Using the five selected measures for the state of Oklahoma, the formula for computing the index of relative taxpaying ability obtained by use of coefficients of part determination gives:

$$(8) X_p = .141 X_1 + .237 X_2 + .223 X_3 + .316 X_4 + .082 X_5.$$

In Chapter V, the value of each measure and the computed index for all of the seventy-seven counties of Oklahoma are presented.

Ordinarily, in the development of an economic index of taxpaying ability, the selection of a weighting technique whereby the economic index of taxpaying ability might be made to give as near the same index of ability as the criterion would be the paramount concern of the individual developing the index. There are some observations that should be made concerning this viewpoint.

Cornell was chairman of a committee on Tax Education and School Finance of the National Education Association that made the following observations concerning mathematical technics for weighting measures in economic indices of taxpaying ability.

There is some question as to how refined statistical adjustments for determining weightings may be justified, particularly if no criterion exists. Some research studies on the subject go about the question as if there were one unique solution to the weightings to be applied to the indices. In these studies technicians are striving for a method which will result in "independent workers" arriving at "exactly the same weights for the same factors". Of course, it is possible by imposing certain definitions and adopting a particular mathematical approach to achieve this end, but it is questioned whether this is desirable in

developing measures which are at best approximations. Moreover, the restrictions imposed by one group may not be acceptable to another.<sup>33</sup>

The Committee further observes:

High refinement in technic for determining weightings is also hardly justified on account of the sampling variation of the weights. For instance, a weight for one variable worked out for a given year with a given set of data might be 0.16359, and for the very next year by the same refined method might be 0.15436. Because of the instability of weights it seems absurd to carry them, regardless of what method, to an extreme number of decimal places. Undoubtedly, two decimals should be the maximum to be used in view of mathematical adequacy as well as logical considerations of technics developed to date. In the latter case, 0.15 or 0.16 is obviously as close as it is worth approximating a weight, for it is to be emphasized again that indices of ability and the weights used in them are at best approximations.<sup>34</sup>

Arkansas and Mississippi are the only states which had weights in their indices of taxpaying ability developed by highly refined mathematical methods. A study by an Arkansas State Legislative Council in 1952<sup>35</sup> pointed out that the number of decimal places, carried in the Arkansas weights, suggested considerably more precision than existed in their determination. This study resulted in Arkansas dropping the complex six-decimal weightings and adopting weights in fraction form in the legislative session of 1957.

Another reason why highly refined mathematical formulas for determining weights are not justified is that the relationships between variables involved are highly unstable and highly irregular. Very few

---

<sup>33</sup>Committee on Tax Education and School Finance, The Index of Local Economic Ability, p. 35.

<sup>34</sup>Ibid., p. 36.

<sup>35</sup>Arkansas State Legislative Council. A Survey of Public Education, (Little Rock, 1952).

states have relatively similar or homogeneous counties with regard to economic characteristics. As a consequence, scatter diagrams showing the interrelationships of variables exhibit many kinds of unusual situations that invalidate most assumptions of homogeneity of variance and linearity which is required in most available technical methods of determining weights. The weights used in this study will be carried out to only three decimal places.

In a mistaken view of the ability index, some believe it should determine the actual property tax revenue-raising potential of a local district. It does not do this. Only state supervision of assessments reflects the actual property tax revenue-raising potential of a local district. The economic index of taxpaying ability should be considered as an interim measure in encouraging improvement of assessment practices. Failure to completely understand the index has possibly restricted or limited its use in various states. Even in Alabama, which has had an index for 18 years, the complaint is made that too many laymen do not understand the working of the index. These difficulties in explaining the index argue in favor of as much simplicity as possible and against weightings the typical citizen cannot understand.

The index is better than assessed valuation, where assessed valuation is determined by local officials on a competitive underassessment basis, in that the index is more objective, stable and equitable.

According to a statement published by a Committee on Tax Education and School Finance of the National Education Association:

The greatest value of the index is as a temporary device in the transition to better property tax assessment; it does not replace good assessment nor does it measure actual taxpaying ability, but it does allow local units to approach either without penalty. By relieving the pressure for under-assessment to receive more state aid, the index makes it easier to establish either state supervised assessments or

state determination of the ratio of assessed to true value for distribution of state aid.<sup>36</sup>

The statement of the Committee on Tax Education and School Finance just quoted, clearly states one value of an economic index of taxpaying ability. The index will relieve the pressure for under-assessing property values in order to receive more state equalization aid. The index is entirely objective and free of local political manipulation.

The index developed in this study is limited, however, in that although it will improve on the objectivity and equity of distributing state equalization aid to county units of government, it will have no effect on inequities existing within counties. The only consolation that might be given in this matter is the supposition that each county assessor has a standard method or procedure whereby assessments are made within his local county jurisdiction and thus the inequities within the county are minimized.

#### Summary

This chapter involved listing the criteria adopted for this study and selecting and weighting measures according to the guiding standards.

The first step in selecting economic measures for inclusion in the index of taxpaying ability involved determining possible measures and categorizing the possible measures under acceptable headings. After the possible measures were categorized, each category was analyzed and specific measures selected for inclusion in the index according to the criteria adopted for the study. The measures selected are as follows:

1. Assessed valuation of railroads and public service companies.
2. Retail sales and use tax receipts.

---

<sup>36</sup>Committee on Tax Education and School Finance, The Index of Local Economic Ability, p. 54.

3. Income to individuals.
4. Automobile vehicle license receipts.
5. Gainfully employed workers.

The basic formula developed for predicting relative taxpaying ability was:  $X_p = A_1X_1 + A_2X_2 + A_3X_3 + A_4X_4 + A_5X_5$ . In this formula  $X_p$  is the index of ability, the X's are the measures in the formula, and the A's are the weights to be given each measure. The true value of real property based on the ratio of assessed value to selected actual sales, combined with the assessed valuation of public utilities, and assessed valuation of personal property valuations adjusted to the true value of real property, was used as a criterion to develop weights for the measures in the index and as a validation measure.

The weights of the measures included in the formula were determined by coefficients of part determination. This is a statistical technic used by Lee that was adopted for this study because, (1) it is sufficiently objective to enable independent workers to obtain the same results, (2) always predicts within the range of the economic evidence, (3) is administratively feasible, (4) is not subject to manipulation by local authorities, and (5) is more equitable and sensitive to the local administrative units than other statistical measures. In the study made by Lee, the use of coefficients of part determination in developing the weights of measures in an index produced the best fit with the criterion than any other method. Its application to this study presented no complications.

Using the five measures selected for inclusion in Oklahoma's economic index of taxpaying ability, the index obtained by the use of coefficients of part determination gives:

$X_p = .141 X_1 + .237 X_2 + .223 X_3 + .316 X_4 + .082 X_5$ . In this formula  $X_p$  represents the index of ability,  $X_1$  represents public utilities valuation,  $X_2$  represents retail sales,  $X_3$  represents income to individuals,  $X_4$  represents auto license receipts, and  $X_5$  represents gainfully employed workers.



## Chapter V

### APPLICATION OF THE INDEX OF TAXPAYING ABILITY TO SCHOOL UNITS

This chapter will present the index of taxpaying ability that has been developed for each of the seventy-seven counties in Oklahoma. A method of applying the index for distributing state equalization aid to the seventy-seven counties and to local school districts will be explained. Since Oklahoma at the present time has local school districts whose boundaries may be all within one county or whose boundaries encompass territory in two or more counties, a method will be discussed whereby the county index of taxpaying ability may be used as a guide for distributing state equalization aid among all local school districts.

The composite index of taxpaying ability for each county for the year 1956 is listed in Table X together with the value of each component measure. In Table X, the first column of figures indicates the per cent of public utilities valuation in each county of Oklahoma, and each of the other columns indicates the per cent retail sales, income to individuals, auto license receipts, gainfully employed workers, and ability index, respectively allocable to each county. The data for each measure are expressed in the county's per cent of the state total. Thus, the data for each measure total one hundred per cent. In order to determine the last column in Table X, the economic index of ability for each county, the weights as determined in formula (8) of Chapter IV must be multiplied by the respective measures which they determine. For instance, in Adair county, the economic index of ability is determined by multiplying .141 times the per cent of public utilities in Adair county, .237 times

Table X  
An Index of The Taxpaying Ability of Oklahoma Counties

County	Per Cent of State Total					Index of <sup>6</sup> Relative Ability
	Public <sup>1</sup> Utilities Valuation	Retail <sup>2</sup> Sales	Income to <sup>3</sup> Individuals	Auto <sup>4</sup> License Receipts	Gainfully <sup>5</sup> Employed Workers	
Adair	.401	.214	.268	.271	.197	.269
Alfalfa	.673	.249	.435	.418	.057	.388
Atoka	.575	.198	.310	.245	.099	.283
Beaver	1.812	.120	.312	.290	.102	.382
Beckham	.904	.694	.653	.826	.529	.743
Blaine	.518	.365	.473	.496	.197	.438
Bryan	1.005	.720	.724	.903	.493	.800
Caddo	2.011	.884	1.020	1.133	.406	1.112
Canadian	3.165	.720	.870	1.254	.414	1.242
Carter	1.730	2.219	2.504	1.973	2.008	2.118
Cherokee	.085	.317	.305	.417	.113	.296
Choctaw	.487	.323	.383	.359	.318	.371
Cimmaron	.768	.145	.204	.208	.062	.259
Cleveland	1.198	1.247	1.337	2.012	.709	1.457
Coal	.212	.125	.163	.161	.033	.149
Comanche	1.143	2.355	3.513	2.485	1.771	2.435
Cotton	.283	.207	.306	.382	.125	.288
Craig	.997	.486	.490	.603	.312	.582
Creek	3.252	1.351	1.464	1.766	1.177	1.761
Custer	.823	.765	.705	.883	.425	.769
Delaware	.225	.172	.238	.380	.153	.258
Dewey	.203	.160	.225	.257	.024	.200
Ellis	.484	.155	.259	.231	.038	.239
Garfield	2.163	2.504	2.603	2.317	2.441	2.414
Garvin	1.936	1.477	1.002	1.373	.885	1.351
Grady	1.848	1.198	1.068	1.379	.859	1.290
Grant	.740	.240	.426	.453	.067	.405
Greer	.212	.261	.294	.367	.131	.284
Harmon	.185	.191	.295	.247	.061	.220
Harper	.504	.143	.203	.254	.040	.234

<sup>1</sup>Oklahoma Tax Commission, 1956.

<sup>2</sup>Oklahoma Tax Commission, 1956.

<sup>3</sup>Business Research Bureau, University of Oklahoma, 1955.

<sup>4</sup>Oklahoma Tax Commission, 1956.

<sup>5</sup>Oklahoma Employment Security Commission, June, 1956.

<sup>6</sup>Combination of measures 1, 2, 3, 4, and 5, multiplied by their respective weights as determined by formula (8) in Chapter IV.

Table X (continued)

## An Index of The Taxpaying Ability of Oklahoma Counties

County	Per Cent of State Total					Index of Relative Ability
	Public Utilities Valuation	Retail Sales	Income to Individuals	Auto License Receipts	Gainfully Employed Workers	
Haskell	.231	.190	.260	.246	.136	.225
Hughes	1.138	.431	.526	.569	.380	.591
Jackson	.756	.924	1.215	.984	.527	.951
Jefferson	.648	.229	.298	.393	.060	.341
Johnston	.383	.144	.222	.210	.040	.204
Kay	2.620	2.467	2.612	2.610	2.825	2.596
Kingfisher	.437	.342	.496	.545	.132	.436
Kiowa	.777	.530	.566	.671	.286	.597
Latimer	.365	.110	.167	.157	.052	.169
Le Flore	1.322	.601	.638	.851	.334	.768
Lincoln	2.354	.546	.713	.816	.340	.906
Logan	1.442	.569	.726	.801	.503	.795
Love	.426	.100	.161	.203	.055	.188
Mc Clain	.946	.306	.395	.507	.137	.466
Mc Curtain	.373	.480	.568	.524	.470	.498
Mc Intosh	.464	.263	.334	.347	.040	.315
Major	.429	.182	.321	.335	.064	.286
Marshall	.285	.213	.246	.294	.196	.255
Mayes	.825	.545	.467	.699	.389	.603
Murray	.331	.374	.408	.516	.229	.408
Muskogee	2.545	2.206	2.268	2.127	2.453	2.263
Noble	1.024	.472	.435	.504	.258	.534
Nowata	.606	.394	.460	.586	.390	.499
Okfuskee	1.347	.279	.362	.384	.173	.472
Oklahoma	10.600	26.149	20.779	19.840	27.116	20.846
Oklmulgee	1.440	1.256	1.602	1.494	1.579	1.461
Osage	3.354	1.105	1.132	1.733	.741	1.596
Ottawa	1.165	1.180	1.177	1.374	1.438	1.260
Pawnee	.886	.332	.407	.600	.117	.794
Payne	1.637	1.616	1.520	1.762	1.279	1.616
Pittsburg	1.517	1.128	1.357	1.254	.934	1.258
Pontotoc	1.176	1.189	1.509	1.262	1.261	1.288
Pottawatomie	2.038	1.584	1.843	1.769	1.658	1.770
Pushmataha	.384	.180	.228	.202	.076	.218
Roger Mills	.205	.099	.211	.200	.008	.163



its per cent of retail sales, .223 times the per cent of income to individuals, .316 times per cent of auto license receipts, and .082 times the per cent of gainfully employed workers; giving an ability index of .269 for Adair county when the results are added.

The last column of Table X lists the index of relative taxpaying ability for each of the seventy-seven counties in Oklahoma. All of the states employing economic indices of taxpaying ability determine the amount to be contributed toward the minimum program by each county unit by simply multiplying each county's index by the total amount of funds to be contributed by all of the county units. All of the states with the exception of Texas and Mississippi determine the amount of funds to be contributed by all the county school units on the basis of a uniform millage rate applied to the total assessed property valuation of the state. In the Texas and Mississippi school finance plans, the amount of contribution to the partnership plan to be made by the county units is set at an arbitrary figure and each county unit's pro rata share determined by its economic index of taxpaying ability.

The method of determining the amount to be contributed by all the county units is not important, as long as the amount determined is reasonable in relation to the total cost of the minimum program and the sources of revenue available from county sources to pay for it. Assuming that the minimum program of education for Oklahoma is determined by the method discussed on page 16 to cost \$90,000,000 for the year 1956 and that the total local contribution required is one-half or \$45,000,000 of the minimum program costs, each of the county fiscal units would be required to raise from ad valorem taxes an amount equal to its economic index of relative ability (shown in Table X) multiplied by \$45,000,000. For example, Kingfisher county would be required to

raise from ad valorem taxes an amount equal to its index of relative ability (.436 per cent) multiplied by the total amount required of all seventy-seven county units (\$45,000,000). The computation of Kingfisher county's required contribution toward the minimum program of education in the county would result in a figure of \$196,200. Assuming that the minimum program cost of education in Kingfisher county was determined to be \$300,000, the amount of state equalization aid to be granted the county would be \$103,800 (\$300,000 minus \$196,200).

It is relatively easy to apply an economic index of relative tax-paying ability to county units of government. It is another matter to apply the index to school districts whose boundaries are not coterminous with county units. The only practical way to apply an index developed on a county unit basis to school districts within the county would be on the basis of each school district's portion of the assessed valuation of the county. Texas and Arkansas, whose school districts are not coterminous with the county unit, apply their indices of taxpaying ability developed on a county unit basis in this manner.

The application of the index to those school units or districts whose boundaries are wholly within the boundaries of the county will be relatively simple. For example, in Kingfisher county, the Kingfisher school district has a valuation of \$6,488,265 of the total county assessed valuation of \$22,973,411. All of the area encompassed by the Kingfisher school district is within the boundaries of Kingfisher county. The Kingfisher school district would have 28.242 per cent of the assessed valuation in Kingfisher county and would be required to raise 28.242 per cent of the total required local contribution required of Kingfisher county on the basis of its index of relative ability.

Where a school district's boundaries included an area in two or more counties, the application of the index would be somewhat more complex. In computing the contribution required of such a district, the per cent of the assessed valuation within the school district of the total assessed valuation in each county would be multiplied by that county's required amount of contribution and the totals added to get the school district's total local required contribution. For example, Temple school district has territory in both Cotton and Stephens counties. In Table XI, the computation of the local contribution required of Temple school district under a partnership plan of equalization is based on an economic index of relative taxpaying ability.

Table XI

Local Contribution Required of Temple School District Based  
On The Application of An Economic Index of Taxpaying Ability

County	Assessed Valuation	Temple Dist. Valuation In County	Temple Per Cent of County Val.	Required Contribution For County	Temple Dist. Required Contribution
Cotton - -	\$7,957,417	\$2,439,538	30.70000	\$129,600	\$39,787
Stephens - -	\$34,414,248	\$19,065	.00055	\$898,650	\$494
DISTRICT TOTALS - -		\$2,458,603			\$40,281

A study of Table XI indicates that the Temple school district has a total valuation of \$2,458,603 in Cotton and Stephens counties. This table indicates that Temple school district has 30.7 per cent of the valuation in Cotton county and .00055 per cent of the valuation in Stephens county. Charging the Temple district with its per cent of valuation in each county by the contribution required of that county on the basis of its economic index figure multiplied by \$45,000,000 (contribution required of total counties of the state) gives the required

contribution required of the Temple school district. The total contribution required of the Temple school district toward the minimum program of education is shown to be \$40,281. Temple school district would be charged this amount toward the minimum program of education in its local district and would be distributed state equalization aid to pay for the remainder of the minimum program costs.

#### Summary

This chapter lists the index of ability in table form for each of the seventy-seven counties in Oklahoma. The table lists public utilities valuation, retail sales, income to individuals, auto license receipts, gainfully employed workers and the index of relative ability for each of the seventy-seven counties of Oklahoma. These measures were all expressed in per cent of the state total.

A method for applying the index to the county unit for distributing state equalization aid to the county unit was explained, and a method was discussed whereby the index might be used for distributing state equalization aid to school districts within or among county units.



## Chapter VI

### SUMMARY AND RECOMMENDATIONS

#### Summary

In a partnership plan of school finance between the state and local school units of government, a fair and equitable measure of relative taxpaying ability of each county or local unit is needed in order to equalize the distribution of funds from state sources. Measures of local taxpaying ability should be closely related to property valuations since the property tax is the chief local source of school funds. If property valuation is to be the basis for raising local revenue, the best measure of local taxpaying ability should be the actual value of property.

Where appraisal of property value is left solely to the local administrative agencies, such as to the county assessor in Oklahoma, such estimates of property are often known to be subject to manipulation and competitive underassessment. In Oklahoma, studies made by Martin and Pugmire determined that the ratio between actual and assessed value varied widely throughout the state. An Oklahoma Tax Commission Study made in 1948 showed that the relation between actual and assessed value varied as much as 22 per cent among counties in the state.

The problem, therefore, was to develop a measure of relative taxpaying ability for Oklahoma corresponding to actual property valuations in each county that might be used as a basis for objective and equitable distribution of state equalization funds among school districts in each county.

There are three positions a state may take with regard to the assessment of property. If the state gives authority to a central body to make property assessments, there is very little need for an index of relative ability. However, if the state is not given the power of assessment, but only supervision of local assessments, an index is useful as a check on local assessing officials in providing equitability. The third position prevails in most of the forty-eight states--the power of assessment is jealously and completely dominated by local assessing officials. Oklahoma has county assessment officials who assess all real and personal property, other than public utilities, within their county jurisdiction. Under this system, an index of relative taxpaying ability would be helpful as a means of distributing the financial burden of supporting an adequate statewide educational program.

The development of an economic index of taxpaying ability of counties in Oklahoma involved developing criteria for the study to: (1) select economic measures of ability to include in the index, (2) determine a method to weight the economic measures in the index, and (3) select a suitable criterion by which to weight the index.

A study was made of the development and application of economic indices of taxpaying ability by authorities in other states. Studies made by Mort, Cornell, Johns, Meyer, and Lee were especially helpful to the author in developing an index for Oklahoma. The published school laws of the states of Alabama, Arkansas, Georgia, Florida, Mississippi and Texas were studied. Supplementary and explanatory material obtained from authorities in states using economic indices of taxpaying ability was received. An economic index of taxpaying ability was developed for Oklahoma and its application to school units described.

The criteria adopted for this study were selected in view of the specific problem of developing an economic index of relative taxpaying ability for Oklahoma in relation to other studies made of economic indices of taxpaying ability. The criteria adopted for this study were:

1. The index and all economic measures should be objective; therefore, all data pertaining to these measures should be obtainable from reliable published sources.

2. All economic measures and the index should be independent of the influence of local assessing bodies.

3. Each economic measure should measure some different aspect of the wealth of the state, and a sufficient number of measures should be included in order to represent all the principal elements of the wealth of the state. However, no measure should be included in the index that is not present to some degree in every local unit in the state.

4. The measures in the index should be weighted according to some criterion. The criterion to be used should directly correspond to the actual value of property.

5. There should be no overlapping of measures to the extent that double weightings would be given one aspect of wealth of the state.

6. The mathematical formula employed for the development of the index of taxpaying ability should be as sensitive to the small local units as it is to the large local units in predicting relative ability.

7. The index of taxpaying ability should be as equitable as possible without undue complexity in order that the formula be administratively feasible. The fewer measures included in the index, the better will this requirement be met as long as enough measures are included to make the index valid.

The measures selected for inclusion in the economic index of taxpaying ability for Oklahoma on the basis of the criteria formulated were as follows:

1. Assessed valuation of railroads and public service companies.
2. Retail sales and use tax receipts.
3. Income to individuals.
4. Automobile vehicle license receipts.
5. Number of gainfully employed workers.

The true value of real property based on the ratio of assessed value to selected actual sales, assessed valuation of personal property valuations adjusted to the true value of personal property, combined with the assessed valuation of public utilities, was used as a criterion to develop weights for the measures in the index and as a validation measure. The basic formula developed for predicting relative ability was:  $X_p = A_1X_1 + A_2X_2 + A_3X_3 + A_4X_4 + A_5X_5$ . In this formula;  $X_p$  is the index of ability,  $X_1$ ,  $X_2$ ,  $X_3$ ,  $X_4$ , and  $X_5$  are the measures in the formula, and  $A_1$ ,  $A_2$ ,  $A_3$ ,  $A_4$ , and  $A_5$  are the weights to be given each measure.

The weights of the measures included in the formula were determined by coefficients of part determination. This is a statistical technic used by Lee that was adopted for this study because Lee proved, (1) it is sufficiently objective to enable independent workers to obtain the same results, (2) always predicts within the range of the economic evidence, (3) is administratively feasible, (4) is not subject to manipulation by local administrative units than other statistical technics. In the study made by Lee, the use of coefficients of part determination in developing the weights of measures in an index produced the best fit with the criterion than any other method. The application of the formula to this study presented no complications.

### Recommendations

The following recommendations are made:

1. The Oklahoma Legislature enact into state law, provisions for the utilization of an economic index of taxpaying ability as a guide for the distribution of state equalization aid.

2. A State Research Agency be created and subsidized to make a study of possible measures that might be included in economic indices of taxpaying ability for Oklahoma that are not now available. This agency should also be charged with the responsibility of compiling all current statistics on the measures to be included in the index.

## SELECTED BIBLIOGRAPHY

- Arkansas State Legislative Council, A Survey of Public Education, (Little Rock, 1952).
- Bureau of Business Research, Income to Individuals, University of Oklahoma Mimeograph Report (Norman, 1957).
- Committee on Tax Education and School Finance, A Method For Calculating An Economic Index of The Taxpaying Ability of Local School Units. /Roe L. Johns and Herbert A. Meyer, ed./ (Washington, D. C., 1952).
- Committee on Tax Education and School Finance, GUIDES--to the Development of State School Finance Programs. National Education Association Bulletin, (Washington D. C., 1949).
- Committee on Tax Education and School Finance, The Index of Local Economic Ability in State School Finance Programs, National Education Association Bulletin, (Washington, D. C., 1953).
- Cornell, Francis G. "Grant-in-Aid Apportionment Formulas," Journal of The American Statistical Association, March, 1947.
- Cornell, Francis G. "A Measure of Taxpaying Ability of Local School Administrative Units," (New York: Teachers College, Columbia University, 1936).
- Cornell, Francis G., and Johns, Roe L. "Alabama's New Index of Local Ability To Pay For Education," School Executive, June, 1941.
- Council of State Governments, The Forty-Eight State School Systems, (Chicago, 1949).
- Cubberley, Ellwood P. Public Education in The United States (rev. ed., Boston: Houghton Mifflin Company, 1934), p. 180.
- Ezekiel, Mordecai. Methods of Correlation Analysis, (2nd ed., New York, 1930).
- Hagen, Hal E. "Three Basic Problems in Financing Oklahoma's Schools," The Oklahoma Teacher, April, 1956.
- Johns, R. L. An Index of The Financial Ability of Local School Systems to Support Public Education, Alabama State Department of Education, (Montgomery, 1938).
- Johns, Roe L. and Meyer, Herbert A. "Distributing State Funds: How To Estimate Taxpaying Ability of Local School Units," Nation's Schools, February, 1952.

## BIBLIOGRAPHY (Continued)

- Lee, Robert E. "A Technique For The Development of An Index of Relative Taxpaying Ability of Local Administrative Units" (unpub. Ed. D. dissertation, University of Florida, 1950).
- Malmborg, Walter Frank. "Multivariate Analysis Applied To A Problem in Taxation," (unpub. Master's Thesis, University of Florida, 1951).
- Martin, Jesse W. "The Development of State Support of The Public Schools of Oklahoma and Recommendations For A Better State Guaranteed Program." (unpub. Ed. D. dissertation, University of Tulsa, 1955).
- Meyer, Herbert A. "A Study of Certain Phases of Local Tax Effort In Relation to Taxpaying Ability In Florida." (unpub. Master's Thesis, University of Florida, 1950).
- Meyer, Herbert A. and Johns, R. L. A Method of Calculating An Economic Index of The Taxpaying Ability of Local School Units, NEA Committee on Tax Education and School Finance Bulletin No. 34 (Washington, 1952).
- Mort, Paul R. Federal Support For Public Education, Bureau of Publications, Teachers College, (Columbia University, 1936).
- Mort, Paul R., et al. Research Problems In School Finance, Report of The National Survey of School Finance (Washington, D. C.: The American Council On Education, 1933).
- Oklahoma Employment Security Commission, Oklahoma Labor Market, Research and Planning Division Publication, (Oklahoma City, 1957).
- Oklahoma Real Property Association, Inc., Summary of Real Estate Ratio Study, (Oklahoma City, 1956).
- Oklahoma Tax Commission, A Certified Study Made To The State Department of Education, (Oklahoma City, 1948).
- Oklahoma Tax Commission, Biennial Report, (Oklahoma City, 1956).
- Oklahoma Tax Commission, Oklahoma Sales Tax and Use Tax. A Statistical Report, (Oklahoma City, 1957).
- Public Schools of South Carolina. A Report of The South Carolina Educational Survey Committee, Division of Surveys and Field Services, (George Peabody College For Teachers, Nashville, 1948).
- Pugmire, Ross. Oklahoma's Children and Their Schools, Oklahoma Education Association Publication, (Oklahoma City, 1950).
- Smith, B. B. "Correlation Theory and Method Applied To Agricultural Research," Bureau of Agricultural Economics, (U. S. Dept. of Agri., 1926).

APPENDIX



C O P Y

STATE OF FLORIDA  
DEPARTMENT OF EDUCATION  
TALLAHASSEE, FLORIDA

July 11, 1957

Mr. L. W. Westfall  
Temple Public Schools  
Office of Superintendent  
Temple, Oklahoma

Dear Mr. Westfall:

I have your letter of July 1 addressed to Dr. R. E. Lee regarding the Florida Index of Taxpaying Ability. Dr. Lee is no longer with the State Department of Education, having accepted the presidency of Georgia State College for Women at Milledgeville.

I am sending you some materials explaining the Florida Index. This index is well accepted in Florida. We realize that it is not perfect but in the absence of any form of tax equalization at the state level it appears to be working satisfactorily.

Probably the outstanding authority in the United States in the area of indices of taxpaying ability is Dr. R. L. Johns, College of Education, University of Florida, Gainesville, Florida. Dr. Johns has been instrumental in developing the indices now in use in most of the states having such plans. I feel confident that you could obtain some materials from him.

Please let us know if we can be of further assistance.

Cordially yours,

Mitchell Wade  
Specialist in Research  
and Statistics

C O P Y

STATE OF MISSISSIPPI  
DEPARTMENT OF EDUCATION  
JACKSON, MISSISSIPPI

July 11, 1957

Mr. L. W. Westfall, Superintendent  
Temple Public Schools  
Temple, Oklahoma

Dear Mr. Westfall:

Mr. Cain will be out of the office a few days, and in his absence I am answering your letter in regard to the economic index of tax-paying ability in Mississippi.

I am sending you the Laws of 1953 which establishes the economic index as a basis for figuring the local contribution of counties and separate school districts. I am also sending an article on financing the public schools, written by G. J. Cain, and also a bulletin published by the State Tax Commission giving the economic index worked out in detail for each county.

You may want to correspond further with Mr. Cain, since he played a vital part in helping to get the economic index passed by our legislature. It has proven very satisfactory in our state and seems to be a much more equitable basis rather than simply using assessments on property to determine local contribution.

Sincerely yours

Ruby M. Thompson, Assistant Director  
Administration and Finance

C O P Y

STATE OF ALABAMA  
DEPARTMENT OF EDUCATION  
MONTGOMERY, ALABAMA

July 12, 1957

Mr. L. W. Westfall, Superintendent  
Temple Public Schools  
Temple, Oklahoma

Dear Mr. Westfall:

In response to your inquiry of July 9, I am pleased to enclose a reprint from The School Executive (June 1941) describing the Economic Index, which is still in use in Alabama. I assume you understand that we use an average index which is obtained from the Economic Index and an assessed valuation index.

I am also enclosing a copy of a bulletin entitled ABC's OF THE MINIMUM PROGRAM which is fairly current with respect to the manner of calculating the four items which go to make up our Minimum Program.

Sincerely yours,

N. F. Greenhill, Director  
Division of Administration and Finance

C O P Y

STATE OF ARKANSAS  
DEPARTMENT OF EDUCATION  
LITTLE ROCK, ARKANSAS

July 12, 1957.

Mr. L. W. Westfall, Supt.  
Temple Public Schools,  
Temple, Oklahoma.

Dear Mr. Westfall:

This will acknowledge receipt of your request for a copy of the Minimum Foundation Program Law for the State of Arkansas which uses an economic index to determine local ability to support the school program.

I am also enclosing an application form which may be of some value to you.

Please advise if other data are needed or if further clarification is necessary.

Very truly yours,

H. Z. Snell, Director  
Budgets and Loans

C O P Y

NATIONAL EDUCATION ASSOCIATION

1201 SIXTEENTH STREET

WASHINGTON 6, D. C.

July 16, 1957

Mr. L. W. Westfall  
Superintendent  
Temple Public Schools  
Temple, Oklahoma

Dear Mr. Westfall:

This will acknowledge your letter of July 9. The Research Division does not have any information on the "Economic index" of taxpaying ability other than that provided in the October 1953 report of the Committee on Tax Education and School Finance which you have and in our School Finance System series (a set is being mailed to you). You may find it advisable to glance thru these one-page descriptions for more recent developments and then write each state for copies of their laws pertaining to the use of the indirect measure of taxpaying ability. We are able to bring this information up to date only about every six or seven years and you may want to contact each state department with your own inquiry. If you should decide to do this we would like to have a copy of your report.

Cordially yours,

Sam M. Lambert  
Director, Research Division

C O P Y

STATE OF WEST VIRGINIA  
STATE BOARD OF SCHOOL FINANCE  
CHARLESTON, WEST VIRGINIA

July 12, 1957

Mr. L. W. Westfall, Superintendent  
Temple Public Schools  
Temple, Oklahoma

Dear Sir:

There is criticism of the present method of determining local share, or taxpaying ability, in West Virginia. Some consider that the fluctuations occurring annually in some counties are too great to permit planning a long range program. Others complain that the results are unrealistic. I might point out that these complaints were among those made when an index was used.

It is my opinion that there will not be a change in the present system for some time. Under the circumstances it is basically a preferable system and some adjustments may make it more acceptable.

If I can be of further assistance, feel free to call on me.

Sincerely yours,

William K. Hamilton, Supervisor,  
County School Budgets,  
STATE BOARD OF SCHOOL FINANCE

C O P Y

TEXAS EDUCATION AGENCY

STATE DEPARTMENT OF EDUCATION

AUSTIN, TEXAS

July 17, 1957

Mr. L. W. Westfall, Superintendent  
Temple Public Schools  
Temple, Oklahoma

Dear Mr. Westfall:

Your letter of July 9 addressed to the State Board of Education has been referred to this Division.

Enclosed you will find data on the economic index from its inception in the statutes of this state. There have been changes in the law since its inauguration in 1949 and they have been included. You will note, on page 24 of the enclosed pamphlet on Gilmer Aiken Laws a full description of the economic index. The first three years of the operation of the law, no change was made in the total sum of local fund. In 1954-55, the total was set at \$51,600,000 for the school year, 1955-56 the total sum was \$52,450,000. In 1956-57 it was changed to \$55,648,000 and for 1957-58 it will be \$64,205,000.

If you have any questions about the index after reading the enclosed data, I shall be glad to correspond further with you.

Sincerely yours,

J. S. Conradt, Supervisor  
Reports and Statistics

C O P Y

STATE DEPARTMENT OF EDUCATION

STATE OFFICE BUILDING

ATLANTA 3, GEORGIA

July 23, 1957

Mr. L. W. Westfall, Supt.  
Temple Public Schools  
Temple, Oklahoma

Dear Mr. Westfall:

This will acknowledge the receipt of your letter of July 9.

Under separate cover I am sending a copy of the Georgia School Laws. The economic index used in our foundation program law may be found on pages 22 and 23 of the school laws. You will note that the State Board of Education has authority to change the factors and weights in the index. About three years ago the State Board of Education decided to eliminate the property digest from the economic index. This is being done over a period of five years reducing the weights given the property digest from 6 to 5 to 4, etc. In this way, this factor will be completely reduced in two more years. We are also now in the process of doing some research on the retail sales in Georgia with the idea of substituting the sales tax receipts for retail sales. At the time the foundation program law was passed, Georgia did not have a sales tax.

I think the economic index is better than the old method of using the property tax to determine the ability of local systems to support education. In this state we have such a wide variation in tax assessment policies, the economic index is only second best. Perhaps the best plan would be to use an adjusted tax assessment and sale price of property, in order to establish an adjusted digest uniformly throughout the state. Then we could use a seven mill or ten mills on the adjusted digest as a means of measuring the ability of local school systems.

Sincerely yours,

Claude Purcell, Asst. State  
Superintendent of Schools



C O P Y

U. S. DEPARTMENT OF COMMERCE

BUREAU OF THE CENSUS

WASHINGTON 25, D. C.

July 29, 1957

Mr. L. W. Westfall  
Superintendent  
Temple Public Schools  
Temple, Oklahoma

Dear Mr. Westfall:

This is in reply to your letter of July 9, 1957, concerning the availability of selected data for certain counties in Oklahoma which were withheld from our published reports.

The law under which the Bureau of the Census operates and the interpretations of that law by the General Counsel of the Commerce Department and by the Attorney General prohibit us from publishing or providing to other than sworn Census employees any information which might reveal the operations of an individual company or establishment. Thus, we are unable to furnish you with the information for those counties which was withheld from our published reports to avoid disclosure of individual operations.

Essentially all figures on value of manufacturing and mineral production which can be released by county are included in the Census final bulletins, MC-135 for the manufacturing census and MI-135 for the minerals census. We presume that you already have the manufacturing bulletin. The minerals bulletin will probably not be received from the printer until September of this year. For the minerals census covering the State of Oklahoma, unfortunately, value of mineral production by county will be particularly incomplete since operators of oil and gas field properties were not requested to report value of shipments by county, the operators considering this an undue burden. Only data on employment and crude petroleum produced were obtained by county.

There is enclosed a copy of the 1954 Census of Agriculture report, Series Ac54-2, for Oklahoma. This report will give you figures on value of farm products sold for each county in your state. If these figures are not adequate for your needs, please let us know.

Sincerely yours,

Edwin D. Goldfield, Chief  
Statistical Reports Division  
Bureau of the Census

C O P Y

GEORGIA STATE COLLEGE

FOR WOMEN

MILLEDGEVILLE, GEORGIA

September 19, 1957

Mr. L. W. Westfall, Superintendent  
Temple Public Schools  
Temple, Oklahoma

Dear Mr. Westfall:

I am intrigued by your letter of September 10 asking for my confirmation of your interpretation of my formula developed in my doctoral dissertation of 1950. Having explored, developed, pursued, tested, and rejected some scores of approaches to this knotty problem, I am sure that I shall always have a genuine interest in what others may do to advance knowledge on this front.

My first reaction is that you have very carefully and properly interpreted the approach to the use of coefficients of part determination as a method of developing weights for the selected economic factors. Your formulas and equations used in determining the coefficients are correct.

In answer to your last question, I concluded as you did that the beta coefficients would be the same whether in score form or in deviation form. I found it far more convenient to work with scores converted to percentages.

I think it is only fair to evaluate my own research in the light of developments since 1950. Dr. Herbert A. Meyer, now Director of the Statistics Laboratory at the University of Florida, was a keenly interested member of my doctoral committee. In fact, he was so interested that within a year he developed a superior formula to the one developed in my dissertation. With such a vast storehouse of electronic equipment to call on, he was in a peculiar position to experiment and proceed with his research. While I admitted that Dr. Meyer's technique was an improvement on mine, I still have the feeling that the results obtained by his method too often yielded weights that were rather volatile and tended to give one factor an unusually high weight.

From a very practical point of view, if I were asked to be a consultant on this problem today, I am convinced that the one method superior to any formula that depends on relative weights as I had developed is the one now being used by the State of West Virginia and no doubt some other states. As I understand it, the relative tax-paying ability of the various counties in West Virginia is determined by comparing assessed value of property with the sale value of representative property. Assuming that there is reasonable consistency in carrying out whatever assessing policy

exists in each individual county, one would come up with a ratio of assessment to sales for each particular county. This would enable the State to determine the corresponding equivalent real value for each County and hence, to produce an index of relative tax-paying ability. The main flaw in this procedure occurs in those counties with a significant element of government--owned property which is tax exempt.

I do not know whether this letter has been of any real help to you or not. I do admit that during the past three years I have not been at all close to any possible further improvements in this challenging problem. I do feel, however, that both Dr. Herbert A. Meyer of the University of Florida and Dr. R. L. Johns of the University of Florida have kept abreast and will be glad to confer with you.

With all good wishes,

Sincerely yours,

R. E. Lee

VITA

Waymon Lavern Westfall

Candidate for the Degree of

Doctor of Education

Thesis: AN INDEX OF TAXPAYING ABILITY FOR OKLAHOMA COUNTIES: A County Index of Taxpaying Ability Composed of Selected Economic Measures That May Be Used In Lieu of Assessed Property Valuations As A Basis For The Distribution of State Equalization Aid To The Public School Districts of Oklahoma

Major Field: Public School Administration

Biographical:

Personal Data: Born near Carney, Oklahoma, December 5, 1923, the son of Iva Almus and Stella Stephens Westfall.

Education: Attended rural grade schools in Perkins and Carney, Oklahoma; graduated from high school at Carney, Oklahoma in 1940; attended college, Oklahoma State University, 1941-43; entered U. S. Navy, 1944-45; re-entered Oklahoma State University, 1945; received the Bachelor of Science Degree from Oklahoma State University, with a major in Business Administration, in May, 1946; received the Master of Science Degree from Oklahoma State University, with a major in Business Education, in May, 1950; completed the requirements for the Degree of Doctor of Education in May, 1959.

Professional Experience: Taught at Tryon, Oklahoma, 1945-47; taught and served as Superintendent of the high school Carney, Oklahoma, 1947-50; served as Superintendent, Omega, Oklahoma, 1950-54; served as Superintendent of Temple Public Schools, 1954-58.